

video and voice communication, as the main information carriers, have been used more and more widely. The existing wireless video transmission system generally uses Bluetooth 2.0 or Wi-Fi technology as the main communication network. Both methods have their own shortcomings: the traditional Bluetooth 2.0 has a small communication range and a low rate; while Wi-Fi The safety of the technology is poor, and the safety design is relatively complicated in use. At the same time, the video compression technology adopted by the existing video transmission system has a single compression mode, low compression rate and poor video quality. This makes the existing video communication system have the following shortcomings: (1) Large transmission range and transmission rate cannot have both high security; (2) Poor compatibility; (3) Poor video quality ; (4) The video communication mode is single, and it is difficult to adapt to environments with different requirements for video quality.

48 Summary of the invention

49 The purpose of the present invention is to avoid the above-mentioned shortcomings in the prior art, and to provide a MPEG4 compressed video transmission communication system based on Bluetooth 3.0 specifications to quickly build a wireless and secure communication network in a variety of environments, especially harsh environments, Carry out fast real-time video and voice transmission, and adjust the image quality at any time as needed to transmit multiple forms of video modes to meet the needs of multiple communication forms for different image quality.

55 In order to achieve the above objective, the communication system of the present invention includes:

56 The Bluetooth control module is used to establish a wireless communication channel, which includes a control channel, a video channel, and an audio channel. The control channel is used to send or receive control commands in the Bluetooth 3.0 ad hoc network; the video channel is used in the Bluetooth 3.0 ad hoc network Send or receive encoded video data in the internal; audio channel is used to send or receive audio data in the Bluetooth 3.0 ad hoc network, and transmit the received commands and data to the ARM end processing control module;

62 The video acquisition module is used to collect on-site video information, convert the analog information of the video image into digital video data, and transmit the converted video data to the ARM end processing control module;

65 Audio collection and playback module, used to collect real-time audio data and play the received audio data, and transmit the collected real-time audio data to the ARM end processing control module;

67 Interface operation module, used to display video images and user graphical interface, use mouse or touch control to generate control commands, and transmit the control commands to the ARM end processing control module, the user graphical interface display content includes video display area, switch function mode button Area, switch video quality button area, call device selection area and current status display area;

71 The DSP end video codec module is used to perform MPEG4 codec on video data, and send the coded and decoded video data to the ARM end processing control module;

73 The ARM processing control module is used to receive and process control commands from the interface operation module and Bluetooth control module, video data from the video acquisition module, audio data from the audio acquisition and playback module, and video data and audio from the Bluetooth control module Data and video data from the DSP video codec module;

77 The external storage module contains a file system with a log structure for storing the control program, operating system, control command and encoded video data of the system.

79 The control method of the MPEG4 compressed video transmission communication system based on the

Bluetooth 3.0 specification of the present invention includes an initiator control method and a receiver control method, wherein:

82 A. The initiator control method includes the following steps:

83 A1) Display user graphical interface;

84 A2) Select the device that needs to communicate, and send a connection request to the selected device;

85 A3) Determine whether to establish a communication channel between the master and slave devices according to whether the selected device accepts the connection request, if yes, the communication connection is established, otherwise, reselect the device that needs to communicate and send the connection request;

88 A4) Select the function mode, send the selected mode information to the connected slave device, and determine the channel according to the selected function mode:

90 In the remote recording and wireless monitoring mode, open the video channel and perform step A9);

91 In the intercom mode, open the audio channel and perform step A5);

92 In the video call mode, open the video channel and audio channel at the same time, and perform step A5) and step A9) in parallel;

94 A5) Start collecting audio data;

95 A6) Send the collected audio data to the slave device;

96 A7) Receive audio data packets sent from the device;

97 A8) Play the audio data in the received audio data packet, jump to step A13), and perform steps A5) ~ A8) in a loop until the user switches the function mode or the session ends;

99 A9) Receive the encoded video data packet sent from the device, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, if so, store the video data to the external storage module, otherwise not store it;

102 A10) Decoding the video data extracted from the data packet;

103 A11) Display the decoded video data in the video display area of the interface operation module, enter step A12), and perform steps A9) ~ A11) in a loop until the user switches the function mode or the session ends;

106 A12) Determine whether to adjust the video quality mode according to the user's selection, if yes, send the new mode information to the slave device, and return to step A9), otherwise go to step A13);

108 A13) Determine whether to adjust the function mode according to the user's choice, if yes, return to step A4), otherwise go to step A14);

110 A14) Decide whether to end the session according to the user's choice, if yes, send an end command to the slave device, the session ends, otherwise continue the session.

112 B. The receiving end control method includes the following steps:

113 B1) Display user graphical interface;

114 B2) Decide whether to respond to the connection request from the master device according to the user's choice, if it responds, establish the communication channel of the master and slave device, and proceed to step B3), otherwise continue to wait for a new connection request;

117 B3) Receive the mode information from the master device, and determine the communication steps according to the mode information:

119 For remote recording and wireless monitoring mode, perform step B8);

120 For intercom mode, perform step B4);

121 For the video call mode, step B4) and step B8) are executed in parallel;

122 B4) Start collecting audio data;
123 B5) Send the collected audio data;
124 B6) Receive audio data packets sent via Bluetooth;
125 B7) Play the received audio data, skip to step B3), and perform steps B4) ~ B7) in a loop until new function mode information is received or the session ends;
127 B8) Collect raw video data;
128 B9) Display the original video data in the video display area of the interface operation module;
129 B10) Perform MPEG4 encoding on the original video data;
130 B11) Send the encoded video data to the main device, enter step B12), and perform steps B8) ~ B11) in a loop until new function mode information is received or the session ends;
132 B12) Determine whether to adjust the video quality mode according to whether the new video quality information is received, if so, determine the MPEG4 encoding parameters according to the new video quality information, and return to step B8), otherwise go to step B13);
135 B13) Determine whether to adjust the function mode according to whether the new function mode information is received, if yes, go back to step B3), otherwise go to step B14);
137 B14) Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise continue the session.
139 The present invention has the following advantages:

1.

143 The Bluetooth 3.0 self-organizing network is adopted in the present invention, which has larger network coverage, faster transmission rate and higher security.

2.

148 The invention adopts MPEG4 video coding and decoding technology, which has higher definition under the same compression rate, and saves storage space. When there are errors or packet loss in network transmission, MPEG4 is less affected and can be quickly restore.

3.

154 The present invention designs 4 function modes and 3 video quality modes, optimizes the fluency and image quality of video display in different environments, and satisfies various complex environments.

4.

159 The present invention uses the status prompt window of the user graphic interface to display the information status of the current mode, including the current function mode status, current video quality status, communication slave device number, current video and audio transmission rate and codec frame rate, which can clearly indicate the system The connection between the user and other terminals in the wireless network enables users of the system to intuitively understand the entire wireless network environment, which is

beneficial for users to make reasonable functional choices according to their needs.

5.

168 The invention not only realizes the video conversation in the wireless network, but also can selectively save the video data, which is convenient for repeated viewing.

6.

173 Because the external storage module of the present invention includes a file system with a log structure, it ensures that data will not be lost when the power is accidentally lost.

175 Description of the drawings

176 Figure 1 is a diagram of the connection mode provided by the existing Bluetooth system;

177 Figure 2 is a schematic diagram of the system structure of the present invention;

178 Fig. 3 is a schematic diagram of the layout of the user graphical interface of the present invention;

179 Figure 4 is a block diagram of the MPEG4 video encoder used in the present invention;

180 Fig. 5 is a control flow chart of the video transmission communication by the session initiating terminal of the present invention;

182 Fig. 6 is a control flow chart of the video transmission communication by the session receiving end of the present invention.

184 detailed description

185 The present invention utilizes the connection mode provided by the existing Bluetooth 3.0 system, as shown in Fig. 1, to realize a fast and safe self-organizing local area network.

187 Figure 1a is a point-to-point connection; Figure 1b is a microgrid composed of a point-to-multipoint connection, where one unit serves as the microgrid master unit and the other is a microgrid slave unit; Figure 1c is a microgrid composed of multiple overlapping microgrids A scattered net.

190 Referring to Figure 2, the double arrow in the figure is the data line, and the single arrow is the control line. The communication system of the present invention mainly consists of a video acquisition module 101, a DSP end video codec module 102, an audio acquisition and playback module 103, and an ARM end processing control module 104, an external storage module 105, an interface operation module 106, a Bluetooth control module 107 and a Bluetooth antenna 108 are composed.

195 among them:

196 The video capture module 101 can use a common camera or a digital camera. This example uses but is not limited to a common CCD camera and a hardware A/D converter. The hardware A/D conversion device uses TI' s video decoder chip TVP5146 to complete the simulation Video data to digital video data conversion, the chip allows 10 channels of analog video input, with 4 channels of 10bit A/D converter, field synchronization signal, line synchronization signal, odd and even field signal, clock output signal are directly led out by the pin, saving The design of the synchronous clock circuit is gone.

202 The DSP-side video codec module 102 and the ARM-side processing control module 104 are implemented using but not limited to TI' s embedded ARM and DSP dual-core structure embedded development platform, which is similar to other structural solutions that use a single processor to implement application functions. Compared with, this kind of scheme has an obvious advantage, namely can improve the power

and efficiency, and extend the user's battery life.

207 This is because the DSP chip is specially designed and customized for processing real-time video signals. The use of two processors can reasonably divide the total workload, thereby reducing clock operating frequency, reducing power consumption, and further reducing system costs.

210 The audio collection and playback module 103 is composed of a common headset.

211 The external storage module 105 adopts any kind of flash chip. In this example, a 64M flash chip is used and the linux operating system is adopted. In order for the flash chip to have the storage function, a linux root file system must be established. The root file system Cramfs, JFFS2, RAM disk and Ext2 can be used.

214 The example of the present invention adopts the JFFS2 root file system.

215 The interface operation module 106 adopts any ordinary resistive or capacitive display screen, and only needs a corresponding driver. In this example, a 4-wire resistive touch screen is adopted, and a 3.5-inch TFT true color LCD screen is adopted.

218 3, the user graphic interface of the interface operation module 106 of this example is divided into a video display area 109, a switch function mode button area 110, a switch video quality button area 111, a call device selection area 112, and a current status display area 113. In this example, The user can browse the stored video files, choose to open, and select the file to be played. The video content will be displayed in the video display area 109 in the middle of the interface.

223 The Bluetooth control module 107 adopts any adapter that conforms to the Bluetooth 3.0 specification. In this example, a Bluetooth 3.0 USB adapter is used.

225 The Bluetooth antenna 108 uses an external SMA antenna.

226 The connection relationship of the above modules is as follows:

227 The video acquisition module 101 is connected to the ARM end processing control module 104, the ARM end processing control module 104 receives the original video data collected by the video acquisition module 101; the DSP end video codec module 102 is connected to the ARM end processing control module 104, and the DSP end video encoding The decoding module 102 encodes and decodes the video data transmitted from the ARM end processing control module 104, and sends the encoded and decoded video data back to the ARM end processing control module 104; the audio capture and playback module 103 is connected to the ARM end processing control module 104, The ARM processing control module 104 receives the audio data collected by the audio acquisition and playback module 103, and transmits the audio data to be played to the audio acquisition and playback module 103 for playback; the external storage module 105 is connected to the ARM processing control module 104, and the ARM processing controls The module 104 runs the control program and operating system of the system stored in the external storage module 105. The external storage module 105 stores the video data that the ARM processing control module 104 needs to save; the interface operation module 106 is connected to the ARM processing control module 104, and the interface The operation module 106 displays the user graphic interface and the video data that needs to be displayed received by the ARM end processing control module 104, the ARM end processing control module 104 processes the control commands generated by the interface operation module 106; the Bluetooth control module 107 and the ARM end processing control module 104 Connected, the ARM processing control module 104 sends the received audio data and encoded video data to the Bluetooth control module 107, while the Bluetooth control module 107 receives the encoded video data to the ARM processing control module 104 for processing; Bluetooth antenna 108 Connect with the Bluetooth control module 107.

247 The above-mentioned modules can be integrated on a PCB circuit board, and the interface operation module

106 is placed on other modules to achieve the miniaturization of the present invention.

249 Referring to Figure 5, the initiating end control method of the MPEG4 compressed video transmission communication based on the Bluetooth 3.0 specification of the present invention includes the following steps:

252 Step 1. Display the user graphic interface. The user graphic interface is divided into video display area, function mode button area, video quality button area, call device selection area, and current status display area. The user can browse the stored video files and choose to open. Just select the file you want to play, and the video content will be displayed in the video display area in the middle of the interface.

256 Step 2. The user selects the device that needs to communicate on the graphical interface, clicks the initiate connection button, and sends a connection request to the selected device.

258 Step 3: Wait for the selected device to respond, and determine whether to establish a communication channel between the master and slave devices according to whether the device accepts the connection request.

260 After the communication device receives the connection request sent by the system, its user graphical interface will prompt a message dialog box. The content of the message dialog box includes: the name of the device requesting the connection, the accept button and the reject button. The user clicks the accept button to accept the connection, the communication connection is established, otherwise click the reject button, after the user selects, the selected information will be fed back to the connection requester.

265 The system receives the feedback information of the communication device, and if the connection is accepted, the communication channel between the master and the slave device is established. The connection initiator is the communication master device and the connection acceptor is the communication slave device. If the connection is rejected, a new communication device is selected and the connection is initiated again.

269 Step 4. After the communication connection is established, the user clicks the button in the function mode area to select the function mode.

271 The functional modes of the present invention include: remote recording, wireless monitoring, intercom mode, and video call. In the remote recording mode, the system stores the video data sent from the device by default. In other modes, the user chooses whether to save the sent Video data, after selection, the system sends the selected mode information to the connected slave device, and determines the steps according to the selected function mode:

276 4a) In the remote recording and wireless monitoring mode, open the video channel and go to step 9;

277 4b) In the intercom mode, open the audio channel and perform step 5;

278 4c) In the video call mode, open the video channel and audio channel at the same time, and perform step 5 and step 9 in parallel.

280 Step 5. Collect live audio data through the microphone.

281 Step 6. Pack the collected audio data and send it to the slave device through the Bluetooth control module.

282 Step 7, receiving the audio data packet sent from the device, and extracting the audio data in the audio data packet.

284 Step 8. Play the extracted audio data through the earphone, skip to step 13, and execute steps 5 to 8 in a loop until the user switches the function mode or the session ends.

286 Step 9. Receive the MPEG4-encoded video data packet sent from the device through the Bluetooth control module, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, and if so, store the video data to the external storage Module, otherwise it will not be stored;

289 Step 10: Perform MPEG4 decoding on the video data extracted from the data packet.

290 Step 11: Display the decoded video data in the video display area of the interface operation module, proceed to step 12, and execute steps 9-11 in a loop until the user switches the function mode or the session ends.

292 Step 12. The user clicks the button in the video quality button area to adjust the video quality mode.

293 According to the wireless network environment, the video quality mode in the user graphic interface of the present invention respectively names three modes: high-definition MJPEG image, real-time clear video, and real-time ordinary video. Each video mode encapsulates different video parameters to adapt to different network environments. When transmitting high-definition MJPEG images, the frame rate is 3fp/s and the image resolution is 1024x768. The image lacks real-time performance, but the image is clear, which can meet the needs of users for scene details in the case of poor network communication; real-time clear video, frame rate is 25fp/s, the image resolution is 720x480, and clearer video sessions can be carried out smoothly when the network is running well; real-time ordinary video, the frame rate is 25fp/s, and the image resolution is 352x288, which can run more on the network. Poor guarantees that the video session can proceed smoothly.

303 If the user selects one of the three video quality modes, and it is different from the current video quality mode, then send the selected mode information to the slave device and return to step 9; otherwise, go to step 13.

305 Step 13. During the communication process, the user switches the function mode at any time as needed. If the user selects a mode different from the existing function mode, return to step 4, otherwise, go to step 14.

307 Step 14. The user clicks the disconnect button on the interface operation module to end the session. If the user ends the session, an end command is sent to the slave device, and the session ends, otherwise the session continues.

310 Referring to Fig. 6, the receiving end control method of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification of the present invention includes the following steps:

312 Step A: Display the user graphic interface. The user graphic interface is divided into video display area, function mode button area, video quality button area, call device selection area and current status display area. The user can browse the stored video files and choose to open. Just select the file you want to play, and the video content will be displayed in the video display area in the middle of the interface.

316 Step B: Waiting for the connection request of other devices. After the system receives the connection request sent by other devices, its user graphical interface will prompt a message dialog box. The content of the message dialog box includes: the name of the device requesting connection, an accept button, and Reject button, the user accepts the connection and clicks the accept button to establish a communication channel between the master and slave devices. The connection initiator is the communication master device and the connection recipient is the communication slave device. If the user rejects the connection, click the reject button. After the user chooses, The selected information will be fed back to the connection requester.

323 If the communication connection is established, go to step C, otherwise continue to wait for a new connection request.

325 Step C: Receive mode information from the main device, the mode information includes: function mode and video quality mode, where:

327 Function modes include: remote recording, wireless monitoring, intercom mode and video call;

328 Video quality modes include: high-definition MJPEG image, real-time clear video, real-time ordinary video 3 modes. Each video mode encapsulates different video coding parameters to adapt to different network environments. When transmitting high-definition MJPEG images, the frame rate is 3fp/s and the image resolution is 1024x768. The image lacks real-time performance, but the image is clear, which can meet the

needs of users for scene details in the case of poor network communication; real-time clear video, frame The rate is 25fp/s, the image resolution is 720x480, and clearer video sessions can be carried out smoothly when the network is running well; real-time ordinary video, the frame rate is 25fp/s, and the image resolution is 352x288, which can run more on the network Poor guarantees that the video session can proceed smoothly.

336 Determine the communication steps according to the received mode information:

337 C1) For remote recording and wireless monitoring mode, perform step H;

338 C2) For the intercom mode, perform step D;

339 C3) For the video call mode, step D and step H are performed in parallel.

340 Step D: Collect live audio data through a microphone.

341 Step E: Pack the collected audio data and send it to the slave device through the Bluetooth control module.

342 Step F: Receive the audio data packet sent from the device, and extract the audio data in the audio data packet.

344 Step G: Play the received audio data through the earphone, jump to step M, and execute steps D to G in a loop until new function mode information is received or the session ends.

346 Step H: Collect original live video frequency information from an ordinary CCD camera, and convert it into digital original video data through a hardware A/D converter.

348 Step I: Display the original video data in the video display area of the interface operation module.

349 Step J: Perform MPEG4 encoding on the original video data.

350 The present invention uses MPEG4 as the video coding and decoding algorithm, and MPEG4 is superior to other compression/decompression schemes in three aspects. First of all, since it was developed as an international standard at the beginning, it has good compatibility; secondly, MPEG4 can provide a better compression ratio than other algorithms, up to 200:1, and more importantly Yes, while MPEG4 provides a high compression ratio, the loss of data is small.

355 Figure 4 shows the specific implementation block diagram of the MPEG4 video encoder. The encoding process is: read a frame of data, take a macro block, select the encoding type according to the encoding control, whether it is intra encoding intra or inter encoding inter, if It is an I frame, all macroblocks are intra-frame coded intra, the read macroblock data directly enters the discrete cosine transform DCT, quantization Q, DC coefficients and AC coefficients DC/AC prediction, run-length coding RLC and combined with other information to form Code stream; if it is a P frame, perform motion estimation ME first, and then determine whether it is intra-frame encoding intra or inter-frame encoding inter, if intra-frame encoding intra, directly use the macro block itself to perform a series of data such as discrete cosine transform DCT Processing, if it is inter-frame coding inter, the motion vector MV obtained by the motion estimation ME is sent to the motion compensation MC unit, and the reconstructed frame data of the previous frame in the frame buffer is combined with the pixel value of the current macroblock to do the calculation, and get The residual data, then, the residual value is subjected to discrete cosine transform DCT, quantization Q, DC coefficient and AC coefficient DC/AC prediction, run-length coding RLC and combined with other information to form a code stream, that is, the coded video data.

369 Step K: Send the encoded video data to the main device, enter step L, and execute steps H to K in a loop until new function mode information is received or the session ends.

371 Step L: Determine whether to adjust the video quality mode according to whether the new video quality information is received, if yes, determine the MPEG4 coding parameters according to the new video quality information, and return to step H; otherwise, go to step M.

- 374 Step M: Determine whether to adjust the function mode according to whether the new function mode information is received. If yes, return to step C to communicate in the new function mode; otherwise, go to step N.
- 377 Step N: Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise the session continues.
- 379 The above embodiment is only a specific embodiment of the present invention, and is not used to limit the scope of implementation of the present invention, that is, all equivalent changes and modifications made in accordance with the content of the present invention, or those of ordinary skill in the art can learn from the disclosure of the present invention. All deformations obtained directly or imagined should be considered as the protection scope of the present invention.



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CLAIMS CN102088593A

1.

¹³ An MPEG4 compressed video transmission communication system based on the Bluetooth 3.0 specification, including: a Bluetooth control module (107), used to establish a wireless communication channel, the channel includes a control channel, a video channel and an audio channel, the control channel is used in the Bluetooth 3.0 automatic Send or receive control commands in the group network; the video channel is used to send or receive encoded video data in the Bluetooth 3.0 ad hoc network; the audio channel is used to send or receive audio data in the Bluetooth 3.0 ad hoc network, and will receive The commands and data are transmitted to the ARM end processing control module; the video acquisition module (101) is used to collect on-site video information, convert the analog information of the video image into digital video data, and transmit the converted video data to ARM processing control module; audio acquisition and playback module (103), used to collect real-time audio data and play the received audio data, and transmit the collected real-time audio data to the ARM processing control module; interface operation module (106), used For displaying video images and user graphical interfaces, mouse or touch control is used to generate control commands, and the control commands are transmitted to the ARM processing control module. The user graphical interface display content includes the video display area (109), the switch function mode button area (110), switch the video quality button area (111), call device selection area (112) and current status display area (113); DSP end video codec module (102), used to encode and decode video data with MPEG4, The decoded video data is sent to the ARM processing control module; the ARM processing control module (104) is used to receive and process control commands from the interface operation module and Bluetooth control module, video data from the video acquisition module, and audio Collect the audio data of the playback module, the video data and audio data from the Bluetooth control module, and the video data from the DSP video codec module; the external storage module (105) contains a file system with a log structure for storing the system' s data Control program, operating system, control command and encoded video data.

2.

38 The video transmission communication system according to claim 1, characterized in that the Bluetooth control module (107) adopts the Bluetooth 3.0 standard to send and receive data in the self-organizing network.

3.

44 The video transmission communication system according to claim 1, characterized in that the switch function mode button area (110) includes remote recording, video call, intercom mode, wireless monitoring mode, and buttons for opening stored video files .

4.

50 The video transmission communication system according to claim 1, characterized in that the switch video quality button area (111) includes high-definition MJPEG images, real-time clear video, real-time normal video, and a button for initiating a session and an exit button.

5.

56 A method for controlling the initiator of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification, including the following steps: 1) Display a user graphical interface; 2) Select the device that needs to communicate, and send a connection request to the selected device; 3) According to Whether the selected device accepts the connection request to determine whether to establish a communication channel between the master and slave devices, if yes, the communication connection is established, otherwise, reselect the device that needs to communicate and send the connection request; 4) Select the function mode to send the connected slave device Send the selected mode information, and determine the channel according to the selected function mode: In the remote recording and wireless monitoring mode, open the video channel and go to step 9); In the intercom mode, open the audio channel and go to step 5); In the video call mode, open the video channel and audio channel at the same time, and perform steps 5) and 9) in parallel; 5) Start collecting audio data; 6) Send the collected audio data to the slave device; 7) Receive the data sent from the slave device 8) Play the audio data in the received audio data packet, skip to step 13), and repeat steps 5) ~ 8) at the same time, until the user switches the function mode or the session ends; 9) Receive slave device The encoded video data packet sent over, extract the video data in the data packet, and decide whether to store the video data according to the user's choice, if it is, store the video data to the external storage module, otherwise it will not be stored; 10) For slave data The video data extracted from the package is decoded; 11) The decoded video data is displayed in the video display area of the interface operation module, and then enters step 12), and at the same time, steps 9) to 11) are executed in a loop until the user switches the function mode or End of the session; 12) Determine whether to adjust the video quality mode according to the user's choice, if yes, send the new mode information to the slave device, and return to step 9), otherwise go to step 13); 13) Determine whether to adjust the function according to the user's choice Mode, if yes, return to step 4), otherwise, proceed to step 14); 14) Determine whether to end the session according to the user's choice, if yes, send an end command to the slave device, the session ends, otherwise continue the session;

6.

83 A receiving end control method of MPEG4 compressed video transmission communication based on Bluetooth 3.0 specification, including the following steps: (1) Display a user graphical interface; (2) Determine whether to respond to the connection request from the main device according to the user's choice, and if it responds Establish the communication channel of the master and slave device, go to step (3), otherwise continue to wait for a new connection request; (3) Receive the mode information from the master device, and determine the communication steps according to the mode information: For remote recording and wireless monitoring mode, execute Step (8); For intercom mode, perform step (4); For visual call mode, perform step (4) and step (8) in parallel; (4) Start collecting audio data; (5) Send the collected audio Data; (6) Receive audio data packets sent via Bluetooth; (7) Play the received audio data, jump to step (13), and perform steps (4) ~ (7) in a loop until a new one is received Function mode information or end of the session; (8) Collect original video data; (9) Display the original video data in the video display area of the interface operation module; (10) Perform MPEG4 encoding on the original video data; (11) Sending process Give the encoded video data to the main device, go to step (12), and perform steps (8) to (11) in a loop until the new function mode information is received or the session ends; (12) According to whether new video quality information is received Determine whether to adjust the video quality mode, if so, determine the MPEG4 encoding parameters according to the new video quality information, and return to step (8), otherwise go to step (13); (13) Determine whether to adjust according to whether the new function mode information is received In functional mode, if yes, return to step (3), otherwise go to step (14); (14) Determine whether to end the session according to whether an end command is received, if yes, the session ends, otherwise continue the session.



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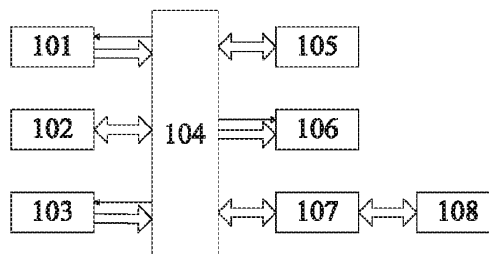
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(54) 发明名称

基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统及方法

(57) 摘要

本发明公开了一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,主要解决现有视频传系统通信流畅度低和功能模式单一的问题。该通信系统包括视蓝牙控制模块、视频采集模块、音频采集播放模块、ARM 端处理控制模块、DSP 端视频编解码模块、界面操作模块和外部存储模块;ARM 端处理控制模块接收音频采集播放模块和视频采集模块采集的音视频数据,DSP 端视频编解码模块对 ARM 端处理控制模块发送的数据进行编解码并将编码后的视频数据存储于外部存储模块,将需要传送的数据通过蓝牙控制模块发送或接收,通过界面操作模块显示视频数据和用户图形界面。本发明功能模式多,适应多种不同的环境,可用于中短距离的自组网络视频语音传输。



1. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,包括:

蓝牙控制模块 (107),用于建立无线通信信道,该信道包括控制信道、视频信道和音频信道,控制信道用于在蓝牙 3.0 自组网络内发送或接收控制命令;视频信道用于在蓝牙 3.0 自组网络内发送或接收编码后的视频数据;音频信道用于在蓝牙 3.0 自组网络内发送或接收音频数据,并将接收到的命令和数据传送给 ARM 端处理控制模块;

视频采集模块 (101),用于采集现场的视频信息,将视频图像的模拟信息转化为数字形式的视频数据,并将转化后的视频数据传输给 ARM 端处理控制模块;

音频采集播放模块 (103),用于采集实时音频数据和播放接收到的音频数据,并将采集实时音频数据传输给 ARM 端处理控制模块;

界面操作模块 (106),用于显示视频图像和用户图形界面,利用鼠标或触摸控制来产生控制命令,并将控制命令传输给 ARM 端处理控制模块,用户图形界面显示内容包括视频显示区域 (109)、切换功能模式按钮区域 (110)、切换视频质量按钮区域 (111)、通话设备选择区域 (112) 和当前状态显示区域 (113);

DSP 端视频编解码模块 (102),用于对视频数据进行 MPEG4 编解码,将编解码后的视频数据送到 ARM 端处理控制模块;

ARM 端处理控制模块 (104),用于接收和处理来自于界面操作模块和蓝牙控制模块的控制命令、来自视频采集模块的视频数据、来自音频采集播放模块的音频数据、来自蓝牙控制模块的视频数据和音频数据和来自 DSP 端视频编解码模块的视频数据;

外部存储模块 (105),包含有日志结构的文件系统,用于存储本系统的控制程序、操作系统、控制命令和编码后的视频数据。

2. 根据权利要求 1 所述的视频传输通信系统,其特征在于蓝牙控制模块 (107),采用蓝牙 3.0 标准进行自组网络内的收发数据。

3. 根据权利要求 1 所述的视频传输通信系统,其特征在于所述的切换功能模式按钮区域 (110),包括远程录像、可视通话、对讲模式、无线监控模式以及打开已经存储视频文件的按钮。

4. 根据权利要求 1 所述的视频传输通信系统,其特征在于所述的切换视频质量按钮区域 (111),包括高清 MJPEG 图像、实时清晰视频、实时普通视频以及发起会话按钮、退出按钮。

5. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的发起端控制方法,包括如下步骤:

1) 显示用户图形界面;

2) 选择需要通信的设备,并向所选的设备发送连接请求;

3) 根据所选设备是否接受连接请求来决定是否建立起主从设备间的通信信道,如果是则通信连接建立,否则重新选择需要通信的设备发送连接请求;

4) 选择功能模式,向已经连接的从设备发送所选择的模式信息,并根据所选功能模式确定信道;

在远程录像和无线监控模式下,开通视频信道,执行步骤 9);

在对讲模式下,开通音频信道执行步骤 5);

在可视通话模式下,同时开通视频信道和音频信道,并行的执行步骤 5) 和步骤 9);

- 5) 开始采集音频数据；
 - 6) 发送采集到的音频数据给从设备；
 - 7) 接收从设备发送过来的音频数据包；
 - 8) 播放接收到的音频数据包中的音频数据,跳转到步骤 13),同时循环执行步骤 5) ~ 8),直到用户切换功能模式或会话结束；
 - 9) 接收从设备发送过来的经过编码的视频数据包,提取数据包中的视频数据,根据用户的选择决定是否存储该视频数据,如果是则存储该视频数据到外部存储模块,否则不存储；
 - 10) 对从数据包中提取出的视频数据进行解码；
 - 11) 将解码后的视频数据显示在界面操作模块的视频显示区域,进入到步骤 12),同时循环执行步骤 9) ~ 11),直到用户切换功能模式或会话结束；
 - 12) 根据用户的选择确定是否调整视频质量模式,如果是则发送新的模式信息给从设备,返回到步骤 9),否则进入步骤 13)；
 - 13) 根据用户的选择确定是否调整功能模式,如果是则返回到步骤 4),否则进入步骤 14)；
 - 14) 根据用户选择决定是否结束会话,如果是则发送结束命令给从设备,会话结束,否则继续会话；
6. 一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的接收端控制方法,包括如下步骤：
- (1) 显示用户图形界面；
 - (2) 根据用户的选择决定是否响应来自主设备的连接请求,如果响应则建立起主从设备的通信信道,进入步骤 (3),否则继续等待新的连接请求；
 - (3) 接收来自主设备的模式信息,根据模式信息确定通信步骤；
对于远程录像和无线监控模式,执行步骤 (8)；
对于对讲模式,执行步骤 (4)；
对于可视通话模式,并行执行步骤 (4) 和步骤 (8)；
 - (4) 开始采集音频数据；
 - (5) 发送采集到的音频数据；
 - (6) 接收通过蓝牙发送过来的音频数据包；
 - (7) 播放接收到的音频数据,跳转到步骤 (13),同时循环执行步骤 (4) ~ (7),直到接收到新的功能模式信息或会话结束；
 - (8) 采集原始视频数据；
 - (9) 将原始的视频数据显示在界面操作模块的视频显示区域；
 - (10) 对原始的视频数据进行 MPEG4 编码；
 - (11) 发送经过编码的视频数据给主设备,进入步骤 (12),同时循环执行步骤 (8) ~ (11),直到接收到新的功能模式信息或会话结束；
 - (12) 根据是否接收到新的视频质量信息确定是否调整视频质量模式,如果是则根据新的视频质量信息确定 MPEG4 的编码参数,返回步骤 (8),否则进入步骤 (13)；
 - (13) 根据是否接收到新的功能模式信息确定是否调整功能模式,如果是则返回步骤

(3), 否则进入步骤 (14) ;

(14) 根据是否接收到结束命令确定是否结束会话, 如果是则会话结束, 否则继续会话。

基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统及方法

技术领域

[0001] 本发明属于无线通信技术领域,涉及视频压缩技术和实时视频和语音的传输,尤其涉及利用蓝牙 3.0 无线传输技术的视频传输通信系统,可用于中短距离的自组网络视频语音传输。

背景技术

[0002] 2009 年 4 月 21 日,蓝牙技术联盟正式颁布了蓝牙核心规范 3.0 版,作为新一代的蓝牙技术标准规范。蓝牙 3.0 的核心是一种全新的交替射频技术 AMP,它允许蓝牙协议栈针对任何一个任务动态地选择正确的射频。蓝牙 3.0 具有传输速度高的优点,通过集成“802.11PAL”协议适应层,使蓝牙 3.0 可在需要的时候调用 802.11Wi-Fi 实现高速数据传输,其数据传输率可提高到 24Mbps,是蓝牙 2.0 的八倍。

[0003] 近年来,无线信息通信已经成为人们生活中必不可少的部分,而视频和语音通信作为主要的信息载体,得到了越来越广泛的应用。现有的无线视频传输系统一般采用蓝牙 2.0 或 Wi-Fi 技术作为主要的通信网络,这两种方式都有各自的缺陷:传统的蓝牙 2.0 的通信范围较小,速率较低;而 Wi-Fi 技术的安全性较差,安全设计在使用上相对繁复。同时,现有的视频传输系统采用的视频压缩技术压缩模式单一,压缩率低,视频质量较差。这使得现有的视频通信系统具有以下缺陷:(1) 较大的传输范围和传输速率与较高的安全性两者不能兼得;(2) 兼容性较差;(3) 视频质量较差;(4) 视频通信模式单一,很难适应对于视频质量要求各异的环境。

发明内容

[0004] 本发明的目的在于避免上述已有技术上的不足,提供一种基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统,以在多种环境尤其是恶劣的环境下,快速的组建无线安全的通信网络,进行快速实时视频和语音的传输,并根据需要随时对图像质量进行调整,以传送多种形式的视频模式,满足多种通信形式对不同图像质量的需要。

[0005] 为实现上述目的,本发明的通信系统包括:

[0006] 蓝牙控制模块,用于建立无线通信信道,该信道包括控制信道、视频信道和 音频信道,控制信道用于在蓝牙 3.0 自组网络内发送或接收控制命令;视频信道用于在蓝牙 3.0 自组网络内发送或接收编码后的视频数据;音频信道用于在蓝牙 3.0 自组网络内发送或接收音频数据,并将接收到的命令和数据传送给 ARM 端处理控制模块;

[0007] 视频采集模块,用于采集现场的视频信息,将视频图像的模拟信息转化为数字形式的视频数据,并将转化后的视频数据传输给 ARM 端处理控制模块;

[0008] 音频采集播放模块,用于采集实时音频数据和播放接收到的音频数据,并将采集实时音频数据传输给 ARM 端处理控制模块;

[0009] 界面操作模块,用于显示视频图像和用户图形界面,利用鼠标或触摸控制来产生控制命令,并将控制命令传输给 ARM 端处理控制模块,用户图形界面显示内容包括视频显

示区域、切换功能模式按钮区域、切换视频质量按钮区域、通话设备选择区域和当前状态显示区域；

[0010] DSP 端视频编解码模块,用于对视频数据进行 MPEG4 编解码,将编解码后的视频数据送到 ARM 端处理控制模块；

[0011] ARM 端处理控制模块,用于接收和处理来自于界面操作模块和蓝牙控制模块的控制命令、来自视频采集模块的视频数据、来自音频采集播放模块的音频数据、来自蓝牙控制模块的视频数据和音频数据和来自 DSP 端视频编解码模块的视频数据；

[0012] 外部存储模块,包含有日志结构的文件系统,用于存储本系统的控制程序、操作系统、控制命令和编码后的视频数据。

[0013] 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信系统的控制方法,包括发起端控制方法和接收端控制方法,其中：

[0014] A. 发起端控制方法包括以下步骤：

[0015] A1) 显示用户图形界面；

[0016] A2) 选择需要通信的设备,并向所选的设备发送连接请求；

[0017] A3) 根据所选设备是否接受连接请求来决定是否建立起主从设备间的通信信道,如果是则通信连接建立,否则重新选择需要通信的设备发送连接请求；

[0018] A4) 选择功能模式,向已经连接的从设备发送所选择的模式信息,并根据所选功能模式确定信道；

[0019] 在远程录像和无线监控模式下,开通视频信道,执行步骤 A9)；

[0020] 在对讲模式下,开通音频信道执行步骤 A5)；

[0021] 在可视通话模式下,同时开通视频信道和音频信道,并行的执行步骤 A5) 和步骤 A9)；

[0022] A5) 开始采集音频数据；

[0023] A6) 发送采集到的音频数据给从设备；

[0024] A7) 接收从设备发送过来的音频数据包；

[0025] A8) 播放接收到的音频数据包中的音频数据,跳转到步骤 A13),同时循环执行步骤 A5) ~ A8),直到用户切换功能模式或会话结束；

[0026] A9) 接收从设备发送过来的经过编码的视频数据包,提取数据包中的视频数据,根据用户的选择决定是否存储该视频数据,如果是则存储该视频数据到外部存储模块,否则不存储；

[0027] A10) 对从数据包中提取出的视频数据进行解码；

[0028] A11) 将解码后的视频数据显示在界面操作模块的视频显示区域,进入到步骤 A12),同时循环执行步骤 A9) ~ A11),直到用户切换功能模式或会话结束；

[0029] A12) 根据用户的选择确定是否调整视频质量模式,如果是则发送新的模式信息给从设备,返回到步骤 A9),否则进入步骤 A13)；

[0030] A13) 根据用户的选择确定是否调整功能模式,如果是则返回到步骤 A4),否则进入步骤 A14)；

[0031] A14) 根据用户选择决定是否结束会话,如果是则发送结束命令给从设备,会话结束,否则继续会话。

- [0032] B. 接收端控制方法包括以下步骤：
- [0033] B1) 显示用户图形界面；
- [0034] B2) 根据用户的选择决定是否响应来自主设备的连接请求，如果响应则建立起主从设备的通信信道，进入步骤 B3)，否则继续等待新的连接请求；
- [0035] B3) 接收来自主设备的模式信息，根据模式信息确定通信步骤；
- [0036] 对于远程录像和无线监控模式，执行步骤 B8)；
- [0037] 对于对讲模式，执行步骤 B4)；
- [0038] 对于可视通话模式，并行执行步骤 B4) 和步骤 B8)；
- [0039] B4) 开始采集音频数据；
- [0040] B5) 发送采集到的音频数据；
- [0041] B6) 接收通过蓝牙发送过来的音频数据包；
- [0042] B7) 播放接收到的音频数据，跳转到步骤 B3)，同时循环执行步骤 B4) ~ B7)，直到接收到新的功能模式信息或会话结束；
- [0043] B8) 采集原始视频数据；
- [0044] B9) 将原始的视频数据显示在界面操作模块的视频显示区域；
- [0045] B10) 对原始的视频数据进行 MPEG4 编码；
- [0046] B11) 发送经过编码的视频数据给主设备，进入步骤 B12)，同时循环执行步骤 B8) ~ B11)，直到接收到新的功能模式信息或会话结束；
- [0047] B12) 根据是否接收到新的视频质量信息确定是否调整视频质量模式，如果是则根据新的视频质量信息确定 MPEG4 的编码参数，返回步骤 B8)，否则进入步骤 B13)；
- [0048] B13) 根据是否接收到新的功能模式信息确定是否调整功能模式，如果是则返回步骤 B3)，否则进入步骤 B14)；
- [0049] B14) 根据是否接收到结束命令确定是否结束会话，如果是则会话结束，否则继续会话。
- [0050] 本发明具有如下优点：
- [0051] 1. 本发明中采用蓝牙 3.0 自组网络，网络覆盖范围更大，传送速率更快，安全性更高。
- [0052] 2. 本发明采用 MPEG4 视频编解码技术，在相同压缩率下具有更高的清晰度，更加节省存储空间，当网络进行传输有误码或丢包现象时，MPEG4 受到的影响很小，并且能够很快恢复。
- [0053] 3. 本发明设计了 4 种功能模式及 3 种视频质量模式，优化了在不同环境下视频显示的流畅性和图像质量，满足了多种复杂的环境。
- [0054] 4. 本发明利用用户图形界面的状态提示窗口来显示当前模式的信息状态，包括当前功能模式情况、当前视频质量情况、通信从设备编号、当前视频音频传送速率和编解码帧率，能明确表示本系统用户与无线网络中其他终端的连接情况，使本系统的用户可直观的了解整个无线网络环境，有利于用户根据需要做出合理的功能选择。
- [0055] 5. 本发明不仅实现了无线网络中的视频会话，还能够对视频数据有选择的进行保存，便于重复观看。
- [0056] 6. 本发明的外部存储模块由于包含有日志结构的文件系统，保证了当意外掉电时

不会丢失数据的特性。

附图说明

- [0057] 图 1 是现有蓝牙系统提供的连接方式图；
[0058] 图 2 是本发明的系统结构示意图；
[0059] 图 3 是本发明的用户图形界面布局示意图；
[0060] 图 4 是本发明使用的 MPEG4 视频编码器框图；
[0061] 图 5 是本发明会话发起端对视频传输通信的控制流程图；
[0062] 图 6 是本发明会话接收端对视频传输通信的控制流程图。

具体实施方式

[0063] 本发明利用现有蓝牙 3.0 系统提供的连接方式,如图 1 所示,实现快速安全自组局域网网络。其中图 1a 为点对点连接方式;图 1b 为点对多点连接方式组成的微网,其中一个单元作为微网主单元,其它为微网从单元;图 1c 为多个有重叠的微网构成的一个散网。

[0064] 参照图 2,图中双箭头为数据线,单箭头为控制线,本发明所述通信系统主要由视频采集模块 101, DSP 端视频编解码模块 102, 音频采集播放模块 103, ARM 端处理控制模块 104, 外部存储模块 105, 界面操作模块 106, 蓝牙控制模块 107 和蓝牙天线 108 组成。其中:

[0065] 视频采集模块 101,可采用普通的摄像头或数字摄像头,本实例采用但不局限于普通的 CCD 摄像头和硬件 A/D 转换器,该硬件 A/D 转化装置采用 TI 公司的视频解码芯片 TVP5146 完成模拟视频数据到数字视频数据的转换,该芯片允许 10 路模拟视频输入,具有 4 路 10bitA/D 转换器,场同步信号,行同步信号,奇偶场信号,时钟输出信号均由引脚直接引出,省去了同步时钟电路的设计。

[0066] DSP 端视频编解码模块 102 与 ARM 端处理控制模块 104,采用但不局限于 TI 公司的内嵌 ARM 和 DSP 双核结构嵌入式开发平台来实现,与其它利用单一处理器实现应用功能的结构方案相比,这种方案具有一个明显的优势,即可以提高功率和效率,并延长用户的电池寿命。这是因为: DSP 芯片是专门为处理实时视频信号而设计和定制的,采用两个处理器可以将总工作负荷进行合理划分,从而降低时钟工作频率,减小功率消耗,进一步降低系统成本。

[0067] 音频采集播放模块 103,采用普通耳麦构成。

[0068] 外部存储模块 105,采用任何一种 flash 芯片,本实例采用 64M 的 nand flash 芯片,并采用 linux 操作系统,为了使 flash 芯片具有所述的存储功能,还必须建立 linux 根文件系统,该根文件系统可采用 Cramfs、JFFS2、RAM disk 和 Ext2。本发明实例采用 JFFS2 根文件系统。

[0069] 界面操作模块 106,采用任何普通的电阻式或电容式显示屏,只需要有相应的驱动,本实例采用 4 线电阻式触摸屏,采用 3.5 英寸的 TFT 真彩液晶屏。参照图 3,本实例界面操作模块 106 的用户图形界面分为视频显示区域 109、切换功能模式按钮区域 110、切换视频质量按钮区域 111、通话设备选择区域 112、当前状态显示区域 113,本实例中,用户可浏览已存储的视频文件,选择打开,选择想要播放的文件即可,视频内容会在界面中间的视频显示区域 109 显示。

[0070] 蓝牙控制模块 107, 采用任何符合蓝牙 3.0 规范的适配器, 本实例采用蓝牙 3.0 USB 适配器。

[0071] 蓝牙天线 108, 采用外接 SMA 天线。

[0072] 上述模块的连接关系如下:

[0073] 视频采集模块 101 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 接收视频采集模块 101 采集的原始视频数据; DSP 端视频编解码模块 102 与 ARM 端处理控制模块 104 相连, DSP 端视频编解码模块 102 对 ARM 端处理控制模块 104 传送过来的视频数据进行编解码, 并将编解码后的视频数据送回 ARM 端处理控制模块 104; 音频采集播放模块 103 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 接收音频采集播放模块 103 采集的音频数据, 并将需要播放音频数据传送给音频采集播放模块 103 进行播放; 外部存储模块 105 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 运行外部存储模块 105 存储的本系统的控制程序和操作系统, 外部存储模块 105 存储 ARM 端处理控制模块 104 需要保存的视频数据; 界面操作模块 106 与 ARM 端处理控制模块 104 相连, 界面操作模块 106 显示用户图形界面和 ARM 端处理控制模块 104 接收到的需要显示的视频数据, ARM 端处理控制模块 104 处理界面操作模块 106 产生的控制命令; 蓝牙控制模块 107 与 ARM 端处理控制模块 104 相连, ARM 端处理控制模块 104 将接收到的音频数据和编码后的视频数据给蓝牙控制模块 107 发送, 同时蓝牙控制模块 107 接收编码后的视频数据给 ARM 端处理控制模块 104 处理; 蓝牙天线 108 与蓝牙控制模块 107 相连。上述的各个模块可集成在一块 PCB 电路板上, 界面操作模块 106 置于其他模块之上, 以达到本发明的小型化。

[0074] 参照图 5, 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的发起端控制方法, 包括以下步骤:

[0075] 步骤 1, 显示用户图形界面, 该用户图形界面分为视频显示区域、功能模式按钮区域、视频质量按钮区域、通话设备选择区域和当前状态显示区域, 用户可浏览已存储的视频文件, 选择打开, 选择想要播放的文件即可, 视频内容会在界面中间的视频显示区域显示。

[0076] 步骤 2, 用户在图形界面上选择需要通信的设备, 点击发起连接按钮, 向所选的设备发送连接请求。

[0077] 步骤 3, 等待所选设备响应, 根据该设备是否接受连接请求来决定是否建立起主从设备间的通信信道。

[0078] 通信设备在接收到本系统发送的连接请求后, 其用户图形界面会提示出消息对话框, 该消息对话框内容包括: 请求连接的设备名称、接受按钮和拒绝按钮, 用户接受连接则点击接受按钮, 通信连接建立, 否则点击拒绝按钮, 用户选择后, 会向连接请求方反馈所选信息。

[0079] 本系统接收通信设备的反馈信息, 如果连接被接受则建立起主从设备间的通信信道, 其中连接发起方为通信主设备, 连接接受方为通信从设备。如果连接被拒绝则选择新的通信设备, 重新发起连接。

[0080] 步骤 4, 通信连接建立后, 用户点击功能模式区域的按钮选择功能模式。

[0081] 本发明功能模式包括: 远程录像、无线监控、对讲模式和可视通话, 在远程录像的模式下系统默认存储从设备发送过来的视频数据, 在其它模式下用户根据需要进行选择是否保存发送过来的视频数据, 选择后, 系统向已经连接的从设备发送所选择的模式信息, 并根

据所选功能模式确定步骤：

- [0082] 4a) 在远程录像和无线监控模式下, 开通视频信道, 执行步骤 9 ;
- [0083] 4b) 在对讲模式下, 开通音频信道执行步骤 5 ;
- [0084] 4c) 在可视通话模式下, 同时开通视频信道和音频信道, 并行的执行步骤 5 和步骤 9。
- [0085] 步骤 5, 通过麦克风采集现场音频数据。
- [0086] 步骤 6, 将采集到的音频数据打包, 并通过蓝牙控制模块发送给从设备。
- [0087] 步骤 7, 接收从设备发送过来的音频数据包, 提取音频数据包中的音频数据。
- [0088] 步骤 8, 通过耳机播放提取出的音频数据, 跳转到步骤 13, 同时循环执行步骤 5 ~ 8, 直到用户切换功能模式或会话结束。
- [0089] 步骤 9, 通过蓝牙控制模块接收从设备发送过来的经过 MPEG4 编码的视频数据包, 提取数据包中的视频数据, 根据用户的选择决定是否存储该视频数据, 如果是则存储该视频数据到外部存储模块, 否则不存储 ;
- [0090] 步骤 10, 对从数据包中提取出的视频数据进行 MPEG4 解码。
- [0091] 步骤 11, 将解码后的视频数据显示在界面操作模块的视频显示区域, 进入到步骤 12, 同时循环执行步骤 9 ~ 11, 直到用户切换功能模式或会话结束。
- [0092] 步骤 12, 用户点击视频质量按钮区域的按钮调节视频质量模式。
- [0093] 本发明的用户图形界面中视频质量模式根据无线网络的环境分别命名高清 MJPEG 图像、实时清晰视频、实时普通视频 3 种模式。每个视频模式分别封装了不同的视频参数以适应不同的网络环境。在高清 MJPEG 图像传送时, 帧率为 3fp/s 图像分辨率为 1024x768, 图像缺乏实时性, 但图像清晰, 可满足用户在网络通信较差的情况下对场景细节的需要 ; 实时清晰视频, 帧率为 25fp/s, 图像分辨率为 720x480, 可在网络运行状态好的流畅的进行较清晰的视频会话 ; 实时普通视频, 帧率为 25fp/s, 图像分辨率为 352x288, 可在网络运行较差的保证视频会话可以流畅进行。
- [0094] 如果用户选择所述的三种视频质量模式中的一种, 且与当前视频质量模式不同, 则发送所选模式信息给从设备, 返回到步骤 9, 否则进入步骤 13。
- [0095] 步骤 13, 在通信过程中, 用户根据需要随时切换功能模式, 如果用户选择与现有功能模式不同的模式, 返回到步骤 4, 否则进入步骤 14。
- [0096] 步骤 14, 用户点击界面操作模块上的断开连接按钮结束会话, 如果用户结束会话则发送结束命令给从设备, 会话结束, 否则继续会话。
- [0097] 参照图 6, 本发明基于蓝牙 3.0 规范的 MPEG4 压缩视频传输通信的接收端控制方法, 包括以下步骤 :
- [0098] 步骤 A, 显示用户图形界面, 该用户图形界面分为视频显示区域、功能模式按钮区域、视频质量按钮区域、通话设备选择区域和当前状态显示区域, 用户可浏览已存储的视频文件, 选择打开, 选择想要播放的文件即可, 视频内容会在界面中间的视频显示区域显示。
- [0099] 步骤 B, 等待其他设备的连接请求, 本系统在接收到其他设备发送的连接请求后, 其用户图形界面会提示出消息对话框, 该消息对话框内容包括 : 请求连接的设备名称、接受按钮和拒绝按钮, 用户接受连接则点击接受按钮, 建立起主从设备间的通信信道, 其中连接发起方为通信主设备, 连接接受方为通信从设备, 如果用户拒绝连接则点击拒绝按钮, 用户

选择后,会向连接请求方反馈所选信息。

[0100] 如果通信连接建立,进入步骤 C,否则继续等待新的连接请求。

[0101] 步骤 C,接收来自主设备的模式信息,模式信息包括:功能模式和视频质量模式,其中:

[0102] 功能模式包括:远程录像、无线监控、对讲模式和可视通话;

[0103] 视频质量模式包括:高清 MJPEG 图像、实时清晰视频、实时普通视频 3 种模式。每个视频模式分别封装了不同的视频编码参数以适应不同的网络环境。在高清 MJPEG 图像传送时,帧率为 3fp/s 图像分辨率为 1024x768,图像缺乏实时性,但图像清晰,可满足用户在网络通信较差的情况下对场景细节的需要;实时清晰视频,帧率为 25fp/s,图像分辨率为 720x480,可在网络运行状态好的流畅的进行较清晰的视频会话;实时普通视频,帧率为 25fp/s,图像分辨率为 352x288,可在网络运行较差的保证视频会话可以流畅进行。

[0104] 根据接收到的模式信息确定通信步骤:

[0105] C1) 对于远程录像和无线监控模式,执行步骤 H;

[0106] C2) 对于对讲模式,执行步骤 D;

[0107] C3) 对于可视通话模式,并行执行步骤 D 和步骤 H。

[0108] 步骤 D,通过麦克风采集现场音频数据。

[0109] 步骤 E,将采集到的音频数据打包,并通过蓝牙控制模块发送给从设备。

[0110] 步骤 F,接收从设备发送过来的音频数据包,提取音频数据包中的音频数据。

[0111] 步骤 G,通过耳机播放接收到的音频数据,跳转到步骤 M,同时循环执行步骤 D~G,直到接收到新的功能模式信息或会话结束。

[0112] 步骤 H,从普通的 CCD 摄像头采集原始的现场视频频信息,并通过硬件 A/D 转化器将其转化成数字形式的原始视频数据。

[0113] 步骤 I,将原始视频数据显示在界面操作模块的视频显示区域。

[0114] 步骤 J,对原始的视频数据进行 MPEG4 编码。

[0115] 本发明采用 MPEG4 作为视频编解码算法, MPEG4 在三方面优于其他压缩/解压缩方案。首先,由于在一开始它就是作为一个国际化的标准来研究制定,所以具有很好的兼容性;其次, MPEG4 能够比其他算法提供更好的压缩比,最高可达 200 : 1,更重要的是, MPEG4 在提供高压缩比的同时,对数据的损失很小。

[0116] 图 4 所示是 MPEG4 视频编码器的具体实现框图,其编码过程是:读取一帧数据,取一个宏块,根据编码控制选择编码类型,是帧内编码 intra,还是帧间编码 inter,如果是 I 帧,所有宏块都是帧内编码 intra,读取的宏块数据直接进入离散余弦变换 DCT、量化 Q、直流系数与交流系数 DC/AC 预测、行程编码 RLC 并与其他信息一起合成形成码流;如果是 P 帧,先进行运动估计 ME,再判断是帧内编码 intra,还是帧间编码 inter,如果是帧内编码 intra,则直接利用宏块本身进行离散余弦变换 DCT 等一系列数据处理,如果是帧间编码 inter,则将经过运动估计 ME 得到的运动矢量 MV 传送给运动补偿 MC 单元,结合帧缓存中的上一帧的重建帧数据与当前宏块的像素值做运算,得到残差数据,然后,对残差值进行离散余弦变换 DCT、量化 Q、直流系数与交流系数 DC/AC 预测、行程编码 RLC 并与其他信息一起合成形成码流,即编码后的视频数据。

[0117] 步骤 K,发送经过编码的视频数据给主设备,进入步骤 L,同时循环执行步骤 H~K,

直到接收到新的功能模式信息或会话结束。

[0118] 步骤 L, 根据是否接收到新的视频质量信息确定是否调整视频质量模式, 如果是则根据新的视频质量信息确定 MPEG4 的编码参数, 返回步骤 H, 否则进入步骤 M。

[0119] 步骤 M, 根据是否接收到新的功能模式信息确定是否调整功能模式, 如果是则返回步骤 C, 以新的功能模式进行通信, 否则进入步骤 N。

[0120] 步骤 N, 根据是否接收到结束命令确定是否结束会话, 如果是则会话结束, 否则继续会话。

[0121] 以上实施例只是本发明的一个具体实施例, 并非用来限定本发明的实施范围, 即凡依本发明内容的作的均等变化与修饰, 或本领域的普通技术人员能从本发明公开的内容直接得到的或联想到的所有变形, 均应认为是本发明的保护范围。

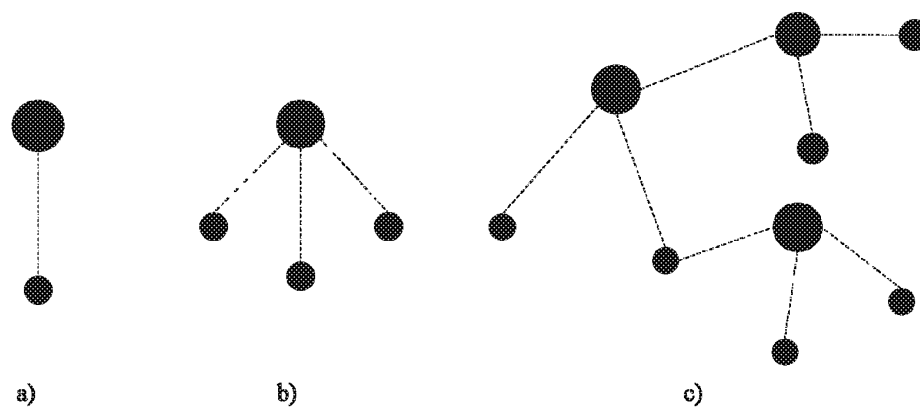


图 1

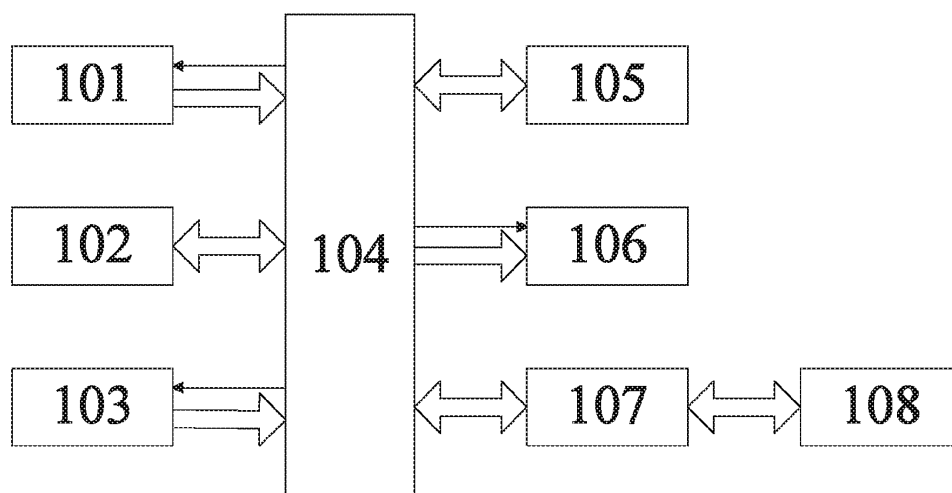


图 2

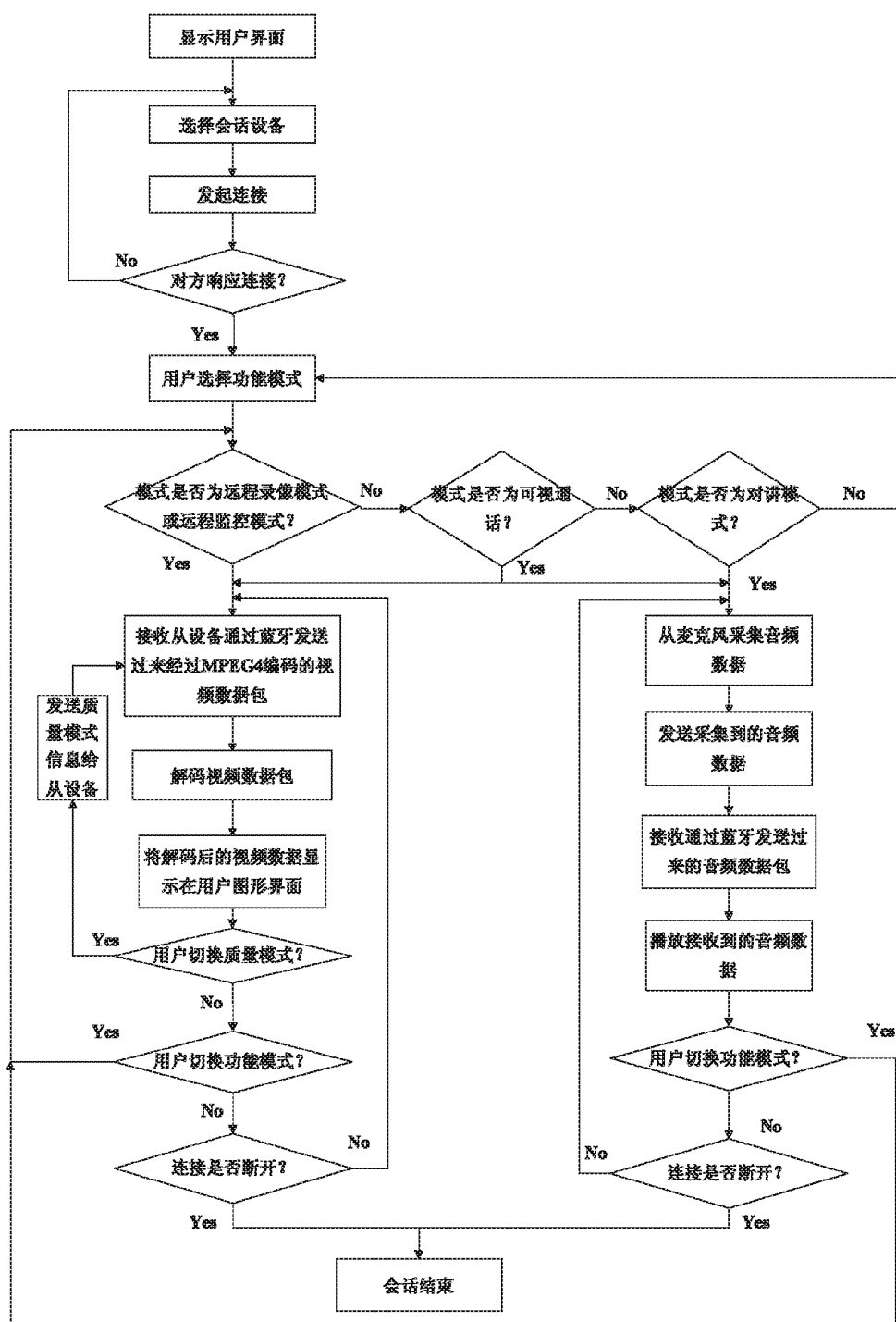


图 5



Espacenet

JP2007148904A METHOD, APPARATUS AND PROGRAM FOR PRESENTING INFORMATION

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METHOD, APPARATUS AND PROGRAM FOR PRESENTING INFORMATION

Abstract

<P>PROBLEM TO BE SOLVED: To present contents of information presented in the past by updating importance of display information in a retrieval interface during presentation. <P>SOLUTION: While the presentation information is displayed on a display apparatus, external data acquired through an input device are recorded and feature quantities are obtained from the external data. The importance is calculated by accumulating the feature quantities for each section in a period for displaying the presentation information. A first index information for a part of presentation information corresponding to the section having the importance exceeding a threshold is generated and presented along a time axis. The contents of the presentation information displayed in the past are retrieved in response to operations for selecting the first index information and displayed on a display apparatus. A second index information for a part of presentation information corresponding to the section selected is generated, and the second index information is added to the first index information listed along the time axis and presented. <P>COPYRIGHT: (C)2007,JPO&INPIT

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(54) 【発明の名称】 情報提示方法、情報提示装置及び情報提示プログラム

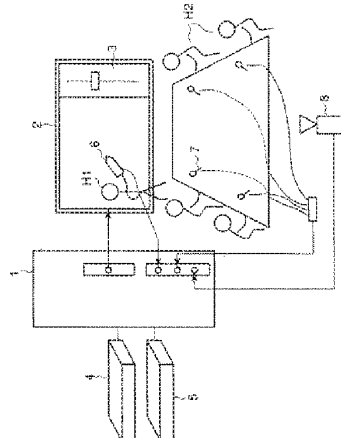
(57) 【要約】

【課題】プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新し、過去の情報提示内容を振り返って提示できるようにする。

【解決手段】ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録し、この外部データから特徴量を求める。プレゼンテーション情報の表示期間における一定の区間ごとに特徴量を積算することにより重要度を算出する。閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成し、時間軸に沿って並べて提示する。第1の見出し情報に対する選択操作に応じて、プレゼンテーション情報の過去の表示内容を検索し、ディスプレイ機器に表示する。そして、選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成し、時間軸に沿って並べられた第1の見出し情報にこの第2の見出し情報を加えて提示する。

【選択図】図1

図1



【特許請求の範囲】**【請求項1】**

ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録するステップと、
前記外部データから特徴量を求めるステップと、
前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出するステップと、
予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成するステップと、
生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に提示するステップと、
前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の表示内容を検索するステップと、
検索された過去の表示内容を前記ディスプレイ機器に表示するステップと、
前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成するステップと、
前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示するステップとを具備する情報提示方法。

【請求項2】

特徴量の種類に応じて異なる重要度算出比率を前記特徴量に乗じることにより前記重要度を算出する請求項1記載の情報提示方法。

【請求項3】

前記特徴量は、前記プレゼンテーション情報への注目度を反映しており、前記プレゼンテーション情報の表示時間の長さ又は前記プレゼンテーション情報に対して前記入力デバイスを通じて与えられた操作の量を表す請求項1記載の情報提示方法。

【請求項4】

前記プレゼンテーション情報が同じ内容を表示している時間がより長いほど前記重要度をより高くする請求項3記載の情報提示方法。

【請求項5】

前記重要度に寄与した特徴量の種類を表す文字列又はアイコンを表示するステップをさらに具備する請求項1記載の情報提示方法。

【請求項6】

前記重要度に応じた時間区間の長さを有する表示領域を含み、前記第1の見出し情報の選択操作に用いられるタイムライン・ユーザインタフェース画面を表示するステップをさらに具備する請求項1記載の情報提示方法。

【請求項7】

前記第1の見出し情報と前記第2の見出し情報との間を前記タイムライン・ユーザインタフェース画面において区別可能に表示するステップを具備する請求項6記載の情報提示方法。

【請求項8】

プレゼンテーション情報を表示するためのディスプレイ機器と、
前記ディスプレイ機器によるプレゼンテーション情報の表示中に外部データを取得するための入力デバイスと、
前記入力デバイスにより取得された外部データから特徴量を求めて記憶する特徴量記憶部と、
前記プレゼンテーションデータの表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出する重要度算出部と、
予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成する見出し情報生成部と、

生成された第1の見出し情報を時間軸に沿って並べて表示するよう前記ディスプレイ機器を制御し、前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の提示内容を検索するタイムライン・ユーザインタフェースとを具備し、

前記見出し情報生成部は、前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成し、

前記タイムライン・ユーザインタフェースは、前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて提示するよう前記ディスプレイ機器を制御することを特徴とする情報提示装置。

【請求項9】

特徴量の種類に応じて異なる重要度算出比率を前記特徴量に乗じることにより前記重要度を算出する請求項8記載の情報提示装置。

【請求項10】

前記特徴量は、前記プレゼンテーション情報への注目度を反映しており、前記プレゼンテーション情報の表示時間の長さ又は前記プレゼンテーション情報に対して前記入力デバイスを通じて与えられた操作の量を表す請求項8記載の情報提示装置。

【請求項11】

前記プレゼンテーション情報が同じ内容を表示している時間がより長いほど前記重要度をより高くする請求項10記載の情報提示装置。

【請求項12】

前記タイムライン・ユーザインタフェースは、前記重要度に寄与した特徴量の種類を表す文字列又はアイコンを表示するよう前記ディスプレイ機器を制御する請求項8記載の情報提示装置。

【請求項13】

前記タイムライン・ユーザインタフェースは、前記重要度に応じた時間区間の長さを有する表示領域を表示するよう前記ディスプレイ機器を制御し、該表示領域は前記第1の見出し情報の選択操作に用いられる請求項8記載の情報提示装置。

【請求項14】

前記タイムライン・インタフェースは、前記第1の見出し情報と前記第2の見出し情報とを関連付けて表示するよう前記ディスプレイ機器を制御する請求項13記載の情報提示装置。

【請求項15】

前記ディスプレイ機器は電子ホワイトボードを含む請求項8記載の情報提示装置。

【請求項16】

ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録する手順と、

前記外部データから特徴量を求める手順と、

前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出する手順と、

予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成する手順と、

生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に表示する手順と、

前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の提示内容を検索する手順と、

検索された提示内容を前記ディスプレイ機器に表示する手順と、

前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成する手順と、

前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示する手順とをコンピュータに実行させるための情報

提示プログラム。

【発明の詳細な説明】

【技術分野】

【0001】

本発明は、ディスプレイ機器に表示されたプレゼンテーション映像、表示中のデータの場所を示す情報、表示中の映像に対して行った操作情報及び周囲の音声・画像情報等から見出し情報を生成して提示し、過去に提示された情報等に容易にアクセスすることのできる情報提示装置に関する。

【背景技術】

【0002】

会議や授業などにおいて、ディスプレイ機器や電子ホワイトボードが活用されている。これは、プロジェクターやパーソナルコンピュータのモニターなどを用いてプレゼンテーションデータを投影して説明や議論に用いられるもので、また電子ホワイトボードの場合はペンや指先の位置を検出することでプレゼンテーション情報に対する書き込みも行えるものである。

【0003】

このような活動において、以前参照した資料や書き込んだ内容を再び参照したいという場合がたびたびあるが、その場合、大抵は保存している場所を探して表示したり、資料の所有者が持つパーソナルコンピュータとディスプレイ機器を接続し直して表示したり、あるいは書き込みが失われて表示されない、ということがあり、以前提示されていた内容を再び提示するためには大きな人的、時間的コストがかかる。

【0004】

このようなコストの解消のために、会議あるいは授業の様子を全て記録し、検索ユーザインタフェースを提供することで再び提示する方法が提案されている。例えば、下記特許文献1には、アノテーションを用いた活性度の付与と要約生成への活用について記載されている。

【0005】

下記特許文献2には、音声、画像、センサ情報の特徴量を可視化して会議データを検索することが記載されている。

【0006】

下記特許文献3及び4には、議事録を時間に沿って提示し、過去の議事内容を議事録に沿って振り返ることが記載されている。

【特許文献1】特開2004-199408号公報

【特許文献2】特開2004-173058号公報

【特許文献3】特開平7-182365号公報

【特許文献4】米国特許第5,572,728号明細書

【発明の開示】

【発明が解決しようとする課題】

【0007】

会議が行われている最中において、発表者がその会議で既になされた重要な議事の内容に振り返りつつ、会議を進行させる場合がしばしばある。このとき、資料等のプレゼンテーションデータの提示操作を行う発表者は、そのような重要な議事内容に対応する、既に提示されたプレゼンテーションデータを容易に呼び出して再度提示できることが好ましい。

【0008】

そして、例えば発表者が既になされた議事内容を振り返って会議を進行したこと自体が、重要な議事内容として記録され、これに応じて検索インタフェースにおいて提示される見出し情報（議事録）等が会議進行中に更新されることが好ましい。しかしながら、このような即時性を備えた検索インタフェースはこれまでに提供されていない。

【0009】

したがって、本発明は、プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新し、過去の情報提示内容を振り返って提示することのできる情報提示方法、情報提示装置及び情報提示プログラムを提供することを目的とする。

【課題を解決するための手段】

【0010】

本発明の一観点に係る情報提示方法は、ディスプレイ機器によるプレゼンテーション情報の表示中に、入力デバイスを通じて取得される外部データを記録するステップと、前記外部データから特徴量を求めるステップと、前記プレゼンテーション情報の表示期間における一定の区間ごとに、前記特徴量を積算することにより重要度を算出するステップと、予め定められた閾値を超える重要度を有する区間に対応するプレゼンテーション情報の一部分の第1の見出し情報を生成するステップと、生成された第1の見出し情報を時間軸に沿って並べて前記ディスプレイ機器に提示するステップと、前記第1の見出し情報に対する前記入力デバイスを用いた選択操作に応じて、前記プレゼンテーション情報の過去の表示内容を検索するステップと、検索された過去の表示内容を前記ディスプレイ機器に表示するステップと、前記選択操作がなされた区間に対応するプレゼンテーション情報の一部分の第2の見出し情報を生成するステップと、前記時間軸に沿って並べられた第1の見出し情報に前記生成された第2の見出し情報を加えて、前記ディスプレイ機器に提示するステップとを具備する。

【発明の効果】

【0011】

本発明によれば、プレゼンテーション中に検索インタフェースにおける表示情報の重要度を更新することができ、そのような更新後の検索インタフェースにおける表示情報に基づいて過去の情報提示内容を振り返って提示することのできる情報提示方法、情報提示装置及び情報提示プログラムを提供できる。したがって、会議中の情報提示や検索にかかる作業時間を短くし、本質的なディスカッションに割く時間を長くすることが可能となる。

【発明を実施するための最良の形態】

【0012】

以下、図面を参照しながら本発明の実施形態を説明する。

【0013】

本発明の実施形態は、会議中の書き込み、資料参照、音声などの特徴量を求めて記録し、それら特徴量から会議のある場面における重要度を算出し、会議中の代表的な場面を表す見出し情報を生成する手段を設けることで、過去の会議中の任意の場面を容易に取り出すことができるようにしたものである。本発明の実施形態は、CPUなどの制御装置と、ROMやRAMなどの記憶装置と、HDDなどの外部記憶装置と、ディスプレイ装置などの表示装置と、キーボード、マウスなどの入力装置とを備えた一般的なコンピュータを用いて実現することができる。

【0014】

図1は、本発明の一実施形態に係る会議支援システムを示す概要図である。図1に示すように、会議支援システムは、ミーティングサーバ1、電子ホワイトボード2、資料ストレージ4、会議ログストレージ5、ペン6、マイク7、カメラ8などから構成される。

【0015】

ミーティングサーバ1には電子ホワイトボード2が接続されており、資料ストレージ4から会議で用いられる資料ファイルを読み出して電子ホワイトボード2に送信する。資料ストレージ4に格納される資料ファイルは、例えばマイクロソフト社のPowerPoint（登録商標）やExcel（登録商標）などの電子ファイルである。

【0016】

ペン6は、例えば会議における発表者H1が電子ホワイトボード2の表示画面上で位置指定を行ったり、線画や文字等の描画を行うための入力デバイスである。

【0017】

マイク7は、例えば会議の参加者H2の発言を記録する。カメラ8は、会議の様を映

像として記録するために設けられる。マイク7及びカメラ8からの入力及び電子ホワイトボード2へのペン6を用いた入力、資料の提示、編集、電子ホワイトボード2の画面及び画面切り替えなどは、ミーティングサーバ1において集中管理され、該ミーティングサーバ1に接続された会議ログストレージ5に記録される。

【0018】

電子ホワイトボード2では、会議ログストレージ5に記録されたデータを会議の最中に電子ホワイトボード2上にいつでも呼び出すことができ、このため、スライド操作により過去の記録を呼び出すためのタイムライン・ユーザインタフェース（以下、「タイムライン」という）3を備える。

【0019】

会議ログストレージ5は、ペン6などの入力を「特徴量」と呼ばれる値に変換し、一定の時間帯における特徴量を時間情報とともに記録する。図2は記録される特徴量を図示したものである。ある一定時間において発生した特徴量F1の値を時間軸に沿って記録する。特徴量F1にはいくつかの種類があり、その種類ごとに分類して記録される。図3は特徴量の種類の一例である。例えば、「ペン」の特徴量は「描画量」であり、「マイク」の特徴量は「音量」、「カメラ」の特徴量は「映像変化量」、「資料」の特徴量は「切り替え、表示時間、参照回数」、「ホワイトボード」の特徴量は「切り替え、表示時間、参照回数」、「タイムライン」の特徴量は「参照回数」であったりする。

【0020】

ペン6を用いた入力に基づく特徴量は、ペン6がその一定時間内にどの程度の描画を行ったかが特徴量として利用される。描画を行った量は、ペン6によって描かれたベクトルデータの長さの合計などで計測される。ペンの太さや色などによって特徴量を変更しても良い。

【0021】

マイク7を用いた入力に基づく特徴量は、マイク7に入力された音声の音量の総計が用いられる。マイク7が複数ある場合は、それらマイク7の音量の合計を用いる。この特徴量は、会議中の議論などによって多くの発言がなされた場面で多くなる。特徴量として一定の音量を越えた入力を得られた時間を用いても良い。

【0022】

カメラ8を用いた入力に基づく特徴量は、フレーム間の画像の変化量を用いる。画像の変化量は、参加者H2がなんらかのジェスチャーを行ったときや、電子ホワイトボード2上の資料の切り替えや資料への書き込みなどを行ったときに多くなる。

【0023】

ミーティングサーバ1を介した、電子ホワイトボード2上に表示される資料に対する操作も特徴量として用いられる。具体的には、スライドのページの切り替えというイベントの発生に一定の特徴量を付加したり、あるひとつのスライドがどれだけの時間にわたって電子ホワイトボード2上に表示されていたかを示す表示時間、そのスライドが会議中で何回表示されたか、又は編集されたかを示す参照回数を特徴量として用いたり、という動作を行う。これら複数の特徴量は、単純に合算して、資料に関する特徴量として扱っても良いし、別々の特徴量として扱っても良い。

【0024】

電子ホワイトボード2の操作も、資料に関する特徴と同様に、そのページの切り替え操作、ページの表示時間、参照時間などを特徴量として用いる。

【0025】

電子ホワイトボード2上のタイムライン3を用いて、会議ログに蓄積された過去の会議を参照することができるが、それによってある時間帯の会議ログを参照した、その参照回数を特徴量として用いる。タイムライン3は、スライドだけ表示する場合、見出しに対応する文字列を表示する場合、見出しを表すサムネイル画像を表示する場合、必要に応じていずれの表示形式にも切り替えることができる。また、タイムライン3の方向は必要に応じて縦横、上下いずれにも切り替えることができる。

【0026】

これら記録された特徴量は、会議のどの部分が参加者H2にとって重要であるかの判別に用いられる。

【0027】

図4は、図1に示されるミーティングサーバ1、資料ストレージ4、及び会議ログストレージ5に基づいて構成される会議資料記録提示装置の機能ブロック図である。同図に示すように、会議資料記録提示装置は、映像表示装置100、プレゼンテーションデータ入力部101、外部データ入力部102、データ制御部103、重要度算出部104、見出し情報生成部105、見出し情報選択部106、見出し情報格納部107、プレゼンテーションデータ格納部108、および外部データ格納部109から構成される。

【0028】

見出し情報格納部107、プレゼンテーションデータ格納部108、外部データ格納部109は、HDD、光ディスク、メモ리카ード、RAMなどの一般的に利用されているあらゆる記憶手段により構成することができる。

【0029】

以下に、各機能ブロックの説明を行う。それぞれの機能ブロックを構成するデータ構造及び処理の手順については後述する。

【0030】

映像表示装置100は、ビデオプロジェクタや電子ホワイトボード2、パーソナルコンピュータの画面などのディスプレイ装置であり、プレゼンテーションデータやタイムライン3を電子ホワイトボード2上に表示する。プレゼンテーションデータ入力部101は、映像表示装置100に投影すべきデータの映像信号及びデータのファイル属性を入力として受け付ける。外部データ入力部102は、上記のベン6からの入力や音声情報など映像投影とともに記録されるデータを受け付ける入力部である。データ制御部103は、プレゼンテーションデータ入力部101と外部データ入力部102から得られたデータを時間情報に基づいて統合し、プレゼンテーションデータ格納部108、外部データ格納部109に格納するとともに、映像表示装置100に投影すべき映像データを出力する。また、見出し情報格納部107から見出し情報を読み出し、タイムライン3とあわせて電子ホワイトボード2上に表示する機能を提供する。重要度算出部104は、データ制御部103よりプレゼンテーションデータと外部データを取得し、投影された映像データに対して重要度を算出し、重要度に応じて映像を所定の区間に分割する。見出し情報生成部105は、重要度算出部104で得られた重要度の高い区間に対して、タイムライン3上に表示する見出し情報を生成する。見出し情報選択部106は、映像表示装置100上に表示されたタイムライン3で選択された見出しに対応する表示データをデータ制御部103より読み出し、映像表示装置100上に表示する。見出し情報選択部106で選択された見出し情報に対応する映像区間の重要度は重要度算出部104において更新される。見出し情報格納部107は、見出し情報生成部105によって生成された見出し情報を格納する。プレゼンテーションデータ格納部108は、プレゼンテーションデータの映像及びデータのファイル属性や参照先などの情報を格納する。外部データ格納部109は、プレゼンテーションデータ提示中に記録された上記の各特徴量を格納する。

【0031】

以上のように構成された本実施形態の動作を説明する。

【0032】

図5は、会議ログストレージ5に特徴量を記録する場合の処理手順を示すフローチャートである。会議の開始(ステップS101)とともに、特徴量の記録を開始する。まず会議ログストレージ5に会議情報を記録する(ステップS102)。会議情報には、電子ホワイトボード2上に表示される画像情報や、カメラ8からの会議の様子を記録した動画、マイク7から取得した音声などが含まれる。同時に、図3に示される特徴量を計算し、種別ごとに記録する(ステップS103)。会議情報や特徴量には時間情報が付加されて記録される。以上の記録動作を会議終了まで行う(ステップS104)。最終的に、会議を

通じて取得された情報及び特徴量は、全て、ミーティングサーバ1、会議ログストレージ5、資料ストレージ4のいずれかに格納される。

【0033】

図6に、会議ログストレージ5に格納されるイベントの例を示す。電子ホワイトボード2上の画像表示や、音声発話、ペン6からの入力などの特徴量60が、タイムスタンプ61とともに格納される。

【0034】

図7は、記録された会議情報及び特徴量を用いてタイムライン3が見出し情報生成を含む処理を行う手順を示すフローチャートである。尚、この処理は図5の会議記録動作と並行に行われる。

【0035】

まず、複数の種別の特徴量から、各場面における重要度を算出するための、重要度算出比率を設定する(ステップS201)。重要度算出比率は、複数種類の特徴量から重要度を算出するためのもので、特徴量のうちどの種別を重視して重要度を算出するか、ということを設定する。図8は重要度算出比率の設定に用いられるユーザインタフェースの一例を示す図である。種別ごとの重要度への影響の比率をバー80、81...の長さで表す。ユーザは、例えばバー80とバー81との間のスライダー82を左右にドラッグすることで比率を変化させることができる。

【0036】

次に、タイムライン3においていつからいつまでの時間範囲を表示するかを設定する(ステップS202)。

【0037】

設定された時間範囲から、特徴量や重要度をどの程度の粒度の時間範囲で区切って計算するかを設定する(ステップS203)。以下、この時間範囲をフレームと呼ぶ。

【0038】

次に、各フレームの特徴量及び重要度を算出する(ステップS204)。特徴量はそのフレームに含まれる時間帯の特徴量を合算することで得られる。重要度は図9のように、それら特徴量を重要度算出比率に応じて合算することで得られる。これらの処理は図4における重要度算出部104により行われる。

【0039】

次に、それらフレームから、見出し情報を付加する重要なフレームを算出するための、重要度の閾値を算出する(ステップS205)。閾値は、タイムライン3において表示可能な見出し情報の数と、計算された各フレームの重要度から、算出する閾値を超える重要度を持つフレーム数が表示可能な見出し情報の数以内に収まるように設定される。タイムライン3において表示可能な見出し情報の数は、電子ホワイトボード2上の表示範囲などの制限によって決定される。

【0040】

図10に示すように、閾値T1を算出した後、その閾値T1を越える重要度300を有するフレームに対して見出し情報を付加する(ステップS206)。図11に示すように、そのフレームにおける重要度が特定の特徴量を高い割合で含む場合、その特徴量の種類に対応するアイコンを、特徴アイコン11、12として表示しても良い。これらの処理は図4における見出し情報生成部105において行われ、生成された見出し情報は見出し情報格納部107に格納される。

【0041】

図12に、見出し情報の格納例を示す。見出しの開始時刻120とともに、重要度の算出結果に基づく見出し内容121、及び他の見出し情報との対応関係として、当該見出しに関連する見出しの時刻122が格納される。他の見出し情報との対応付けについては後述する。

【0042】

また、図5において特徴量を記録する際に、量を表す値だけでなく、その特徴量に関連

する属性情報を取得しても良い。その場合、図13に示すような、特徴量の各種類に対応する属性を特徴量に付加した情報が、会議ログストレージ5に記録される。

【0043】

ペン6による入力に対しては、例えば発表者H1が操作したペン6が丸や下線などの特定の図形を記述したことをストロークとして認識し、その形の種類や図形が電子ホワイトボード2上のどの範囲をカバーしているかを表す範囲を属性として付加することができる。また文字認識を行うことで、ペン6によってどのような文字が記述されたかの情報を付加することができる。

【0044】

マイク7による入力に対しては、音声認識を行うことで発言内容の文字列を付加することができる。また各参加者H2の前に備わったマイク7の音量から発言者がだれかという情報を付加することができる。

【0045】

カメラ8による入力に対しては、画像認識を行うことで、参加者H2がどのようなジェスチャーを行ったかという情報を付加することができる。ジェスチャー情報には、動き方の種類や電子ホワイトボード2中のどの範囲を指しているかを表す指示範囲が含まれる。

【0046】

資料の提示に対しては、その資料の特定部分を表示するためのスクロールやズーム動作から注目点を判別し、付加することができる。またスライドに対してはそのスライドのタイトルや、全スライド中の何ページ目かという情報を付加することができる。

【0047】

電子ホワイトボード2への操作に対しては、ポインタ機能を使って行われたポイントの範囲を情報として付加することができる。

【0048】

図7に説明を戻す。タイムライン3への見出し情報表示は、図4における見出し情報表示部（映像表示装置100）を用いて行われる（ステップS207）。タイムライン3への操作に対しては、その操作を誰が行ったかという操作者の情報を付加することができる。

【0049】

特徴量に上記のような属性が付加されている場合、ある見出し情報に対応する特徴量の属性に基づいて、図14に示すように、その見出し情報を説明する説明文140を付加することができる。また特定の属性を持つ特徴量に対して、その値を増加させることで、重要な属性を備えたフレームに見出し情報が付加されやすくなるようにしても良いし、図15に示すように、タイムライン3とサムネイル画像150とを対応付けて表示しても良い。

【0050】

尚、重要度は前フレームからの特徴量の変化量に基づいて計算されても良い。閾値を越える連続する複数のフレームをひとまとまりにし、それら複数フレームに対して1つの見出し情報を対応付けても良い。また、図16に示すように、各フレームの重要度に応じて、タイムライン3上に表示される各フレームの長さを変更することで、重要なフレームとそうでないフレームの間での表示粒度を変更しても良い。

【0051】

〔他の見出し情報との対応付け〕

図5の特徴量記録において、ユーザがタイムライン3上のスライドの操作による過去の議事の振り返りをしている場合、過去の議事における特徴量を加味した重要度判定を行うための、過去特徴量を記録する場合の処理を図17のフローチャートに示す。タイムライン3上のスライド操作によって過去の議事の電子ホワイトボード2上への呼び出しを行っている場合（ステップS301）、その過去の議事に対応する時間の特徴量を取得し（ステップS302）、その値を過去特徴量として作業メモリ等に一時的に記録する（ステップS303）。図18に示すように、過去特徴量180と通常のリアルタイムに取得する

特徴量181とを合算した値が、その時点での特徴量となり、重要度の算出に用いられる（ステップS304）。過去特徴量は、その記録の前に一定の係数を積算することで、重要度の算出に影響する重みを、通常の特徴量とは異ならせるとよい。

【0052】

過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容とは対応付けられる。以前に表示したデータを再度参照し、その参照したデータに情報を追記する例について図19及び図20のフローチャートを用いて説明する。

【0053】

画面201において、「A」という文字が描画された直後に、ユーザが画面202のようにスライド190をスライドさせることで、図4における見出し情報選択部106が呼び出され、スライドされた場所に対応する画像が表示される。画面201では、以前描いた「T」が表示される。この時、新しい見出し情報が生成され、参照された元の見出し情報との対応付けが行われる。画面203のように「T」の上にペン6で追記を行った後、画面204のように再びスライド190を表示させると「A」の記入時に表示されていた領域の下に、もう一つ領域191が追加される。画面202において「T」を参照した時の領域193に対応する、画面204における領域192は例えば網掛けを付加することにより表示態様を変更されて表示される。「T」の直前に描いた「A」を再度編集する場合は画面205のようにスライド190を一つ上の領域194まで上げることで表示される。この画面205の領域194は、画面201における領域195に対応している。

【0054】

図20に示すように、まず直前のイベント内容を取得する（ステップS401）。次に、過去のプレゼンテーション内容への参照かをステップS402において判定する。過去のプレゼンテーション内容への参照であるならば、操作後の表示内容に対して見出しを生成し（ステップS403）、この作成された見出しに対して、参照元の見出しを関連見出しとして登録する（ステップS404）。関連見出しとして参照した見出しに装飾（領域192）をして表示する（ステップS405）。

【0055】

以前に表示したデータを関連付けて表示する方法としては、上述したように装飾して表示する場合の他に、図21に示すように、同じファイルを表示している見出し210や、参照関係にある見出し211を並べて表示することで、関連する見出し情報にすぐアクセスできるようにしてもよい。

【0056】

以上説明したように、本実施形態によれば、タイムライン3上に重要度に応じた見出し情報を付加することで、タイムライン3上において重要な場面を再び電子ホワイトボード2上に呼び出すことが容易になる。重要度は複数の特徴量から算出され、それら特徴量のうちどの特徴量を重視して見出し情報を付加するかを設定するユーザインタフェースを備えることで、システムを利用するユーザや場面に応じた適切な見出し情報を得ることができる。また見出し情報は、タイムライン3上に表示する時間範囲を変化させた場合でも、表示可能な適切な数に抑えられ、タイムライン3上の時間粒度の変化に対応することが可能である。

【0057】

見出し情報には、特定の特徴から重要と判断されたことを表す特徴アイコンや、その特徴に付加された属性から得られる見出し情報説明文を付加することができ、それによって複数の見出し情報からユーザが必要としている会議中の場面を指定することが容易になる。

【0058】

特徴量に合わせてタイムライン3上のフレームの長さを調整することで、会議中の重要な部分が視覚的に判別できるとともに、タイムライン3上のスライドを用いて過去の会議を参照する場合、重要な場面ほどより細かい粒度で参照することが可能になる。

【0059】

また、過去特徴量を加味した特徴量算出を行い、スライドを用いた振り返りを行った場面の重要度を増加させることによれば、会議中に何度も参照した場面の重要度が増すことになる。これによれば、見出し情報をリアルタイムに更新することができ、会議中に繰り返し注目された場面を更新後の見出し情報表示に基づいて容易に呼び出すことができるようになる。

【0060】

尚、本実施の形態にかかる会議資料記録提示装置で実行される会議資料記録提示プログラムは、インストール可能な形式又は実行可能な形式のファイルでCD-ROM、フロッピー（登録商標）ディスク、CD-R、DVD等のコンピュータで読み取り可能な記録媒体に記録されて提供することができる。

【0061】

また、本実施の形態にかかる会議資料記録提示装置で実行される会議資料記録提示プログラムを、インターネット等のネットワークに接続されたコンピュータ上に格納し、ネットワーク経由でダウンロードさせることにより提供するように構成しても良い。また、本実施の形態にかかる会議資料記録提示で実行される会議資料記録提示プログラムをインターネット等のネットワーク経由で提供又は配布するようにしても良い。

【0062】

また、本実施の形態の会議資料記録提示プログラムを、ROM等に予め組み込んで提供するように構成しても良い。

【0063】

本実施の形態にかかる会議資料記録提示装置で実行される資料提示プログラムは、上述した各部を含むモジュール構成となっており、実際のハードウェアとしてはCPUが上記記憶媒体から会議資料記録提示プログラムを読み出して実行することにより上記各部が主記憶装置上にロードされ、上述した各部が主記憶装置上に生成されるようになっている。

【0064】

なお、本発明は上記実施形態そのままに限定されるものではなく、実施段階ではその要旨を逸脱しない範囲で構成要素を変形して具体化できる。また、上記実施形態に開示されている複数の構成要素の適宜な組み合わせにより、種々の発明を形成できる。例えば、実施形態に示される全構成要素から幾つかの構成要素を削除してもよい。さらに、異なる実施形態にわたる構成要素を適宜組み合わせてもよい。

【図面の簡単な説明】

【0065】

【図1】本発明の一実施形態に係る会議支援システムを示す概要図

【図2】時間に沿った特徴量の記録例を示す図

【図3】特徴量の種類の一例を示す図

【図4】会議資料記録提示装置の機能ブロック図

【図5】会議ログストレージ5に特徴量を記録する場合の処理手順を示すフローチャート

【図6】会議ログストレージ5に格納されるイベントの一例を示す図

【図7】記録された会議情報及び特徴量を用いてタイムライン3が見出し情報生成を含む処理を行う手順を示すフローチャート

【図8】重要度算出比率の設定に用いられるユーザインタフェースの一例を示す図

【図9】特徴量を重要度算出比率に応じて合算することにより重要度を算出する例を示す図

【図10】重要度の閾値比較を示す図

【図11】重要度に寄与する特徴量の種類を表す特徴アイコンの表示例を示す図

【図12】見出し情報の格納例を示す図

【図13】会議ログストレージ5に記録される属性付き特徴量の一例を示す図

【図14】見出し情報を説明する説明文の表示例を示す図

【図15】タイムライン3とサムネイル画像150との対応付け表示例を示す図

【図16】フレームの重要度に応じた表示粒度の変更例を示す図

【図17】過去の議事における特徴量を加味した重要度判定を行うための、過去特徴量を記録する場合の処理手順を示すフローチャート

【図18】過去特徴量180と通常のリアルタイムに取得する特徴量181との合算を示す図

【図19】過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容とは対応付けを説明するためのフローチャート

【図20】過去の議事に振り返る前の見出し表示内容と、振り返った後の見出し表示内容との対応付け表示例を示す図

【図21】関連する見出し情報の表示例を示す図

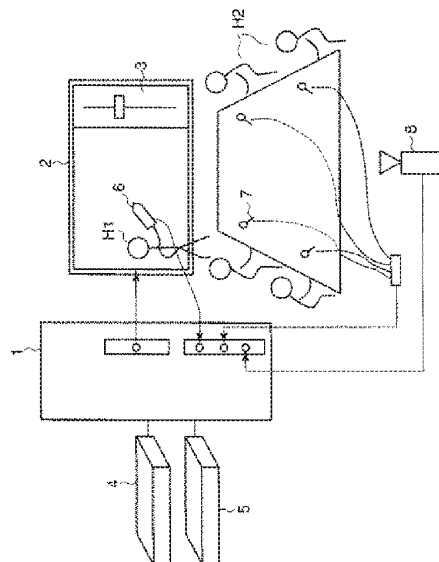
【符号の説明】

【0066】

- 1…ミーティングサーバ；
- 2…電子ホワイトボード；
- 3…タイムライン・ユーザインタフェース；
- 4…資料ストレージ；
- 5…会議ログストレージ；
- 6…ペン；
- 7…マイク；
- 8…カメラ

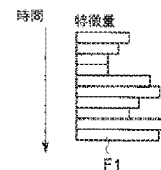
【図1】

図 1



【図2】

図 2

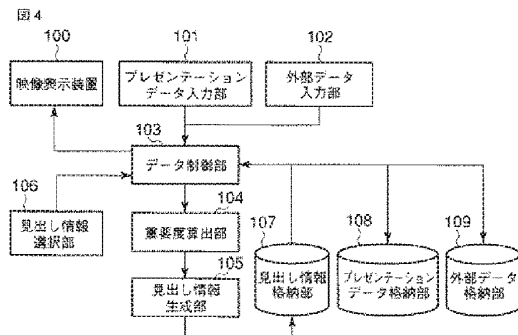


【図3】

図 3

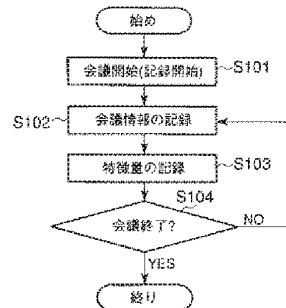
種 類	特 徴 量
ペン	描画量
マイク	音量
カメラ	映像変化量
資料	切り替え、表示時間、参照回数
ホワイトボード	切り替え、表示時間、参照回数
タイムライン	参照回数

【図4】



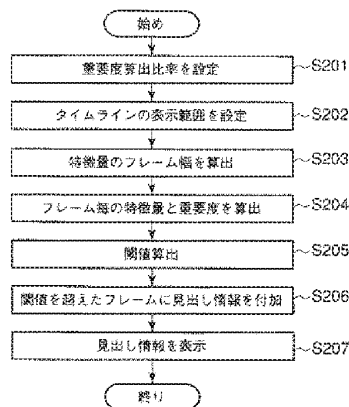
【図5】

図5



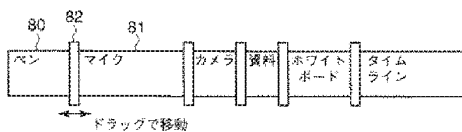
【図7】

図7



【図8】

図8



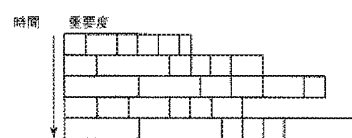
【図6】

図6

時刻	特徴量の種類	内容	属性
2005/10/18 16:29:50	発話	田中	田中
2005/10/18 16:30:10	発話	終了	田中
2005/10/18 16:30:32	スライド操作	スライドショー開始	打ち合わせ資料, ppt, 1ページ
2005/10/18 16:30:42	発話	田中	田中
2005/10/18 16:30:51	発話	終了	田中
2005/10/18 16:30:52	スライド操作	スライドショー表示	打ち合わせ資料, ppt, 2ページ
...	...	...	...
2005/10/18 17:03:22	ストローカー	マーキング	打ち合わせ資料, ppt, 2ページ
...	...	...	...
2005/10/18 16:30:40	スライダー	見出し情報呼び出し	...
...	...	...	...
2005/10/18 17:59:19	スライド操作	スライドショー終了	打ち合わせ資料, ppt

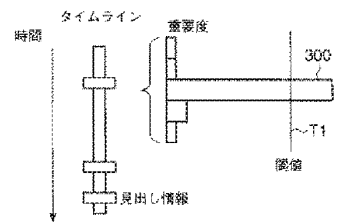
【図9】

図9

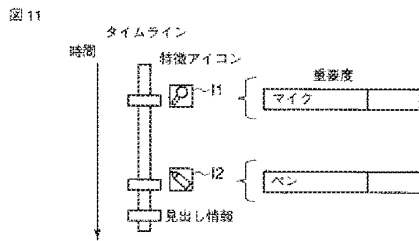


【図10】

図10



【図11】



【図12】

図 12

見出し開始時刻	見出し内容	関連する見出し時刻
2005/10/18 16:29:50	発話	
2005/10/18 16:30:10	アジェンダ表示	
...	...	
2005/10/18 16:33:15	前回議事録参照	
...	...	
2005/10/18 16:30:52	過去内容参照	2005/09/30 14:57:36
...	...	
2005/10/18 17:12:42	スライド参照	2005/10/11 11:23:19
...	...	
2005/10/18 16:32:25	田中さん発話	
...	...	
2005/10/18 17:57:34	TODO表示	

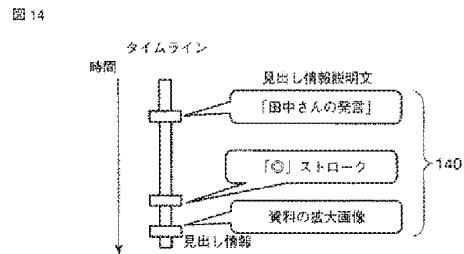
120 121 122

【図13】

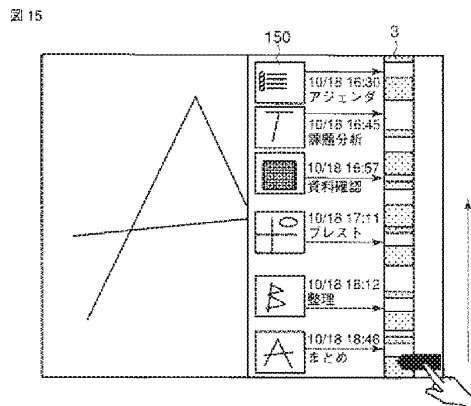
図 13

種類	属性付き特徴量
ペン	ストローク(種類、範囲)、文字
マイク	音声認識、発話者
カメラ	ジェスチャー(種類、指示範囲)
資料	注目点(スクロール、ズーム)
ホワイトボード	スライド(タイトル、ページ数)
タイムライン	ポイント(範囲)
	操作者

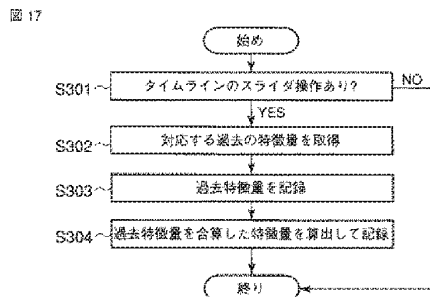
【図14】



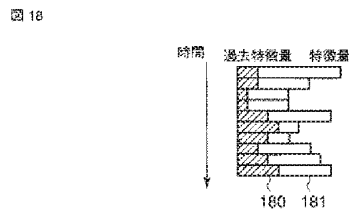
【図15】



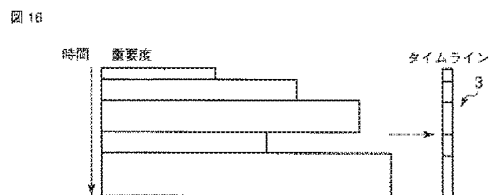
【図17】



【図18】

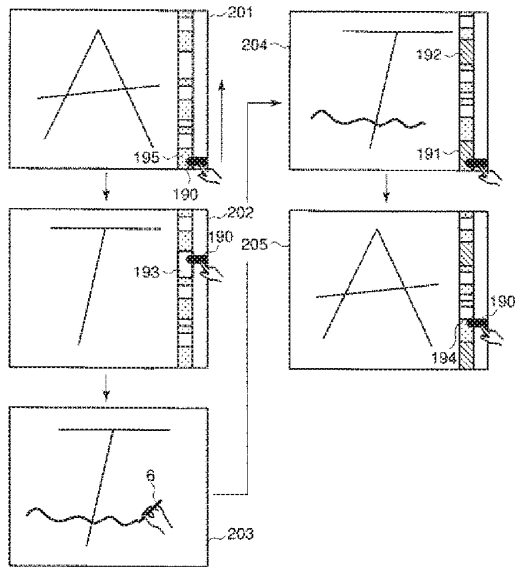


【図16】



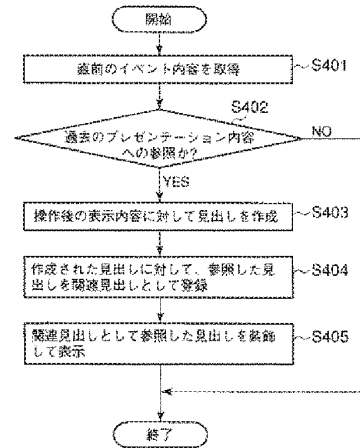
【図19】

図 19



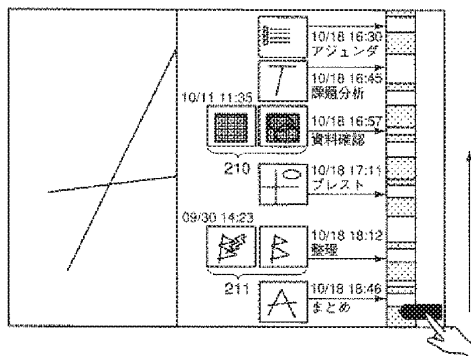
【図20】

図 20



【図21】

図 21



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Espacenet

TW201012222A Method for producing internet video images

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Inventors: LYU SZU-HAO [TW]

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H04N21/4314 (EP); H04N21/440263 (EP); H04N21/4788 (EP); H04N7/15 (EP);**

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Method for producing internet video images

Abstract

The present invention discloses a method for producing internet video images. The method comprises producing a plural of video images by a plural of webcams, compressing the video images into compressed video images and merge the compressed video images into a single conference image and outputting the conference image to plural screens.



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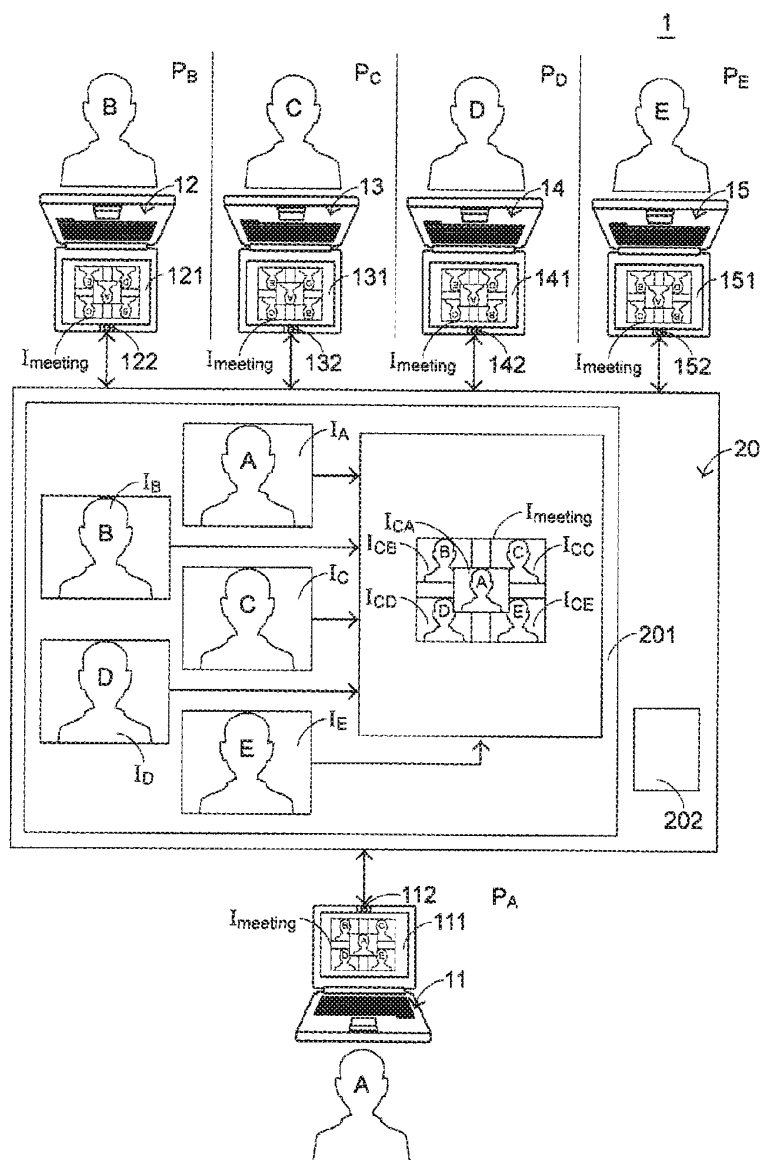
(54)名稱

產生網路視訊影像之方法

METHOD FOR PRODUCING INTERNET VIDEO IMAGES

(57)摘要

本發明係關於一種產生網路視訊影像之方法，包括分別使用複數網路攝影機產生複數影像，壓縮該複數影像並將之結合為一單一會議影像，以及輸出該會議影像至複數螢幕。



1：網路視訊系統

11：電腦

12：電腦

13：電腦

14：電腦

15：電腦

20：網路伺服器

111：螢幕

112：網路攝影機

121：螢幕

122：網路攝影機

131：螢幕

132：網路攝影機

141：螢幕

142：網路攝影機

151：螢幕

152：網路攝影機

201：記憶體

202：視訊影像結合應用程式

A：使用者

B：使用者

C：使用者

D：使用者

E：使用者

I_A：影像I_B：影像I_C：影像I_{CA}：影像I_{CB}：影像I_{CC}：影像I_{CD}：影像I_{CE}：影像I_D：影像I_E：影像I_{meeting}：會議影像

P_A : 地點

P_B : 地點

P_C : 地點

P_D : 地點

P_E : 地點

六、發明說明：

【發明所屬之技術領域】

本發明係關於一種產生網路視訊影像之方法，尤其係關於一種可用於視訊會議之產生網路視訊影像之方法。

【先前技術】

傳統的通訊方式包括書信往來、室內電話(公共電話)、傳呼機(又稱扣機或 B.B Call)以及傳真等，但隨著科技的快速發展，電腦以及網際網路隨之發展，使通訊方式也跟著演進。在科技發達的今天，通訊方式已不再限制於傳統書信、電話、簡訊或傳真等方式。例如，書信往返已演化為電子郵件；電話與傳呼機演化為行動電話以及簡訊。

此外，網際網路除了促進電子郵件的發展之外，更提供了一網路通訊平台，是透過網際網路來傳送訊息以達到通訊聯絡的效果，例如部落格或網路通訊程式，而本案係以網路通訊程式為主。網路通訊程式可藉由輸入文字、符號或圖形與在網際網路上的他人進行文字符號上的交談，例如 MSN、即時通以及 Skype 等通訊程式。而該些網路通訊程式更可提供一視訊會議之功能，讓位於不同城市、國家的使用者可透過視訊會議功能來進行會談而可節省長途電話費、國際電話費甚至於可省下原本為了進行當面會談的交通費等。

當使用者利用電腦執行網路通訊程式以進行視訊會議時，電腦的麥克風可錄下使用者的聲音，而電腦的網路攝影機可擷取使用者的影像，並藉由網路通訊程式將使用者的聲音以及影像傳輸至另一使用者的電腦中，再透過另一使用者之電腦的喇叭以及螢幕將該聲音以及影像播放出來。另一使用者亦透過相同方式以傳輸聲音及影像給予使用者，藉此得以進行視訊會議。

上述為兩位使用者進行視訊會議之情況，但當同時有三位使用者欲進行視訊會議時，可分為兩種情形：第一種情形係每個使用者皆位於不同地點；第二種情形則為第一使用者位於一地點，而第二使用者與第三使用者皆位於另一地點。第一種情形的三位使用者進行視訊會議時，以習知網路通訊程式之視訊會議功能僅提供一對一的視訊會議而無法進行一對多的視訊會議，因此，僅可讓第一使用者分別與第二使用者以及第三使用者於不同視窗同時進行視訊會議，而第二使用者與第三使用者則無法進行視訊會議，也就是無法同時進行三方視訊會談。第二種情形則是第二使用者與第三使用者必須透過同一網路攝影機來與第一使用者進行視訊會議，而第二使用者與第三使用者必須擠在網路攝影機之拍攝範圍內才可同時拍攝到第二使用者與第三使用者之影像；若不想擠在網路攝影機之拍攝範圍內的話，必須於需發言的人位於拍攝範圍內，而當另一人發言時則交換位子，如此輪流發言的方式非常不方便且效率低下。

【發明內容】

本發明之目的在提供一種可顯示複數影像於同一影像之產生網路視訊影像之方法。

於一較佳實施例中，本發明提供一種產生網路視訊影像之方法，包括：

建立第一電腦、第二電腦以及第三電腦與網路伺服器間之網路連線；

傳輸由第一電腦之第一網路攝影機所拍攝之第一影像、由第二電腦之第二網路攝影機所拍攝之第二影像以及由第三電腦之第三網路攝影機所拍攝之第三影像至網路伺服器；

使用網路伺服器中之視訊影像結合應用程式壓縮結合第一影像、第二影像以及第三影像而產生一會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦、第二電腦以及第三電腦。

於一較佳實施例中，第一影像、第二影像以及第三影像被儲存於網路伺服器之記憶體中。

於一較佳實施例中，視訊影像結合應用程式將該些影像壓縮結合而產生會議影像，且會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦係桌上型電腦或筆記型電腦。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦分別包括第一螢幕、第二螢幕以及第三螢幕，用以展示輸出至第一電腦、第二電腦以及第三電腦之會議影像。

於一較佳實施例中，本發明亦提供一種產生網路視訊影像之方法，包括：

建立第一電腦與第二電腦間之網路連線，其中第二電腦連接於第二網路攝影機以及第三網路攝影機；

傳輸由第一電腦之第一網路攝影機所拍攝之第一影像、由第二網路攝影機所拍攝之第二影像以及由第三網路攝影機所拍攝之第三影像至第二電腦；

使用第二電腦中之視訊影像結合應用程式壓縮結合第一影像、第二影像以及第三影像而產生會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦以及連接於第二電腦之一螢幕。

於一較佳實施例中，第一影像、第二影像以及第三影像被儲存於第二電腦之記憶體中。

於一較佳實施例中，會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦以及第二電腦係桌上型電腦或一記型電腦。

於一較佳實施例中，第二電腦更包括複數 USB 連接埠，使第二電腦藉由複數 USB 連接埠連接於第二網路攝影機以及

第三網路攝影機。

於一較佳實施例中，第二電腦更包括一 USB 擴充器，而 USB 擴充器具有複數 USB 連接埠，使第二電腦藉由該 USB 擴充器連接於第二網路攝影機以及第三網路攝影機。

於一較佳實施例中，第一電腦包括第一螢幕，用以展示輸出至第一電腦之會議影像。

於一較佳實施例中，連接於第二電腦之螢幕係一投射布幕，用以展示輸出至第二電腦之會議影像。

於一較佳實施例中，本發明更提供一種產生網路視訊影像之方法，包括：

分別使用第一電腦，第二電腦以及第三電腦產生並輸出第一影像、第二影像以及第三影像；

壓縮第一影像、第二影像以及第三影像並將之結合為一會議影像，其中會議影像包括第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像，且第一被壓縮影像、第二被壓縮影像以及第三被壓縮影像可同時顯示於會議影像中；以及

分別輸出會議影像至第一電腦、第二電腦以及第三電腦。

於一較佳實施例中，第一電腦更包括第一網路攝影機，第二電腦更包括第二網路攝影機，而第三電腦更包括第三網路攝影機，該些網路攝影機分別用以拍攝而產生第一影像、第二影像以及第三影像。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦透過網路輸出第一影像、第二影像以及第三影像至網路伺服器之

記憶體中。

於一較佳實施例中，會議影像被儲存於記憶體中。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦係桌上型電腦或筆記型電腦。

於一較佳實施例中，第一電腦、第二電腦以及第三電腦更各自包括第一螢幕、第二螢幕以及第三螢幕，用以分別展示輸出至第一電腦、第二電腦以及第三電腦之會議影像。

【實施方式】

以下藉由實施例來說明本發明之方法，請參閱第一圖，其為本發明產生網路視訊影像之方法於一較佳實施例之方塊示意圖。第一圖中揭露應用於使用者與位於同一地點之多位使用者進行視訊會議之較佳實施例，其中第一使用者 A 位於第一地點 P_A ，而第二使用者 B、第三使用者 C、第四使用者 D 以及第五使用者 E 位於第二地點 P_B ，其中第二地點 P_B 係一會議室。網路視訊系統 1 中包括網路伺服器 20、位於第一地點 P_A 之第一電腦 11 以及位於第二地點 P_B (即會議室) 之第二電腦 12，其中第二電腦 12 包括一記憶體 201 以及一視訊影像結合應用程式 202，且第二電腦 12 另外連接於一投影布幕 30。為了使位於第二地點 P_B 之四位使用者不必擠在攝影機之拍攝範圍內，於每一使用者面前設置一網路攝影機，其中第二網路攝影機 122 用以拍攝第二使用者 B，第三網路攝影機 132 用以拍攝第三使用者 C，第四網路攝影機 142 拍攝第四使用者 D，而第五

網路攝影機 152 拍攝第五使用者 E，且該些網路攝影機 122 至 152 連接於第二電腦 12，其中位於第二地點 P_B 之第二電腦 12 係桌上型電腦，而位於第一地點 P_A 之第一使用者 A 所使用之第一電腦 11 係包括第一螢幕 111 以及第一網路攝影機 112 之筆記型電腦。

第一圖中，當第一使用者 A 欲與其他四位使用者 B 至 E 進行視訊會議時，使第一電腦 11 透過網際網路連接於第二電腦 12，接下來第一電腦 11 之第一網路攝影機 112 拍攝第一使用者 A 而產生一第一影像 I_A ，而位於第二地點 P_B 之第二網路攝影機 122 拍攝第二使用者 B 而產生一第二影像 I_B ，第三網路攝影機 132 拍攝第三使用者 C 而產生一第三影像 I_C ，第四網路攝影機 142 拍攝第四使用者 D 而產生一第四影像 I_D ，而第五網路攝影機 152 拍攝第五使用者 E 而產生一第五影像 I_E 。位於第二地點 P_B 之網路攝影機 122 至 152 透過一擴充器 40 連接於第二電腦 12，其中第二網路攝影機 122 連接於擴充器 40 之第一 USB 連接埠 401，第三網路攝影機 132 連接於擴充器 40 之第二 USB 連接埠 402，第四網路攝影機 142 連接於擴充器 40 之第三 USB 連接埠 403，而第五網路攝影機 152 連接於擴充器 40 之第四 USB 連接埠 404。一般而言，網路攝影機可直接連接於電腦之 USB 連接埠即可，於本較佳實施例中另設置一擴充器 40 係由於網路攝影機之數量大於第二電腦 12 之 USB 連接埠。

影像擷取完成後，第一電腦 11 透過網路輸出第一影像 I_A 至第二電腦 12 之記憶體 201 儲存，而位於第二地點 P_B 之網路

攝影機 122 至 152 透過實體線路將影像 I_B 至 I_E 傳輸至第二電腦 12 之記憶體 201，於本較佳實施例中，該些影像 I_A 至 I_E 之解析度係為 640×480 。接下來，第二電腦 12 中之視訊影像結合應用程式 202 壓縮該些影像 I_A 至 I_E 為第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} ，其中被壓縮影像 I_{CA} 至 I_{CE} 之解析度小於 640×480 。此外，視訊影像結合應用程式 202 更將該些被壓縮影像 I_{CA} 至 I_{CE} 結合為一會議影像 $I_{meeting}$ ，其中會議影像 $I_{meeting}$ 包括第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} ，且第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} 可同時顯示於該會議影像 $I_{meeting}$ 中，而會議影像 $I_{meeting}$ 之影像解析度亦為 640×480 ，會議影像 $I_{meeting}$ 之排列方式如第一圖中之所示。

接下來會議影像 $I_{meeting}$ 被輸出至第一電腦 11 之第一螢幕 111，而會議影像 $I_{meeting}$ 亦被輸出至連接於第二電腦 12 之投影布幕 30，使位於第二地點 P_B 之使用者 B 至 E 可同時觀看顯示於投影布幕 30 之會議影像 $I_{meeting}$ ，同樣地，第一使用者 A 亦可透過第一螢幕 111 觀看會議影像 $I_{meeting}$ 。本發明將所有使用者之影像整合於一張會議影像 $I_{meeting}$ 上並將其輸出至位於不同地點之螢幕，使每個使用者可看到每個會議參與者之影像，不需如習知技術般交換位子或擠在拍攝範圍內，而可讓複數使用者得以進行兩人以上之視訊會議。

本較佳實施例僅揭露一種會議影像 $I_{meeting}$ 之排列形式，如

第一圖所示，但本發明之方法並未限制會議影像 I_{meeting} 之排列形式。由上述可知，本發明產生網路視訊影像之方法解決了位於不同地點之使用者無法同時進行視訊會議之困擾。

接下來說明多位使用者位於不同地點進行視訊會議之情況，請參閱第二圖，其為本發明產生網路視訊影像之方法於另一較佳實施例中之方塊示意圖。第二圖揭露了應用於五位使用者位於不同地點之較佳實施例，其中第一使用者 A 位於第一地點 P_A ，第二使用者 B 位於第二地點 P_B ，第三使用者 C 位於第三地點 P_C ，第四使用者 D 位於第四地點 P_D ，而第五使用者 E 位於第五地點 P_E 。網路視訊系統 1 中包括網路伺服器 20、位於第一地點 P_A 之第一電腦 11、位於第二地點 P_B 之第二電腦 12、位於第三地點 P_C 之第三電腦 13、位於第四地點 P_D 之第四電腦 14 以及位於第五地點 P_E 之第五電腦 15，其中網路伺服器 20 包括一記憶體 201 以及一視訊影像結合應用程式 202。於本較佳實施例中，電腦 11 至 15 皆為內建網路攝影機之筆記型電腦，其中第一電腦 11 包括第一螢幕 111 以及第一網路攝影機 112，第二電腦 12 包括第二螢幕 121 以及第二網路攝影機 122，第三電腦 13 包括第三螢幕 131 以及第三網路攝影機 132，第四電腦 14 包括第四螢幕 141 以及第四網路攝影機 142，第五電腦 15 包括第五螢幕 151 以及第五網路攝影機 152。

第二圖中，當第一使用者 A 欲與其他四位使用者進行視訊會議時，使第一電腦 11 連接上網際網路而建立第一電腦 11 與網路伺服器 20 之網路連線，其他四台電腦 12 至 15 亦透過網際網路連接至網路伺服器 20。第一電腦 11 之第一網路攝影機

112 拍攝第一使用者 A 而產生一第一影像 I_A ，第二電腦 12 之第二網路攝影機 122 拍攝第二使用者 B 而產生一第二影像 I_B ，第三電腦 13 之第三網路攝影機 132 拍攝第三使用者 C 而產生一第三影像 I_C ，第四電腦 14 之第四網路攝影機 142 拍攝第四使用者 D 而產生一第四影像 I_D ，而第五電腦 15 之第五網路攝影機 152 拍攝第五使用者 E 而產生一第五影像 I_E ，於本較佳實施例中，該些影像 I_A 至 I_E 之解析度係為 640×480 。而該些影像 I_A 至 I_E 透過網路傳輸至網路伺服器 20 之記憶體 201 儲存，網路伺服器 20 中之視訊影像結合應用程式 202 將該些影像 I_A 至 I_E 壓縮為解析度 320×240 之第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} ，並將該些被壓縮影像 I_{CA} 至 I_{CE} 結合為一會議影像 $I_{meeting}$ ，其中會議影像 $I_{meeting}$ 包括第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} ，且第一被壓縮影像 I_{CA} 、第二被壓縮影像 I_{CB} 、第三被壓縮影像 I_{CC} 、第四被壓縮影像 I_{CD} 以及第五被壓縮影像 I_{CE} 可同時顯示於該會議影像 $I_{meeting}$ 中。

接下來會議影像 $I_{meeting}$ 被分別輸出至第一電腦 11、第二電腦 12、第三電腦 13、第四電腦 14 以及第五電腦 15，再分別將會議影像 $I_{meeting}$ 顯示於第一螢幕 111、第二螢幕 121、第三螢幕 131、第四螢幕 141 以及第五螢幕 151 上，以供電腦前之各使用者觀看，讓每一使用者可看到每個會議參與者之影像，甚至於可看到自己的影像，藉此，讓複數使用者得以進行兩人以上之視訊會議。需特別說明的是，於本較佳實施例中，視訊影

像結合應用程式將影像解析度為 640×480 之該些影像 I_A 至 I_E 壓縮為影像解析度 320×240 之該些被壓縮影像 I_{CA} 至 I_{CE} ，再將被壓縮之影像結合為會議影像 $I_{meeting}$ ，而會議影像 $I_{meeting}$ 之影像解析度亦為 640×480 。本較佳實施例揭露了不同於第一圖之會議影像 $I_{meeting}$ 之排列形式，且本發明之方法並未限制視訊影像結合應用程式將影像壓縮為何種解析度之被壓縮影像，唯一限制僅是被壓縮影像之解析度小於未壓縮前之影像，而未壓縮前之影像以及會議影像 $I_{meeting}$ 之影像解析度並不限於 640×480 。

由上述二較佳實施例可知，本發明產生網路視訊影像之方法可解決習知技術中使用者無法同時進行一人對多人或多對多視訊會議之困擾，且本發明方法僅需另設計一視訊影像結合應用程式即可直接使用於現有之硬體上，而不需額外耗費研發成本。此外，實施本發明方法雖需龐大的網路頻寬以及記憶體設備，但以現在的電腦技術是可以達成的，更何況電腦科技仍繼續研發中，日後電腦科技更發達、更成熟時，本發明之方法則可更臻完善。

以上所述僅為本發明之較佳實施例，並非用以限定本發明之申請專利範圍，因此凡其它未脫離本發明所揭示之精神下所完成之等效改變或修飾，均應包含於本案之申請專利範圍內。

【圖式簡單說明】

第一圖係本發明產生網路視訊影像之方法於一較佳實施例中之方塊示意圖。

第二圖係本發明產生網路視訊影像之方法於另一較佳實施例中之方塊示意圖。

【主要元件符號說明】

1 網路視訊系統

11、12、13、14、15 電腦

20 網路伺服器

30 投射布幕

40 擴充器

111、121、131、141、151 螢幕

112、122、132、142、152 網路攝影機

201 記憶體

202 視訊影像結合應用程式

401、402、403、404 USB 連接埠

A、B、C、D、E 使用者

I_A 、 I_B 、 I_C 、 I_D 、 I_E 影像

I_{CA} 、 I_{CB} 、 I_{CC} 、 I_{CD} 、 I_{CE} 影像

$I_{meeting}$ 會議影像

P_A 、 P_B 、 P_C 、 P_D 、 P_E 地點

發明專利說明書

(本說明書格式、順序，請勿任意更動，※記號部分請勿填寫)

※申請案號：97134980

※申請日：97.9.12 ※IPC 分類：H04N 7/5(2006.01)

一、發明名稱：(中文/英文)

產生網路視訊影像之方法 / METHOD FOR PRODUCING
INTERNET VIDEO IMAGES

二、中文發明摘要：

本發明係關於一種產生網路視訊影像之方法，包括分別使用複數網路攝影機產生複數影像，壓縮該複數影像並將之結合為一單一會議影像，以及輸出該會議影像至複數螢幕。

三、英文發明摘要：

The present invention discloses a method for producing internet video images. The method comprises producing a plural of video images by a plural of webcams, compressing the video images into compressed video images and merge the compressed video images into a single conference image and outputting the conference image to plural screens.

七、申請專利範圍：

1、一種產生網路視訊影像之方法，包括：

建立一第一電腦、一第二電腦以及一第三電腦與一網路伺服器間之網路連線；

傳輸由該第一電腦之一第一網路攝影機所拍攝之一第一影像、由該第二電腦之一第二網路攝影機所拍攝之一第二影像以及由該第三電腦之一第三網路攝影機所拍攝之一第三影像至該網路伺服器；

使用該網路伺服器中之一視訊影像結合應用程式壓縮結合該第一影像、該第二影像以及該第三影像而產生一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦、該第二電腦以及該第三電腦。

2、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一影像、該第二影像以及該第三影像被儲存於該網路伺服器之一記憶體中。

3、如申請專利範圍第 2 項所述之產生網路視訊影像之方法，其中該視訊影像結合應用程式將該些影像壓縮結合而產生該會議影像，且該會議影像被儲存於該記憶體中。

4、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦係一桌上型電腦或一

筆記型電腦。

5、如申請專利範圍第 1 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦分別包括一第一螢幕、一第二螢幕以及一第三螢幕，用以展示輸出至該第一電腦、該第二電腦以及該第三電腦之該會議影像。

6、一種產生網路視訊影像之方法，包括：

建立一第一電腦與一第二電腦間之網路連線，其中該第二電腦連接於一第二網路攝影機以及一第三網路攝影機；

傳輸由該第一電腦之一第一網路攝影機所拍攝之一第一影像、由該第二網路攝影機所拍攝之一第二影像以及由該第三網路攝影機所拍攝之一第三影像至該第二電腦；

使用該第二電腦中之一視訊影像結合應用程式壓縮結合該第一影像、第二影像以及該第三影像而產生一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦以及連接於該第二電腦之一螢幕。

7、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第一影像、該第二影像以及該第三影像被儲存於該第二電腦之一記憶體中。

8、如申請專利範圍第 7 項所述之產生網路視訊影像之方法，其中該會議影像被儲存於該記憶體中。

9、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其

中該第一電腦以及該第二電腦係一桌上型電腦或一筆記型電腦。

10、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第二電腦更包括複數 USB 連接埠，使該第二電腦藉由該複數 USB 連接埠連接於該第二網路攝影機以及該第三網路攝影機。

11、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第二電腦更包括一 USB 擴充器，而該 USB 擴充器具有複數 USB 連接埠，使該第二電腦藉由該 USB 擴充器連接於該第二網路攝影機以及該第三網路攝影機。

12、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中該第一電腦包括一第一螢幕，用以展示輸出至該第一電腦之該會議影像。

13、如申請專利範圍第 6 項所述之產生網路視訊影像之方法，其中連接於該第二電腦之該螢幕係一投射布幕，用以展示輸出至該第二電腦之該會議影像。

14、一種產生網路視訊影像之方法，包括：

分別使用一第一電腦，一第二電腦以及一第三電腦產生並輸出一第一影像、一第二影像以及一第三影像；

壓縮該第一影像、該第二影像以及該第三影像並將之結合為一會議影像，其中該會議影像包括一第一被壓縮影像、一第二被壓縮影像以及一第三被壓縮影像，且該第一被壓縮影像、該第二被壓縮影像以及該第三被壓縮影像可同時顯示於該會議影像中；以及

分別輸出該會議影像至該第一電腦、該第二電腦以及該第三電腦。

15、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦更包括一第一網路攝影機，該第二電腦更包括一第二網路攝影機，而該第三電腦更包括一第三網路攝影機，該些網路攝影機分別用以拍攝而產生該第一影像、該第二影像以及該第三影像。

16、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦透過網路輸出該第一影像、該第二影像以及該第三影像至一網路伺服器之一記憶體中。

17、如申請專利範圍第 16 項所述之產生網路視訊影像之方法，其中該會議影像被儲存於該記憶體中。

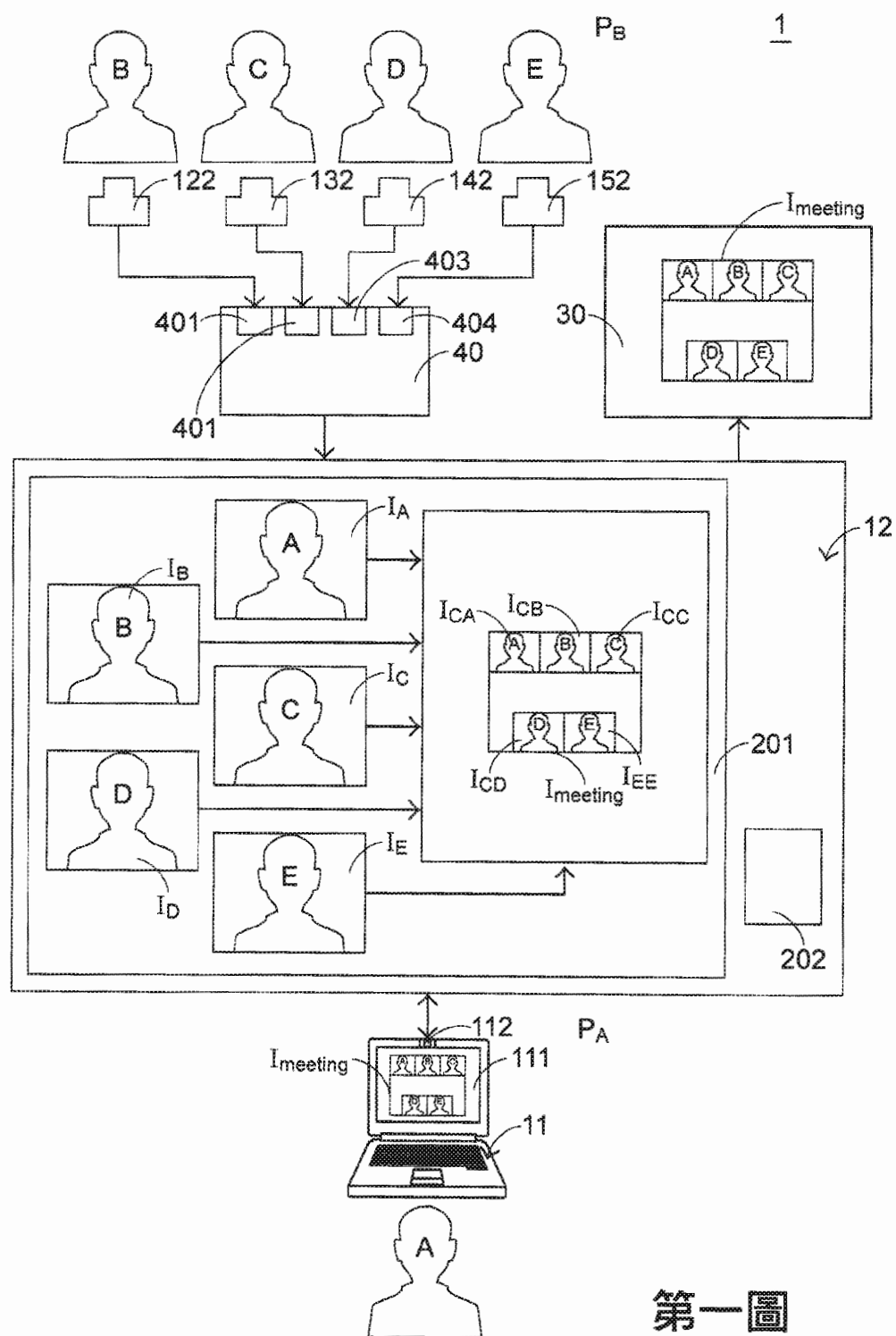
18、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦係一桌上型電腦或一筆記型電腦。

19、如申請專利範圍第 14 項所述之產生網路視訊影像之方法，其中該第一電腦、該第二電腦以及該第三電腦更各自包括一第一螢幕、一第二螢幕以及一第三螢幕，用以分別展示輸出至該第一電腦、該第二電腦以及該第三電腦之該會議影像。

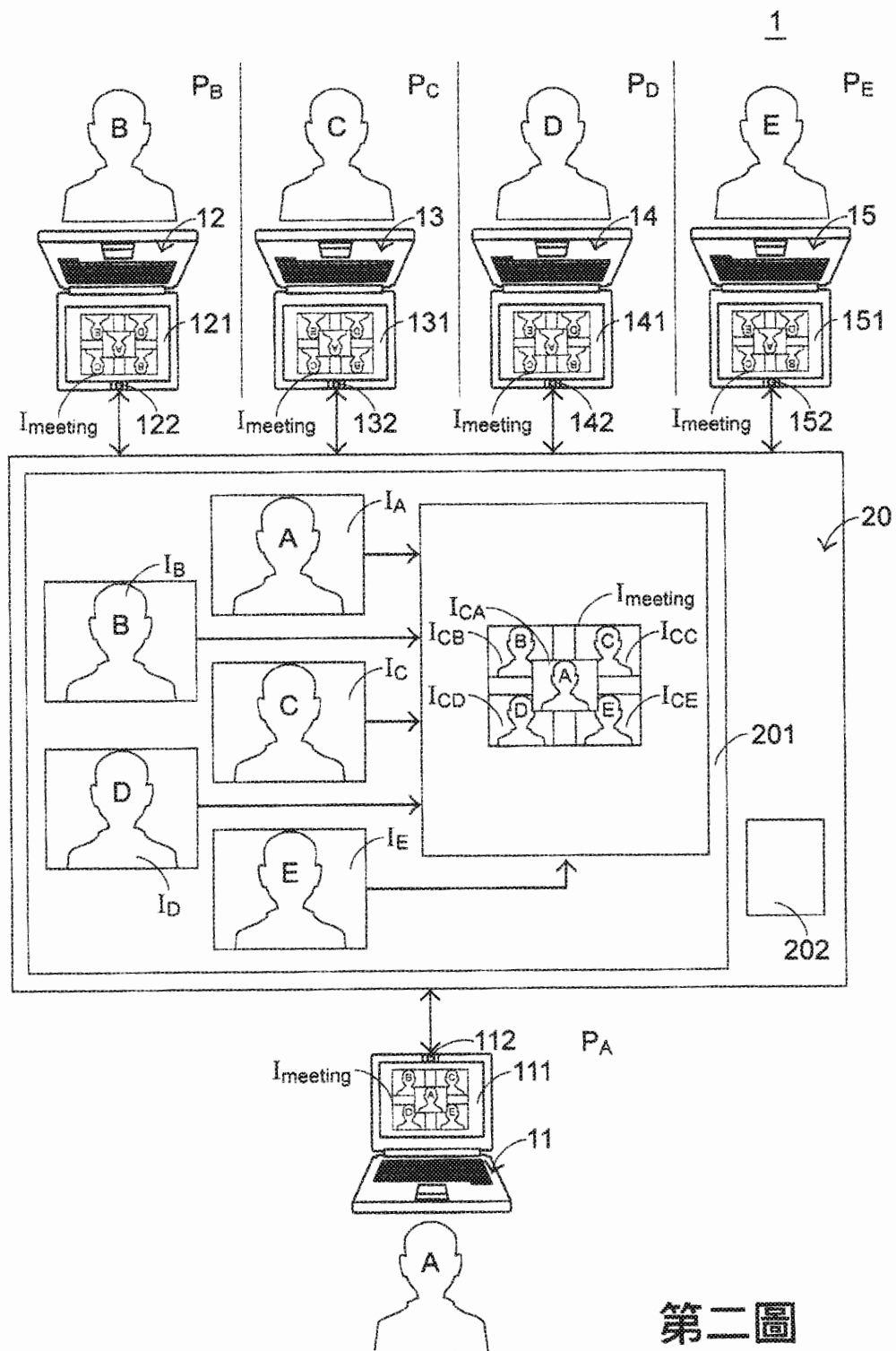
201012222

八、圖式：





第一圖



四、指定代表圖：

(一)本案指定代表圖為：第（ 二 ）圖。

(二)本代表圖之元件符號簡單說明：

1 網路視訊系統

11、12、13、14、15 電腦

20 網路伺服器

111、121、131、141、151 螢幕

112、122、132、142、152 網路攝影機

201 記憶體

202 視訊影像結合應用程式

A、B、C、D、E 使用者

I_A、I_B、I_C、I_D、I_E 影像

I_{CA}、I_{CB}、I_{CC}、I_{CD}、I_{CE} 影像

I_{meeting} 會議影像

P_A、P_B、P_C、P_D、P_E 地點

五、本案若有化學式時，請揭示最能顯示發明特徵的化學式：

無

Electronic Acknowledgement Receipt

EFS ID:	40210088
Application Number:	16852790
International Application Number:	
Confirmation Number:	5321
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
Filer:	Thomas Lee/Shelly Darrenkamp
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	BEEL3004C/TL
Receipt Date:	06-AUG-2020
Filing Date:	20-APR-2020
Time Stamp:	11:50:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	1035131	no	5
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Information:					
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/852,790	04/20/2020	Koen Simon Herman Beel	BEEL3004C/TL

CONFIRMATION NO. 5321

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

PUBLICATION NOTICE



OC000000119014933

Title:ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

Publication No.US-2020-0250110-A1

Publication Date:08/06/2020

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The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS, CHRISTOPHER A.
	Attorney Docket Number	BEEL3004C/TL

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

1	U.S. Office Action in corresponding U.S. Application No. 16/034,846, dated June 25, 2020.
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Examiner Signature	Date Considered
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-30
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EFS ID:	39870934
Application Number:	16852790
International Application Number:	
Confirmation Number:	5321
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
Filer:	Thomas Lee/Shelly Darrenkamp
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	BEEL3004C/TL
Receipt Date:	30-JUN-2020
Filing Date:	20-APR-2020
Time Stamp:	14:41:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	612128	no	4
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16852790
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	BARTELS, CHRISTOPHER A.
	Attorney Docket Number	BEEL3004C/TL

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16852790
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	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

1	LINQ SOFTWARE USER'S GUIDE, Smart Technologies Inc., Copyright 2004-2005, Version 1.0, pages 1-19.		
If you wish to add additional non-patent literature document citation information please click the Add button Add			
EXAMINER SIGNATURE			
Examiner Signature			Date Considered
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.			
¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.			

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16852790
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	BARTELS, CHRISTOPHER A.	
	Attorney Docket Number	BEEL3004C/TL	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☒ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-06-16
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	39728220
Application Number:	16852790
International Application Number:	
Confirmation Number:	5321
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman Beel
Customer Number:	23364
Filer:	Thomas Lee/Shelly Darrenkamp
Filer Authorized By:	Thomas Lee
Attorney Docket Number:	BEEL3004C/TL
Receipt Date:	16-JUN-2020
Filing Date:	20-APR-2020
Time Stamp:	11:41:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS.pdf	612267	no	4
			13f9c97666f897b45d838e7d0bf3aaf1b3f7fcd2		

Warnings:

Information:					
2	Non Patent Literature	LinQ_Software_Users_Guide. pdf	2532188	no	19
			5ecd1dab1c60cf631ea7f88a95907d0a9a3c8107		
Warnings:					
Information:					
Total Files Size (in bytes):				3144455	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
16/852,790	04/20/2020	2676	2180	BEEL3004C/TL	20	4

CONFIRMATION NO. 5321

FILING RECEIPT



0000000118311690

23364
BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314-1176

Date Mailed: 04/27/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Koen Simon Herman Beel, Eke, BELGIUM;
Yoav Nir, Komen, BELGIUM;
Filip Josephine Johan Louwet, Knesselare, BELGIUM;
Guy Coen, Aalst, BELGIUM;

Applicant(s)

BARCO N.V., Kortrijk, BELGIUM;

Assignment For Published Patent Application

BARCO N.V., Kortrijk, BELGIUM

Power of Attorney: The patent practitioners associated with Customer Number 23364

Domestic Priority data as claimed by applicant

This application is a CON of 14/344,836 03/03/2015
which is a 371 of PCT/EP2012/068167 09/14/2012
which claims benefit of 61/534,592 09/14/2011
and claims benefit of 61/635,234 04/18/2012
and is a CIP of 13/270,659 10/11/2011 PAT 8756348

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 04/23/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/852,790**

Projected Publication Date: 08/06/2020

Non-Publication Request: No

Early Publication Request: No
Title

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

Preliminary Class

358

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/852,790	
APPLICATION AS FILED - PART I							
(Column 1)		(Column 2)		SMALL ENTITY		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *				x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = *	1			x 460 =	460
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
			TOTAL			TOTAL	2180
* If the difference in column 1 is less than zero, enter "0" in column 2.							
APPLICATION AS AMENDED - PART II							
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
				TOTAL ADD'L FEE			TOTAL ADD'L FEE
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)
	Total (37 CFR 1.16(i))	*	Minus **	=	x =		x =
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x =		x =
	Application Size Fee (37 CFR 1.16(s))						
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
				TOTAL ADD'L FEE			TOTAL ADD'L FEE
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.							

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	
	Filing Date	2020-04-20
	First Named Inventor	Koen Simon Herman BEEL
	Art Unit	2184
	Examiner Name	
	Attorney Docket Number	BEEL3004C/TL

U.S.PATENTS							Remove
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	6966035	B1	2005-11-15	Suess et al.	Cited in Specification	
	2	8316138	B2	2012-11-20	Chang		
	3	8346753	B2	2013-01-01	HAYES		
If you wish to add additional U.S. Patent citation information please click the Add button.							Add
U.S.PATENT APPLICATION PUBLICATIONS							Remove
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	
	1	20100087139	A1	2010-04-08	Glass	Cited in Specification and German Search Report	
	2	20060095376	A1	2006-05-04	Mitchell et al.	Cited in Specification	
	3	20090198839	A1	2009-08-06	Banerjee et al.	Cited in Specification	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
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	Art Unit	2184	
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4	20110115689	A1	2011-05-19	Sugiyama et al.	Cited in Specification
5	20020196378	A1	2002-12-26	Slobodin et al.	Cited in Specification
6	20130067121	A1	2013-05-14	Beel et al.	Related U.S. App. 13/270,659
7	20130050254	A1	2013-02-28	Tran et al.	
8	20120331509	A1	2012-12-27	Laksono	
9	20070005809	A1	2007-01-04	Kobayashi et al.	
10	20100302130	A1	2010-12-02	Kikuchi et al.	
11	20070244970	A1	2007-10-18	Watanabe et al.	
12	20060031779	A1	2006-02-09	Theurer et al.	
13	20050036509	A1	2005-02-17	Acharya et al.	
14	20040263636	A1	2004-12-30	Cutler et al.	

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	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name		
	Attorney Docket Number	BEEL3004C/TL	

	15	20090046139	A1	2009-02-19	Cutler et al.	
	16	20110023096	A1	2011-01-27	XIAO et al.	
	17	20070033289	A1	2007-02-08	NUYTTENS et al.	
	18	20140082227	A1	2014-03-20	BEEL et al.	
	19	20040125777	A1	2004-07-01	Doyle et al.	
	20	20070065078	A1	2007-03-22	Jiang	
	21	20090247006	A1	2009-10-01	Thompson	
	22	20130054348	A1	2013-02-28	Holsman et al.	
	23	20100302454	A1	2010-12-02	EPSTEIN et al.	
	24	20090064302	A1	2009-03-05	COLELLA	
	25	20130060662	A1	2013-03-07	CARLSON et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number			
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	Attorney Docket Number	BEEL3004C/TL		

	26	20110078716	A1	2011-03-31	MACWAN	
	27	20100332663	A1	2010-12-30	CHANG	
	28	20090235170	A1	2009-09-17	GOLDEN et al.	
	29	20040128354	A1	2004-07-01	HORIKIRI et al.	corresponds to CN 1499841
	30	20100066806	A1	2010-03-18	LYU	
	31	20070109410	A1	2007-05-17	SIEW	
	32	20110150433	A1	2011-06-23	ALEXANDROV et al.	
	33	20110180380	A1	2011-07-28	Lee	
	34	20020174254	A1	2002-11-21	KITA et al.	corresponds to CN 1689275

If you wish to add additional U.S. Published Application citation information please click the Add button.

FOREIGN PATENT DOCUMENTS Remove							
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear ^{T5}

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number			
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	First Named Inventor	Koen Simon Herman BEEL		
	Art Unit	2184		
	Examiner Name			
	Attorney Docket Number	BEEL3004C/TL		

1	00/52887	WO	A1	2000-09-08	MICROSOFT CORPORATION		
2	1246395	EP	A1	2002-10-02	MOTOROLA, INC.		
3	1187480	EP	A1	2002-03-13	TELESUITE CORP.		
4	2001/089156	WO	A2	2001-11-22	SONY CORP		
5	2008/271265	JP	A	2008-11-06	MATSUSHITA ELECTRIC IND CO LTD	English abstract and translation	×
6	2107463	EP	A2	2009-10-07	OPTION		☐
7	2756668	EP	A	2014-07-23	BARCO NV	corresponds to WO 2013/037979	☐
8	1499841	CN	A	2004-05-26	FUJI XEIOX CO LTD	cited in CN OA, corresponds to US 20040128354	☒
9	101106681	CN	A	2008-01-16	VTRON CORP	cited in CN OA, English machine translation	☒
10	1788494	CN	A	2006-06-14	TELESUIT CORP	cited in CN OA, English abstract	☒
11	101022529	CN	A	2007-08-22	LIXING INTERNAT SCIENCE & TECH	cited in CN OA, English abstract	☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number			
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	Art Unit	2184		
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	Attorney Docket Number	BEEL3004C/TL		

	12	101106469	CN	A	2008-01-16	AWIND INC	cited in CN OA, English abstract	☒
	13	101442500	CN	A	2009-05-27	XIAOTAO YIN	cited in CN OA, English abstract	☒
	14	101828392	CN	A	2010-09-08	CREATIVE TECH LTD	cited in CN OA, English abstract	☒
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	17	2007/137415	WO	A1	2007-12-06	SMART TECH INC	cited in EP Office Communication	☐

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	1	International Search Report (ISR) dated March 6, 2013, for PCT/EP2012/068166.	
	2	International Search Report (ISR) dated March 19, 2013, for PCT/EP2012/068167.	
	3	International Search Report (ISR) dated March 4, 2013, for PCT/EP2012/068168.	

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	4	International Search Report (ISR) dated January 28, 2013, for PCT/EP2012/068169.	
	5	British Search Report dated August 28, 2012, for GB 1206841.7.	
	6	German Search Report dated November 17, 2011, for DE 102011055443.2.	
	7	Jiang et al., "A Novel Wireless Approach for Conference Projecting and Cooperating", Lecture Notes in Computer Science, Vol. 4159, pp. 688-697, 2006. (cited in GB 1206841.7 Search Report)	
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15	Office Action in related U.S. Application Number 14/344,836, dated February 28, 2018.	☐
16	U.S. Office Action dated October 20, 2017, for U.S. Application No. 14/344,836.	☐
17	European Notice of Opposition dated September 27, 2017 for EP 2756668.	☐
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24	European Office Communication dated June 15, 2015, for EP 12762258.7.	☐
25	European Office Action dated August 1, 2016, for EP 12762258.7.	☐

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26	U.S. Office Action dated June 17, 2016, for 14/278,442.	☐
27	U.S. Office Action dated June 17, 2016, for 14/725,401.	☐
28	Chinese Office Action dated April 5, 2017, for CN 201280055744.2, and English translation thereof.	☐
29	U.S. Office Action dated May 3, 2017, for U.S. Application No. 14/344,836.	☐
30	Chinese Office Action dated September 26, 2017, for CN 201280055744.2, and English translation thereof.	☒
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	37	Final Office Action in corresponding U.S. App. 14/725,401 dated January 26, 2017.	☐
	38	Final Office Action in corresponding U.S. App. 14/278,442 dated January 26, 2017.	☐
	39	Chinese Office Action in Chinese Application Number 201280074077.2, dated January 4, 2018.	☒
	40	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068166.	☐
	41	International Preliminary Report on Patentability (IPRP) dated March 27, 2014, for PCT/EP2012/068167.	☐
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	43	Request for Reexamination of Patent No. 8,756,348, dated February 9, 2018.	☐
	44	Request for Reexamination of Patent No. 9,083,769, dated February 9, 2018.	☐
	45	Intervention according to Art. 105 EPC in corresponding European patent 2756668, dated May 3, 2018.	☐
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	48	Chinese Office Action dated June 28, 2017, for CN 201280074077.2, and English translation thereof.	☒
	49	Chinese Office Action dated July 4, 2017, for CN 201280055667.0, and English translation thereof.	☒
	50	Chinese Office Action dated July 21, 2017, for CN 20128001542.X, and English translation thereof.	☒

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That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

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A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-04-20
Name/Print	THOMAS LEE	Registration Number	66396

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	1	6601087		2003-07-29	Zhu et al.		
	2	7584313		2009-09-01	Hay et al.		
	3	7762470		2010-07-27	Finn et al.		
	4	8069465		2011-11-29	Bartholomay et al.		
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	6	8521926		2013-08-27	Hsueh et al.		
	7	8601470		2013-12-03	Yue et al.		
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	9	8896656		2014-11-25	Epstein et al.	
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	2	20060233191		2006-10-19	Pirzada et al.	
	3	20070162661		2007-07-12	Fu et al.	
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	27	20110188391		2011-08-04	Sella et al.	
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16	2008165007	JP		2008-07-17	Brother Ind Ltd		×
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18	102045864	CN		2011-05-04	NEC Casio Mobile Comm Ltd.	English abstract	☐
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	12	Chinese Office Action dated October 10, 2016, for CN 201280055667.0.	
	13	Final Office Action in corresponding U.S. app. 14/395,364 dated November 2, 2016.	
	14	Office Action in related U.S. app. 14/725,401 dated December 31, 2019.	
	15	Summons to attend oral proceedings in corresponding EP 12762258.7 dated December 12, 2019.	
	16	Chinese Office Action in corresponding Chinese Application No. 201280074077.2, dated September 30, 2019.	
	17	U.S. Office Action in corresponding U.S. Application No. 14/278,442, dated September 18, 2019.	
	18	Notice on Reexamination in corresponding Chinese Application No. 201280001542.X, dated June 11, 2019.	×
	19	European Office Action in corresponding European Application No. 12759440.6-1204, dated May 28, 2019.	☐
	20	U.S. Office Action in corresponding U.S. Application No. 15/449,048, dated April 8, 2019.	☐
	21	European Office Action in corresponding European Application No. 12775162.6-1204, dated May 21, 2019.	☐
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23	European Office Action in corresponding European Application No. 16170760.9-1216, dated April 2, 2019.	☐
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37	Office Action in corresponding app. 14/344,830 dated September 27, 2017.	☐
38	Office Action in corresponding app. 14/344,830 dated October 6, 2016.	☐
39	Chinese Notice on Reexamination in corresponding Chinese Application No. 201280074077.2, dated March 31, 2020.	☒
40	European Office Action in corresponding European Application No. 12775162.6, dated April 14, 2020.	☐
41	Brazil Office Action in corresponding Brazil Application No. BR112014026147-4, dated April 8, 2020.	☒
42	Brazil Office Action in corresponding Brazil Application No. BR122015022158-7, dated April 8, 2020.	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	TBD	
	Attorney Docket Number	BEEL3004CTL	

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		
	Filing Date		2020-04-20
	First Named Inventor	Koen Simon Herman BEEL	
	Art Unit	2184	
	Examiner Name	TBD	
	Attorney Docket Number	BEEL3004CTL	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas Lee/	Date (YYYY-MM-DD)	2020-04-20
Name/Print	THOMAS LEE	Registration Number	66396

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
First Named Inventor/Applicant Name:		Koen Simon Herman BEEL		
Filer:		Thomas Lee/Shelly Darrenkamp		
Attorney Docket Number:		BEEL3004C/TL		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	460	460
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2180

Electronic Acknowledgement Receipt	
EFS ID:	39200129
Application Number:	16852790
International Application Number:	
Confirmation Number:	5321
Title of Invention:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
First Named Inventor/Applicant Name:	Koen Simon Herman BEEL
Customer Number:	23364
Filer:	Thomas Lee
Filer Authorized By:	
Attorney Docket Number:	BEEL3004C/TL
Receipt Date:	20-APR-2020
Filing Date:	
Time Stamp:	13:23:36
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2180
RAM confirmation Number	E20204JD25137959
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal of New Application	BEEL3004C_Utility_trans.pdf	291826	no	2
			8f07332feb3b3baa19155c51c1cf0e517f99dd71		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	BEEL3004C_Fee_Transmittal.pdf	235818	no	2
			f2625ffc05756fa3fc56da66398d860e4f6cf57		
Warnings:					
Information:					
3	Application Data Sheet	BEEL3004C_ADS.pdf	1256701	no	10
			5e4b1842d4bbb04f2e9e416310294c3c76e0a44b		
Warnings:					
Information:					
4		BEEL3004_pct_publication.pdf	3853839	yes	74
			522aa8840d031b32dff6daafb7c2eb5f75d3b559		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Abstract		1	2	
	Specification		3	55	
	Claims		56	68	
	Drawings-only black and white line drawings		69	74	
Warnings:					
Information:					

5		BEEL3004C_PrelimAmend.pdf	54702	yes	9
			2bad380b45100866ecc4d762c5533cd1959761db		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Preliminary Amendment		1	1	
	Abstract		2	3	
	Specification		4	4	
	Claims		5	8	
	Applicant Arguments/Remarks Made in an Amendment		9	9	
Warnings:					
Information:					
6	Oath or Declaration filed	BEEL3004_Dec_Assgn.pdf	385883	no	3
			aafd52da2e4aa574259d4ec876621b19d7374cc6		
Warnings:					
Information:					
7	Power of Attorney	GENERAL_POA_BARCO.pdf	158558	no	1
			28c4f1a66fb792dec0424ac70f226a829279744a		
Warnings:					
Information:					
8	Transmittal Letter	BEEL3004C_IDS_Transmittal_Ltr.pdf	26073	no	2
			041810f5b532f932d1113e558cc3b5c3cd3b1952		
Warnings:					
Information:					
9	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_IDS_SB08_Part1.pdf	616252	no	13
			a62a7d2a3d03157f3771320a3aeeba10fd65bd2		
Warnings:					
Information:					

10	Information Disclosure Statement (IDS) Form (SB08)	BEEL3004C_ids_Sb08_part2. pdf	1038097 cb47aaa576c52052be7abxc6d89dd7a7a2a757542	no	13
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	36689 b97fad66f64d9777aa4edbd850dc3bb0593834ae	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			7954438		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

GENERAL POWER OF ATTORNEY BY APPLICANT

This power revokes any previous powers of attorney given in the above-identified patent application.

I (we) hereby appoint Practitioners associated with the following Customer Number as my/our attorney, and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

Customer Number: 23364

Please recognize or change the correspondence address for the above-identified application to the address associated with the above-mentioned Customer Number.

I (we) am/are the Applicant Assignee or Person to Whom the Inventor is Under an Obligation to Assign. This revocation and appointment to the above-identified Practitioners is to the exclusion of the inventor(s).

Signature of Applicant for Patent

Signature			
Name	PETER GERETS	Date	12/02/2017
Title and Company	BARCO NV, VP Technology		

General Power of Attorney
rev. 05NOV12
Substitute for PTO/AIA/82B
Bacon & Thomas, PLLC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Continuation Patent Application of:
U.S. App. No. 14/344,836

Application No.:	TBD	Confirm. No.:	TBD
Filing Date:	April 20, 2020	Art Unit:	2184
First Inventor:	Koen Simon Herman BEEL	Customer No.:	23364
Attorney No.:	BEEL3004C/TL	Examiner:	TBD
For:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:

INTRODUCTORY COMMENTS

Pursuant to Rule 37 C.F.R. §§ 1.51(b), 1.56, 1.97 and 1.98, this Information Disclosure Statement is submitted in the above-identified patent application. A listing of documents to be published on the face of any patent granted from this application is submitted herewith on the attached form PTO/SB/08A. Any other documents or information submitted for consideration by the Examiner are listed on the attached forms. Copies of the references are not provided as they are of record in the parent Application Nos. 14/344,836 and 13/270,659 (*see* MPEP 609.02).

This Information Disclosure Statement is submitted before the mailing of a first Office action on the merits. No fees are required.

Atty. Dkt. No. BEEL3004C/TL

The Examiner is requested to acknowledge consideration of the information provided in this paper in accordance with prescribed procedures.

BACON & THOMAS, PLLC	Respectfully submitted,
625 Slaters Lane, Fourth Floor	
Alexandria, Virginia 22314-1176	/Thomas Lee/
Phone: (703) 683-0500	

Date: April 20, 2020	THOMAS LEE
	Attorney for Applicant
	Registration No. 66,396

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

UTILITY PATENT APPLICATION TRANSMITTAL <i>(Only for new nonprovisional applications under 37 CFR 1.53(b))</i>	Attorney Docket No.	BEEL3004C/TL
	First Named Inventor	Koen Simon Herman BEEL
	Title	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS
	Priority Mail Express® Label No.	

APPLICATION ELEMENTS <i>See MPEP chapter 600 concerning utility patent application contents.</i>	Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450
1. ☒ Fee Transmittal Form (PTO/SB/17 or equivalent) 2. ☐ Applicant asserts small entity status. See 37 CFR 1.27 3. ☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent. 4. ☒ Specification [Total Pages <u>68</u>] Both the claims and abstract must start on a new page. (See MPEP § 608.01(a) for information on the preferred arrangement) 5. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets <u>6</u>] 6. ☐ Inventor's Oath or Declaration [Total Pages <u>3</u>] (including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e)) a. ☐ Newly executed (original or copy) b. ☒ A copy from a prior application (37 CFR 1.63(d)) 7. ☒ Application Data Sheet * See note below. See 37 CFR 1.76 (PTO/AIA/14 or equivalent) 8. ☐ CD-ROM or CD-R in duplicate, large table, or Computer Program (Appendix) ☐ Landscape Table on CD 9. Nucleotide and/or Amino Acid Sequence Submission (if applicable, items a. – c. are required) a. ☐ Computer Readable Form (CRF) b. ☐ Specification Sequence Listing on: i. ☐ CD-ROM or CD-R (2 copies); or ii. ☐ Paper c. ☐ Statements verifying identity of above copies	ACCOMPANYING APPLICATION PAPERS 10. ☐ Assignment Papers (cover sheet & document(s)) Name of Assignee _____ 11. ☐ 37 CFR 3.73(c) Statement ☒ Power of Attorney (when there is an assignee) 12. ☐ English Translation Document (if applicable) 13. ☒ Information Disclosure Statement (PTO/SB/08 or PTO-1449) ☒ Copies of citations attached 14. ☒ Preliminary Amendment 15. ☐ Return Receipt Postcard (MPEP § 503) (Should be specifically itemized) 16. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed) 17. ☐ Nonpublication Request Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent. 18. ☒ Other: Applicant incorporates by reference parent application no. 14/344,836 _____ _____ _____

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
 (2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS					
☒ The address associated with Customer Number: <u>23364</u> OR ☐ Correspondence address below					
Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	
Signature	/Thomas Lee/			Date	April 20, 2020
Name (Print/Type)	THOMAS LEE			Registration No. (Attorney/Agent)	66396

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number

FEE TRANSMITTAL		Complete if known	
		Application Number	
		Filing Date	April 20, 2020
☐ Applicant asserts small entity status. See 37 CFR 1.27.		First Named Inventor	Koen Simon Herman BEEL
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.		Examiner Name	
		Art Unit	
TOTAL AMOUNT OF PAYMENT	(\$)	2180	Practitioner Docket No. BEEL3004C/TL

METHOD OF PAYMENT (check all that apply)
☐ Check ☐ Credit Card ☐ Money Order ☐ None ☒ Other (please identify): EFS Web
☒ Deposit Account Deposit Account Number: 02-0200 Deposit Account Name: Bacon & Thomas, PLLC

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☒ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**
☐ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayment of fee(s)
WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

Application Type	FILING FEES			SEARCH FEES			EXAMINATION FEES			Fees Paid (\$)
	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	U (\$)	S (\$)	M (\$)	
Utility	300	150*	75	660	330	165	760	380	190	1720
Design	200	100	50	160	80	40	600	300	150	
Plant	200	100	50	420	210	105	620	310	155	
Reissue	300	150	75	660	330	165	2,200	1,100	550	
Provisional	280	140	70	0	0	0	0	0	0	

* The \$150 small entity status filing fee for a utility application is further reduced to \$75 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee (\$)	Small Entity Fee (\$)	Micro Entity Fee (\$)
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	460	230	115
Multiple dependent claims	820	410	205
Total Claims			
20 - 20 or HP = 0 x			
HP = highest number of total claims paid for, if greater than 20.			
Indep. Claims			
4 - 3 or HP = 1 x	460		
HP = highest number of independent claims paid for, if greater than 3.			

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fees Paid (\$)
74	- 100 =	/ 50 =	(round up to a whole number) x	

4. OTHER FEE(S)

Non-English specification, \$130 fee (no small or micro entity discount)

Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)

Other (e.g., late filing surcharge):

SUBMITTED BY

Signature	/Thomas Lee/	Registration No. (Attorney/Agent)	66396	Telephone	703-683-0500
Name (Print/Type)	THOMAS LEE			Date	April 20, 2020

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Koen	Simon Herman	BEEL			
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service						
City	Eke	Country of Residence ⁱ	BE			
Mailing Address of Inventor:						
Address 1	Zandstraat 20a					
Address 2						
City	Eke	State/Province				
Postal Code	9810	Country ⁱ	BE			
Inventor 2					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Yoav		NIR			
Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service						
City	Komen	Country of Residence ⁱ	BE			
Mailing Address of Inventor:						
Address 1	rue de Ten Brielen 19					
Address 2						
City	Komen	State/Province				
Postal Code	B-7780	Country ⁱ	BE			
Inventor 3					Remove	
Legal Name						

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Prefix	Given Name	Middle Name	Family Name	Suffix
	Filip	Josephine Johan	LOUWET	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	Knesselare	Country of Residence ⁱ	BE	

Mailing Address of Inventor:

Address 1	De Wijngaard 1			
Address 2				
City	Knesselare	State/Province		
Postal Code	9910	Country ⁱ	BE	
Inventor	4	Remove		

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Guy		COEN	
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service				
City	Aalst	Country of Residence ⁱ	BE	

Mailing Address of Inventor:

Address 1	Louis Camustraat 25			
Address 2				
City	Aalst	State/Province		
Postal Code	9300	Country ⁱ	BE	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

Add

Correspondence Information:Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).☐ An Address is being provided for the correspondence information of this application.

Customer Number	23364		
Email Address	mail@baconthomas.com	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Application Information:

Title of the Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		
Attorney Docket Number	BEEL3004C/TL	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	6	Suggested Figure for Publication (if any)	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	23364		

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Continuation of	14344836	2015-03-03		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
14344836	a 371 of international	PCT/EP2012/068167	2012-09-14		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
PCT/EP2012/068167	Claims benefit of provisional	61/534592	2011-09-14		
Prior Application Status	Expired	Remove			
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
PCT/EP2012/068167	Claims benefit of provisional	61/635234	2012-04-18		
Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
PCT/EP2012/068167	Continuation in part of	13270659	2011-10-11	8756348	2014-06-17
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)¹ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant	1	Remove
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.		
Clear		
☐ Assignee	☐ Legal Representative under 35 U.S.C. 117	☐ Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		

Name of the Deceased or Legally Incapacitated Inventor:			
☒ If the Applicant is an Organization check here.			
Organization Name	BARCO N.V.		
Mailing Address Information For Applicant:			
Address 1	PRESIDENT KENNEDYPARK 35		
Address 2			
City	KORTRIJK	State/Province	
Country	BE	Postal Code	8500
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button. Add			

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

Assignee	1		
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.			
Remove			
If the Assignee or Non-Applicant Assignee is an Organization check here. ☒			
Organization Name	BARCO N.V.		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	PRESIDENT KENNEDYPARK 35		
Address 2			
City	KORTRIJK	State/Province	
Country ⁱ	BE	Postal Code	8500
Phone Number		Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add			

Signature: [Remove](#)

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Thomas Lee/		Date (YYYY-MM-DD)	2020-04-20	
First Name	THOMAS	Last Name	LEE	Registration Number	66396
Additional Signature may be generated within this form by selecting the Add button. Add					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	BEEL3004C/TL
		Application Number	
Title of Invention	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS

The present invention relates to electronic tools for meetings with audio including methods or devices for providing connection to a communications network, to
5 networks or methods of operating the network, methods or devices for use in displaying media content with audio as well as software for performing any of these methods.

Technical background

Tools for collaboration

Allowing *ad hoc* groups of persons to communicate with each other is one of the fundamental aspects of collaboration, problem solving, negotiation, teaching and education, etc. To assist in communication, there has been an explosion of electronic
15 communication tools such as electronic conferencing tools, e.g. synchronous and asynchronous conferencing, online chat, Instant Messaging, audio conferencing, videoconferencing, data conferencing, application sharing, remote desktop sharing, electronic meeting systems, collaborative management (coordination) tools, project management systems, knowledge management systems, and social software systems.

One classic approach is the lecture or seminar often involving a presentation using presentation software. To a large extent the traditional single person presentation or lecture has been maintained with the audience being in a rather passive mode as far as determining, constructing, augmenting or modifying the information to be presented is
25 concerned.

As with other business processes, meetings are going digital. Increasingly, people are using computer technology alone and in conjunction with broadband networks to support their meeting objectives prior to and during an actual meeting. For example, e-
30 mail is used to pass around files for people to read prior to a meeting.

Collaborative workspaces in corporate networks and on the Internet offer geographically distributed collaborators a virtual repository for documents related to a

project or a meeting. Electronic meeting support systems, such as interactive network-connect whiteed boards and videoconferencing appliances, are available for the benefit of those who share the same room as well as those who are in remote locations.

- 5 The AMIDA Final Public Report describes the overall methodology behind the development of meeting support technologies. It reports that numerous studies confirm that meetings dominate the way people work. Namely, according to a study conducted by MCI Worldcom in 2003 a business person participates in 60 meetings per month. People meet in groups for a multitude of reasons. They interact in numerous
- 10 predictable and unpredictable ways and the results of their interactions are as varied as the people who participate and the projects on which they are collaborating or communicating. Studies of business processes also reveal that approximately 80% of the “workload” associated with a project or process happens in preparation for a meeting. In other words, many people view the ”live” meeting as a milestone or
- 15 deadline by which they can pace and measure their productivity and that of their colleagues. Unfortunately, for many information managers, being in perpetual meetings has reduced their ability to prepare adequately for the next meeting, perpetuating a vicious and negative cycle.
- 20 However, Marc Al-Hames et al. report in “Audio-Visual Processing in Meetings: Seven Questions and Current AMI Answers”, that although large parts of working days are consumed by meetings and conferences, unfortunately a lot of them are neither efficient, nor especially successful. They report a study in which people were asked to select emotion terms that they thought would be frequently experienced in a
- 25 meeting. The top answer – mentioned from more than two third of the participants – was “boring”; furthermore nearly one third mentioned “annoyed” as a frequently perceived emotion.

- The conclusion is that despite the plethora of electronic aids to meetings, fundamental
- 30 problems in handling meetings have not been solved. In fact organising and conducting meetings in a business context involves a large number of factors.

Participation

A lack of efficiency of meetings is addressed in the article “Mood indicators on electronic meeting tools” IBM, IP.com number: IPCOM000011711D, Publication Date: March 12, 2003. This article addresses the issue that the lack of direct feedback makes meetings clumsy, inefficient and often unproductive. It proposes a “mood indicator” as well as an “I want to ask a question” indicator which allow the presenter to choose an appropriate moment to pause, change track or field a question. It is argued that interrupting a presenter in full flow can be awkward; however, sometimes it is difficult to get an opportunity to ask a question or make a comment when many different people are trying to make their voices heard. In a similar vein, US6966035 suggests displaying a “murmur frame” for a participant to express a view. To increase user participation, US 2010/0087139 discloses a system for sending a selection to another computer, and US 2006/0095376 discloses a system for secure voting. Commenting, voting or selecting requires that a central authority provides the information that is to be selected or commented or voted on. Hence, these proposals still leave a central figure such as the presenter in a dominating position and the other members of the meeting are largely an audience with limited selection or voting or participation rights.

A further problem with meetings is that someone is usually late or has to leave early. With the person arriving late one has to decide if the meeting is interrupted and a summary of the proceedings so far is given. For the person leaving early (often a senior person), subsequent discussions can go missing. If there is a notes taker, this provides a personal summary of the meeting – but not an objective one.

Presents systems do not provide an optimal solution.

Legal and security issues

A legal requirement of a meeting is that presentations, comments and submissions need to be completely reproducible – in some circumstances, e.g. in a share holders’ meeting, the events in the meeting should be subject to total recall. Computer-supported collaborative work technologies, particularly those which capture human verbal and non-verbal communications (audio and video interaction) in addition to text and graphics generated during a meeting, promise to have a long term impact on how

people will prepare for and behave during and following meetings. In addition, connecting to a network brings the danger of virus, malware or spyware transfer in either direction, and there is danger of copying of confidential information.

5 Practical Difficulties

Scalability and ease of use

There are even more fundamental problems with using electronic tools in meetings. If two persons want to make two presentations then usually either both presentations must be placed on one machine or there is a need to swap between the presenters' machines. To bring the display content of a computer to a projector, the most common ways are to use a cable that connects the display adapter of the graphics card to the video input of the projector [method 1] or to use a software that captures the display contents and sends it over a wired or wireless network to a remote base unit connected to the projector [method 2]. This is often called "remote desktop" and is mostly used for remote administration or remote IT assistance purposes.

Less common but also practiced methods are to use a special device connected to the display adapter of the graphics card, that captures, encodes and streams the display content over a wired or wireless network [method 3].

Method 1 has several practical problems and disadvantages. In meetings where people want to contribute content from their own computers, e.g. to project images on a display, typically a video cable such as a VGA cable is used to connect each PC one at a time to the projector. This is not only not scalable but also can be and often is quite a cumbersome process that typically wastes valuable meeting time and takes the dynamism out of the meeting. Connection can be made more difficult and time consuming for example if the computer has to be rebooted for it to detect the projector or when the format of the PC differs from the format of the projector. In addition changing format can leave the computer with a new format that is not compatible with its own screen so that on reboot of the PC alone, nothing is displayed on the computer screen. Without a visible screen image the necessary re-configuration can be difficult. These issues are aggravated by a number of elements:

- The use of many different video adapters, such as VGA, DVI, DP, HDMI,...
 - Reach depends on cable length: too long leaves a tangled cable “salad” in the meeting room, too short reduces flexibility, often necessitating people to move around in the meeting room when they want to present something.
- 5 - Cable connection is either point to point or requires tedious and extensive cabling and the use of complex and expensive video switches.
- It is often difficult and time consuming to find the right display resolution and refresh rate that both the computer and the display or projector support.
- 10 Method 2 also has many drawbacks. If the connection is made to a corporate LAN there is a danger of virus, malware or spyware transfer in either direction, there is danger of copying of confidential information, and there is the difficulty of making the connection, e.g. entry of a user code and password, as well the administration of such passwords and user codes.
- 15 The advantage of method 3 is that the computer does not need to use its own processing power to bring the display content in a form that is easily transported over a network. This advantage becomes less relevant as computers grow in processing power. A drawback of method 3 is that the same problems often encountered with
- 20 method 1 of connecting to the display adapter remain. Another drawback is that the special device referred to requires significant processing power, which means that this device will consume much power, be relatively big and certainly be relatively expensive.
- 25 An alternative method in the making today is to use the well known USB interface of the computer for extracting the display content of the computer. US 2009/0198839 discloses such a pluggable cable arrangement. US 2011/0115689 discloses a similar USB solution for wireless connection to a projector. Accordingly connecting a projector to a computer using the standard USB port might become commonplace with
- 30 time. However, this usually requires special drivers and even special hardware. Connecting a projector to a computer using the standard USB port hence might become commonplace – but even when that happens there will be a mix of new and legacy machines for several years.

Firewalls

Additional problems can occur with firewalls. Typically a visitor to a meeting will bring a computer such as a laptop that is set up for a different corporate networking environment and hence has different or incompatible networking settings. The setting
5 up of a firewall can be complicated and if this is not done correctly, telecommunication software that has to pass through a firewall may be blocked. In order to solve problems associated with firewalls it may be necessary to open ports or identify or even add programs in an exception list. If, besides a network (hardware)
10 firewall and an operating system firewall, there is any software based third-party firewall like ZoneAlarm, CA Internet Security Suite or McAfee Firewall, then it is necessary to follow that software developer's documentation to place programs on a safe list or adding exceptions to the firewall rules. Such activity is beyond the usual user. Fussing with computer settings, or having to call for IT support wastes valuable
15 meeting time and takes the dynamism out of the meeting.

Audio

Software based systems for presentations typically rely on specific software drivers to be installed on the client PC. An example of this is Soundflower on Apple Mac OS/X.
20 In case the built-in generic audio driver is used, it is hard to guarantee that the audio will work on any given hardware, considering the large variety of sound cards in PC's.

Conclusion

The following problems remain for holding a face-to-face meeting using advanced
25 electronic tools at the present time:

- Complexity of the networking infrastructure.
- High demands on technical expertise of users in current systems that are supposed to be designed to support everyday use by the non-expert user.
- Barriers to the use of complicated technology in meetings.
- 30 - Great variety of possible collaborative software solutions – none of which seems to solve the fundamental problems of holding successful meetings.
- Meetings being boring or annoying for members of the meeting.
- Complexity of firewalls and other security measures employed in corporate

networks.

- Lack of, or restriction of participation by members of a meeting.
- Time taken to prepare presentations for meetings.
- Need to record events in the proper time sequence at meetings without
- 5 burdening a meeting more than necessary.
- Lack of standards for audio
- Need to install proprietary drivers for audio
- Large number of different, non-standardised sound cards in use

Although some tools solve some of these problems effectively, no electronic meeting
10 tool solves all of them.

Summary of the invention

An object of the present invention is to provide network solutions including electronic
tools with audio for meetings as well as devices for providing connection to a
15 communications network, to methods of operating the network, methods of displaying
media content with audio as well as software for performing any of these methods or
for implementing such systems.

In one aspect the present invention relates to a method for capturing audio for use in
20 presentation systems e.g. at meetings. A wireless network may be used to connect a
processing device such as a laptop, personal computer, PDA, smartphone etc to a
display device, e.g. via a projector. The present invention addresses the problems
caused by the many different audio cards in use for commercial PC's, a lack of a
standard way for capturing audio that works on all PC platforms (Windows, Mac,
25 Linux, Android) and the need for synchronization of the captured audio with the
captured video to provide lip synchronization.

The present invention provides in embodiments a method and a system for connecting
a processing device, e.g. a digital processing device such as a laptop, smartphone,
30 PDA, computer, tablet and suchlike to a communications network, the processing
device having a memory, a display and an operating system with pre-installed generic
drivers providing a generic communications protocol for communication between
processing device and a standard class of peripheral devices. The method and/or

system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 5 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network
- 10 via the means for communication, wherein the generic communication protocol is used for transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- 15 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the
- 20 operating system, a means for data communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network
- 25 via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

In an embodiment audio data is captured through a virtual sound card interface added

30 as a logical device over the physical interface provided in the peripheral device. On the processing device only a generic sound driver such as a USB sound driver is required which is generally standard on any modern processing devices such as a PC (UAC1 or UAC2).

In an aspect the present invention provides an electronic meeting tool for communicating arbitrary media content from users at a meeting comprising:
a node configuration means adapted to operate a display node of a communications
5 network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a
10 connection unit comprising:

- (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
- (b) a transmitter for communicating with the communications network,

15 a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said
20 user selected arbitrary media content to said transmitter through said port.

Obtaining user selected arbitrary media content is preferably not obtained by application sharing but by the process of screen scrapping. Although software packages that provide screen scraping require installation on the target device, or at
25 least require the installation of dedicated and/or custom drivers, embodiments of the present invention use software stored on the peripheral device which allows screen scraping when run on the processing device but leaves a zero footprint when terminated. Embodiments of the present invention can screen scrape full HD videos at
20fps without requiring any installation of a program on the processing device nor
30 requiring configuring the processing device such as a PC that they run on for the connectivity to the network hence meeting "zero footprint" operational requirements.

The program adapted to be loaded onto the processing device and to run on the

operating system of the processing device and being adapted to obtain user selected arbitrary media content can be stored on the peripheral device. The transmitter can be a wireless transmitter or transceiver. The peripheral device can be a plug-and-play device. The program can adapted to screen scrape content of the second display.

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The input device can be physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square mm. Alternatively, the input device can be a key displayed on the second display. The key displayed on the second display can be one not screen scraped by the program.

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On the peripheral device a mass storage device is provided that stores the software to be run on the processing device. The mass storage device can be logically closed once the software has been read and loaded and is running from RAM in the processing device. Also provided on the peripheral device is a further device such as an HID (human interface device) to capture user input and provide user feedback. In embodiments of the present invention, the peripheral device contains multiple internal logical devices that are combined:

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An HID (human interface device) used for capturing user input (e.g. following a user action such as pressing or activating a button) and providing user feedback, e.g. by an optical indicator such as a light ring around the button e.g. an LED ring, for streaming the screen scraped video content to the network and hence to a base unit and a display,

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A mass storage device used to store the application, and optionally

An audio device that acts as a virtual sound card to a client PC over USB, using a generic driver such as a UAC1 or UAC2 device driver.

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Embodiments of the present invention are not limited to application sharing but make use of screen scraping which is able to capture all material in a neutral manner rather than being limited by proprietary applications. Further the screen scraper application is zero footprint on termination rather than being fully installed on the processing device. Embodiments of the present invention can provide arbitrary "full content" to the meeting room and participants can display in real-time, The real-time content is shown on a central display rather than being broadcast to

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individual participants or archived.

Embodiments of the present invention "auto compose" arbitrary user data on a central display or screen so that full real-time content that is provided by multiple meeting participants who intentionally share this content in order to make the meeting more effective and efficient,

5 Embodiments of the present invention implement a principle of "democratic screen sharing", in which the meeting participants decide themselves on a peer-to-peer basis which content to share when and where. In particular in some embodiments a participant can obtain unilateral access to the display device, i.e. without agreement of other participants. Peer-to-peer data sharing differs from systems in which the content
10 to be displayed is determined by a presenter or meeting director. The user determines where his content is routed to and can do so without any software configuration on the user processing device.

15 In another aspect the present invention provides a method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:

- 20 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- 25 c) coupling the processing device to a communications network via the peripheral device;
- d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device
30 and the peripheral device.

The routing of the screen scraped data can be to a defined network node such as a display node without user entry of configuration details. Thus the routing can be

dedicated to a specific network node such as a display node, base station etc. This is achieved by pairing of the peripheral device to the relevant node before the communication starts.

- 5 In accordance with embodiments of the present invention users start an application from the peripheral device such as a USB dongle, thus making the connection in a 3 step process: (1) connect, e.g. plug in the peripheral device to the processing device, (2) start the screen scraping application, (3) perform a user action such as click on a button on the peripheral device to go allow content to be displayed on the central
10 screen or display. To achieve step 2 Autorun or AutoPlay can be used with some Windows operating systems, but there are many different variants based on the OS version and which patches have been installed. Furthermore, this mechanism is generally considered a security hazard, which is why most IT departments will disable Autorun/Autoplay. Other OS providers have disabled this function, e.g. Apple
15 removed a similar functionality entirely from its OS/X since Snow Leopard.

In an embodiment of the present invention a very small service - also called daemon on some OS's - is provided that requires installation on the processing device such as a laptop. This service is pre-installed on the processing device. The installation is
20 required only once on every processing device such as a laptop. The role of this is to provide a permanently running service which continuously monitors if a peripheral device according to the present invention has been offered up for connection to the processing device. When such a peripheral device is connected, the service will detect this and start the client application software residing in the mass storage area of the
25 peripheral device. Once the service is installed, connectivity with the peripheral device becomes a 2 step process: connect, e.g. plug in the peripheral device to the processing device, (2) perform a user action such as click on a button on the peripheral device to allow content to be displayed on the central screen or display. The application loaded from the processing device still leaves a zero footprint on termination

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Step b) can comprise presenting the peripheral device to the processing device as a human interface device (e.g. a USB HID) and wherein the pre-installed generic driver is a human interface device driver (e.g. USB HID driver).

Alternatively or additionally step b) can comprise presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

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Alternatively, or additionally step b) comprises presenting the peripheral device to the processing device as a composite device (e.g. USB composite device) and wherein pre-installed generic drivers drive different device interfaces independently.

- 10 A client application can be stored on the peripheral device which when run on the processing device obtains the screen scraped data. Such a client application can be a portable application and can leave a zero footprint on termination.

- In another aspect the present invention provides a peripheral device for providing
- 15 communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device,
- 20 said executable software code comprising:
- a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
 - a second software code portion for connecting the processing device to a
- 25 communications network via the peripheral device, the peripheral device having a transceiver;
- a third software code portion for screen scraping data from the processing device; and
 - a fourth software code for routing screen scraped data between the processing device and the communications network over the means for communication; wherein the first
- 30 software code portion is adapted to use the generic communication protocol for transferring the screen scraped data between the processing device and the peripheral device.

The first software code portion can be adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

5 The first software code portion can be adapted to present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

10 The executable software code can comprise fifth code for providing a means for connecting to the communications network including a base node. The third code can comprise means for capturing video frame buffers of the processing device.

The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing means for initiating connection to the base node. The executable software code can comprise ninth code

20 for receiving inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting to the user a GUI. The executable software code can comprise twelfth code for presenting a GUI for

25 administration of the said executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

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In another aspect the present invention provides a peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing

a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- 5 a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a
- 10 transceiver; and
- a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and
- 15 an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

The first software code portion can be adapted to present the peripheral device to the

20 processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver. The first software code portion can be adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver. The first software code portion can be adapted to present the peripheral device to the

25 processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

The input device is preferably a physical actuator coupled to the peripheral device. The physical actuator preferably has a surface area of between 100 and 14,400 square

30 mm. The input device can be for example a key for display on the display. The executable software code can comprise fourth code for providing a means for connecting to the communications network including a base node. The executable software code can comprise fifth code for providing a means for capturing video frame

buffers of the processing device. The executable software code can comprise sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node. The executable software code can comprise seventh code for providing a means for handling the peripheral device. The executable software code can comprise eighth code for providing a means for initiating connection to the base node. The executable software code can comprises ninth code for receive inputs from an input device on the peripheral device. The executable software code can comprise tenth code for providing a means for sending state changes to the visual indicator on the peripheral device. The executable software code can comprise eleventh code for providing a means for presenting the user a GUI. The executable software code can comprise twelfth code for presenting GUI for administration of the executable software code when executed as a portable application. The executable software code can comprise thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data from the processing device to the base node.

In another aspect of the invention a peripheral device is provided for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:

- a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;
- a third software code portion for receiving media content from the network and for displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol

for transferring the media content between the peripheral device and the processing device.

The executable software code can comprise fourth code for providing a means for
5 correctly configuring a receiver as an access point. The executable software code can
comprise fifth code for providing a means for listening for output of connection units
trying to connect on a specific port. The executable software code can comprise sixth
code for providing a means for a GUI for administration purposes. The executable
software code can comprise seventh code for providing a means for publishing its
10 presence over the network using the zeroconf protocol. The executable software code
can comprise eighth code for providing a means for accepting and installing software
updates. The executable software code can comprise ninth code for providing a means
for providing facilities for pairing of connection units to the processing device. The
executable software code can comprise tenth code for providing a means for auto-
15 composing of different incoming arbitrary media streams and rendering of composited
image on display. The executable software code can comprise eleventh code for
providing a means for receiving, decrypting and decoding incoming arbitrary media
content. The executable software code can comprise twelfth code for scaling of
incoming arbitrary media streams. The executable software code can comprise
20 thirteenth code for providing a means for displaying incoming arbitrary media content
in accordance with a set of rules.

The present invention also provides a method for communicating arbitrary media
content from users at a meeting comprising:

25 operating a display node of a communications network, the display node being
coupled to a first display, to receive user selected arbitrary media content and to
control display of the user selected arbitrary media content on the first display; and
connecting a peripheral device to a port of a processing device and communicating the
user selected arbitrary media content via the communications network,
30 loading a program onto the processing device and running the program on the
operating system of the processing device to obtain user selected arbitrary media
content, said program leaving a zero footprint on termination, and
triggering transfer of said user selected arbitrary media content to said transmitter

through said port after a user action on an input device.

The present invention also provides a peripheral device comprising:

a base

- 5 a connector for connection to a plug and play port of a host processing device,
a flexible connection between the base and the connector for transferring data signals
and power,
an actuator on the base for actuating a signal and for transferring the signal to the
connector for transfer to the port, wherein the base has electronics comprising
10 permanent storage for storing a portable application, a processing engine, a transceiver
and a visual indicator.

The present invention also provides a method for providing communication
connectivity from a processing device,

- 15 setting up a communications network between a base node of the communications
network and a peripheral device coupled to the processing device;
transferring media content between the processing device and the peripheral device,
transmitting the media content from the peripheral device to the communications
network,
20 receiving media content from the communications network at the base node and
displaying the media content on a display in accordance with a set of rules.

Any of the above software code stored on a non-transitory storage medium.

25 Definitions

- "Plug and play" is a term used to describe the characteristic of a computer bus, or
device specification, which facilitates the discovery of a hardware component in a
system, without the need for physical device configuration, or user intervention in
30 resolving resource conflicts. Plug and play devices can be added to a bus of a
computing system (while running or when shut down), and the newly added device
and possibly the rest of the computing system is automatically configured to make the
newly added device work, both from hardware and from software perspective.

Plug and play interfaces include for example (not an exhaustive list): Firewire (IEEE-1394), PCI, Mini PCI, PCI Express, Mini PCI Express, PCMCIA, PC Card, Universal Serial Bus (USB), SDIO cards.

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"Auto-configuration" is the automatic configuration of devices without manual intervention, without setting any switches or jumpers, and without any need for software configuration. An example of auto-configuring devices: USB devices. Examples of auto-configuring protocols: DHCP, Zeroconf, Bonjour.

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A plug and play device has auto-configuration software by default to make it plug and play. Example: USB devices are made to be plug and play by including the correct auto-configuration software (e.g. host driver, host stack, application software).

Autoconfiguration can also refer to a software alone and is not restricted to a physical device.

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"Hot swapping and hot plugging" are terms used to describe the functions of replacing computer system components without shutting down the system. More specifically, hot swapping describes replacing components without significant interruption to the system, while hot plugging describes the addition of components that would expand the system without significant interruption to the operation of the system. A well-known example of this functionality is the Universal Serial Bus (USB) that allows users to add or remove peripheral components such as a mouse, keyboard, or printer. Other examples are eSATA, PCIe, FireWire, for example.

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A "portable application" (portable app), sometimes also called standalone, is a computer software program designed to run without installation on the target machine. This type of application is stored on a removable storage device such as a CD, USB flash drive, flash card, or floppy disk – storing its program files, configuration information and data on the storage medium alone. It is a program that can be stored on an electronic device such as a USB flash drive, iPod, memory card, portable hard drive or other portable electronic device and runs on a computer or other processing device coupled to the electronic device without making permanent configuration

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changes to the host computer. All such programs have a zero-footprint, meaning all temporary files, registry entries, and any other changes to the machine exist only while the program is running.

- 5 To be considered a portable application, for purpose of this invention, a software program must:
- Not require any kind of formal installation onto a computer's permanent storage device to be executed, and can be stored on a removable storage device such as USB flash drive, iPod, memory card, portable hard drive or other portable electronic storage
- 10 device thus enabling it to be used on multiple computers.
- Settings are stored with, and can be preferably carried around with, the software (i.e., they are written to the electronic device such as a USB drive). Settings are not stored to the registry or any other central system database of the computer.
- 15 Leaves a zero (or near-zero) "footprint" on any PC it is run on after being used. i.e., all temporary files/registry settings should be either avoided or at least removed once the program has exited, and files created by the user can be saved directly to the same removable media as the application is stored on.
- 20 A portable application does not leave its files or settings on the host computer on which it runs. For example, the application does not write to the Windows registry or store its configuration files (such as an INI file) in the user's profile; instead, it stores its configuration files in the program's directory. Another requirement, since file paths will often differ on changing computers due to variation in Windows drive letter
- 25 assignments, is the need for applications to store them in a relative format. Preferably, such a program does not require a launcher program to copy necessary settings and files to the host computer when the application starts and move them back to the application's directory when it closes as this may leave a residue on the hard drive in case of power failure.
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- "Electronic meeting systems" (EMS) need to be distinguished on the one hand from classic groupware, on the other from web conferencing systems. In reality, there is some overlap between minor features of products of the named categories. The main

difference from groupware is the intensity of collaboration. EMS should be distinguished from systems with which it is possible to show the contents of an individual computer screen on a remote display with multiple users at the same time.

- 5 "Groupware" supports collaboration within groups where the individual contributions remain identifiable. In contrast, EMS enable the group to cooperatively produce a result for which the group is responsible as a whole. In a business process, groupware and electronic meeting systems complement each other: Groupware supports teams when researching and creating documents in the run up to an EMS session or when
10 implementing the results of such a session.

- "Web conferencing systems" and "electronic meeting systems" complement each other in the online meeting or workshop: EMS extends the web conferencing system by providing interactive tools for producing and documenting group results. On the other
15 hand, "web conferencing systems" complement EMS with the screen sharing and voice conferencing functionality required in synchronous online meetings and not present in EMS.

- "Data conferencing" refers to a communication session among two or more
20 participants sharing computer data in real time. Interaction and presentation devices such as a screen, keyboard, mouse, camera, etc. can be shared. It is a term used to distinguish from video conferencing and audio conferencing. The data can include screen, documents, graphics, drawings and applications that can be seen by the participants of the meeting.

- 25 "Application sharing" is an element of remote access, falling under the collaborative software umbrella, that enables two or more users to access a shared application or document from their respective computers simultaneously in real time. Generally, the shared application or document will be running on a host computer, and remote access
30 to the shared content will be provided to other users by the host user. Application sharing should be distinguished from systems in which collaboration on the applications between different users is not possible but the contents of individual computer screens can be projected onto a remote display with multiple users at the

same time.

The term “arbitrary media content” refers to the fact that a user may generate, create or select any media content that is appropriate to display. This differs from client voting
5 on, or selecting of media content that is displayed by another in a meeting or presentation. This term refers to client oriented, distributed rights and privileges for the display of content rather than a central presenter providing content which is presented to the members of the meeting.

10 “Screen scraping” in our sense refers to reading the video frame buffers and processing them, rather than just rendering them on a display. Screen scraping for presentations is described in US2002/0196378 to Slobodin et al which is included herein by reference.

15 “Auto composition” or “auto layout” refers to the automatic nature in which multiple graphics/video sources are rendered on a central display, without user intervention and in a way that a user would intuitively expect it to happen.

20 “Wireless” and “wireless communication network” can be any network that does not use cable links between nodes, e.g. uses RF, optical or InfraRed for communication purposes, such as IrDA, diffuse infra-red, WLAN, WiMax, WiFi, WiFi Direct, Bluetooth or any other wireless communication network known to the person skilled in the art such as optical networks like LiFi.

25 “Computer” generally refers to a processing device, i.e. having a processing engine capable of various types of digital processing, such as rendering graphics images for display. A computer can be in the form of a work station, a personal computer, a laptop, a palm top, a PDA, a smartphone, a tablet etc. Generally a computer has memory such as volatile RAM. Non-volatile memory such as a hard disc, optical disk or solid
30 state memory can be included in the computer or can be a peripheral device. Currently most computers are electronic but the term “computer” also include optics based computing devices.

The term "pre-installed generic driver" is intended to mean a driver which is installed on a processing device such as a computer as a standard driver, e.g. is installed with the installation of the operating system. Such a driver is standard for the operating system and can drive a standard class of peripheral devices coupled to or connected to the processing device. The installation of a specific driver for such a peripheral device is not required. Such a generic driver can be a human interface driver (HID) or a mass storage device driver, which has predetermined software components configured for driving mass storage, a CD-ROM, a keyboard etc. or combinations of these. Such devices can be readable and writable computer peripheral memory devices such as USB memory sticks, flash memories, external hard drives, or more.

Brief Descriptions of the drawings

Fig. 1a shows a meeting room that can be used with embodiments of the present invention. Fig. 1b shows a combination of a client processing device, a connection unit, a base node and a display in accordance with an embodiment of the present invention.

Fig 2 shows a screen display in accordance with an embodiment of the present invention.

Figs. 3 to 5 show a base node and a peripheral device and a client processing device in accordance with embodiments of the present invention.

Fig 6 shows a display in accordance with an embodiment of the present invention.

Fig. 7 shows a peripheral device in accordance with an embodiment of the present invention.

Fig. 8 shows a client processing device in accordance with an embodiment of the present invention.

Fig. 9 shows a further client processing device in accordance with an embodiment of the present invention.

Fig. 10 shows an embodiment of a peripheral device in accordance with an embodiment of the present invention.

Fig. 11 is a schematic representation of a communications system for presentations in which audio has been integrated in accordance with an embodiment of the present invention.

Detailed Description of the Embodiments of the present Invention

The present invention will be described with respect to particular embodiments and with reference to certain drawings but the invention is not limited thereto but only by
5 the claims. The drawings described are only schematic and are non-limiting.

Furthermore, the terms first, second, third and the like in the description and in the claims, are used for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. The terms are interchangeable under
10 appropriate circumstances and the embodiments of the invention can operate in other sequences than described or illustrated herein.

Moreover, the terms top, bottom, over, under and the like in the description and the claims are used for descriptive purposes and not necessarily for describing relative
15 positions. The terms so used are interchangeable under appropriate circumstances and the embodiments of the invention described herein can operate in other orientations than described or illustrated herein.

The term "comprising", used in the claims, should not be interpreted as being
20 restricted to the means listed thereafter; it does not exclude other elements or steps. It needs to be interpreted as specifying the presence of the stated features, integers, steps or components as referred to, but does not preclude the presence or addition of one or more other features, integers, steps or components, or groups thereof. Thus, the scope of the expression "a device comprising means A and B" should not be limited to
25 devices consisting only of components A and B. It means that with respect to the present invention, the only relevant components of the device are A and B.

Similarly, it is to be noticed that the term "coupled", also used in the description or claims, should not be interpreted as being restricted to direct connections only. Thus,
30 the scope of the expression "a device A coupled to a device B" should not be limited to devices or systems wherein an output of device A is directly connected to an input of device B. It means that there exists a path between an output of A and an input of B which may be a path including other devices or means.

Elements or parts of the described devices may comprise logic encoded in media for performing any kind of information processing. Logic may comprise software encoded in a disk or other computer-readable medium and/or instructions encoded in an
5 application specific integrated circuit (ASIC), field programmable gate array (FPGA), or other processor or hardware.

References to software can encompass any type of programs in any language executable directly or indirectly by a processor.

10

References to logic, hardware, processor or circuitry can encompass any kind of logic or analog circuitry, integrated to any degree, and not limited to general purpose processors, digital signal processors, ASICs, FPGAs, discrete components or transistor logic gates and so on.

15

Embodiments of the present invention provide solutions to three major problems with meetings:

- 20 a) the time taken to prepare for a meeting. This is mainly achieved by allowing “on-the-fly” presentation of any displayable information. This information does not have to be linked into any particular presentation software, nor to be compatible with any such presentation software,
- b) the time taken to conduct the meeting using electronic meeting tools. This is achieved by reducing the time to connect computers to the display or projection
25 system.
- c) the time taken to reflect and review and document the meeting afterwards. This is achieved by providing the possibility of recording the course of the meeting in the same time sequence that it was carried out as well as be able to store all data presented and who presented it.

30

Fig. 1a is a schematic representation of a generic meeting room 30 with a meeting table that can be used with embodiments of the present invention. Participants 37 having some form of processing device 31 such as a laptop computer, a tablet, a PDA

etc. Each of the processing devices 31 can be a host device and has a first connection unit 47 to which it is coupled. The first connection unit 47 provides access to a network 50 which in this case is a wireless network, but could be a wired network. Each connection unit 47 may be coupled to an input device 48 which will be described in more detail later. A user 37 will typically at a distance from the processing device 37 which is ergonomically satisfactory. This ergonomic boundary is typically an area of about 1000 sq cm to 4000 sq cm. This ergonomic boundary will typically have the user as one side of the boundary and the comfortable reach of the arms will determine an area on the left and right of the processing device which falls within the ergonomic boundary and the far edge of the boundary of the processing device (normally delimited by a display screen) will determine the other side of the ergonomic boundary. The area defined by the ergonomic boundary will overlap or include the processing device 31 itself. The processing device will also have an outer physical boundary. The input device 48 is preferably arranged to operate outside the boundary of the processing device 31 but within the ergonomic boundary. Preferably the input device is arranged to function when it is flat on the table. The input device preferably has a size of activation area of between 1 and 144 square cm.

Preferably the network 50 is a local area network, i.e. preferably local to the meeting room for security reasons but the network 50 may have access to other local or wide area networks such as 51 or to a larger corporate network or the internet 43, for example via a router 42. Another node of the network 50 is the base or display node 36. This node 36 may optionally be a wireless access point. The base node 36 may also be a processing device or host computer and may be coupled to a second connection unit 49 that provides access to the network 50 thus linking all of the processing devices 31, 36 together. The connection unit may have an input device as described above. Alternatively, network connections installed on the base node 36 can be used. Audio equipment 46 may be provided, e.g. a telephone that allows other members of the meeting to call in from remote destinations.

30

The display node 36 is coupled to and adapted to allow display of media on some kind of display 44. The display node is in embodiments of the present invention a base node of the communications network 50. The display 44 may be a projector and/or screen,

the projector being coupled to the base node 36. A whiteboard 45 can optionally be provided that can be optionally coupled to the display 44 and/or the base node 36, e.g. when the whiteboard can record electronically what is written on it. Optionally, a camera 35 may be provided to record the entries on the whiteboard 45. The camera 35
5 may have a third connection unit 52 for connecting the camera 35 to the network 50 so that the data from the whiteboard can be recorded and stored or transmitted to other networks via router 42. The connection unit 52 may have an input device 53 as described above for the connection unit 47.

10 Optional equipment can be cameras 39, 40, 41 for recording the progress of the meeting. These cameras can be linked by a network 51, e.g. a cable network to the router 42 and/or the base node 36. Another optional item is a microphone or microphones 38 that can be used to transfer audio, e.g. to the processing devices 31 and to loud speakers (not shown) attached to the base node 36 or part of the display
15 44.

Any or all of the outputs of the processing devices 31, the cameras, the whiteboard, etc. can be recorded and stored digitally, e.g. in node 36 or elsewhere to provide a complete record with correct time sequence.

20 Summarising the above, the present invention provides an electronic meeting tool for communicating arbitrary media content between different users 37 (with their own processing devices 31, e.g. PC, mobile phone, or tablet) and one display or projector or multiple displays or projectors 44 in the meeting room 30.

25 Referring to Figs. 1a and 1b embodiments of the present invention comprise a base or display node 36 being a processing device, e.g. a host computer adapted to receive user selected arbitrary media content, the base node 36 being coupled to a central display 44 which can be a fixed format display and/or a projector or similar. The
30 arbitrary media content can be provided from any of the user processing devices 31. The base node 36 can be adapted to display the received user selected arbitrary media content in accordance with a set of rules, e.g. FIFO, automatically, on request or approval, forced to display, in accordance with a priority etc. Optionally the base node

36 is adapted to force display of the received user selected arbitrary media content, i.e. to allow participation in the meeting by an individual user displaying own selected content on display 44 independently of the person who is nominally responsible for giving a presentation or chairing the meeting. Forcing the display can also be
5 considered as a rule. The meeting tool can also be adapted to allow a priority setting. This means that a user can set a priority setting for the media to be displayed. A priority of "1" for example can be interpreted by the base node as a forced display, a priority "2" can be interpreted by the base node as display as soon as possible, priority "3" can be interpreted by the base node as place in queue and display as the time
10 comes etc. Setting and using priorities for display are also considered to be working to rules. To execute the rules, the base node 36 may have a decision module. The base node 36 may be a host computer having a processing engine such as a microprocessor and a memory. Preferably, the base node 36 is adapted to treat media content passed to the base node 36 from any or all of the connection units 47 in an equal manner. The
15 base node 36 may be adapted to auto compose the media content on the central display 44 connected to it, e.g. from one or more processing devices 31.

An independent aspect of the present invention is at least one connection unit 47, (optionally 49 for receiving or optionally connection unit 52) adapted to communicate
20 the user selected arbitrary media content to said base node 36. Preferably the connection units 47 and/or optionally 49 or optionally connection unit 52 are physical plug-and-play devices. An example of a connection unit is shown schematically in Fig. 10.

25 The connection unit 47 be may integrated into a user processing device 31, e.g. as an internal peripheral device or may preferably be an external peripheral device comprising a connector adapted to couple to a port of a user processing device 31. The processing device 31 may have a client display, a processing engine such as a microprocessor, a memory and an operating system. The optional connection unit 49
30 may be integrated into the base node 36, e.g. as an internal peripheral device or may be an external peripheral device comprising a connector adapted to couple to a port of the base node 36. The connection unit 49 may be fully integrated into the base node 36, e.g. is an internal network interface of the base node 36. The base node 36 may have a

processing engine such as a microprocessor, a memory and an operating system.

The user processing devices 31, the connection units 47, (optionally 49 or optionally connection unit 52) and the base node 36 co-operate to form a communication network
5 50 for linking between at least one of the plurality of processing devices 31, 36 and 35 and the central display device 44. The communication network 50 is adapted to receive arbitrary media content from at least one of the plurality of processing devices 31 and to transmit the arbitrary media content of at least one of the plurality of processing devices to the central display device 44.

10

An independent aspect of the present invention is a portable application 60 adapted to be loaded onto a client processing device 31 and to be run on the operating system of the client processing device 31. The portable application 60 runs as a process on the client processing device 31 that is adapted to deliver an arbitrary media content from
15 the client processing device 31 to the communication network 50 in response to a user action applied to an input device 48, the process leaving a zero footprint on termination on the client processing device 31. Optionally the portable application 60 is stored on each connection unit 47 and optionally 49. Preferably the portable application 60 is adapted to "screen scrape" content of the client display of the client
20 processing device 31. Optionally the portable application 60 when run on a processing device 31 is adapted to "screen scrape" content of the client display of this client processing device 31 and to transmit it via a connection unit 47. Optionally the portable application 60 when run on the processing device is adapted to "screen scrape" content of the client display of the client processing device 31 and to transmit
25 it via a network interface of the processing device 31, for example if the connection unit 47 has no transmitter or this is not functioning.

The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a
30 transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

The base node 36 for communicating with the connection unit 47 has a receiver 63 which can be included in the connection unit 49 or integrated into the base node 36.

The receiver is preferably a transceiver. Optionally the transmitter/receiver can be a wireless transmitter/receiver.

5 The input device 48 allows a user interaction with the connection unit 47. Preferably the input device 48 is physical actuator coupled to the connection unit 47. The user action applied to the input device 48 generates a signal that can trigger transfer of data from the processing device 31 (to which the connection unit 47 is coupled) to the network 50. Preferably the input device 48 has an activating surface that is between 100 and 14,400 square mm. Optionally, the input device 48 can be a key displayed on
10 the client display 1 of a client processing device 31. This key can be activated, e.g. by use of a pointing device such as a mouse trigger transfer of data from the processing device 31 to the network 50.

The connection unit 47 is preferably provided with a visual indicator 61, e.g. for
15 allowing user feedback from the connection unit 47 of the status of any activity.

The system also can include a server program 64 adapted to be loaded onto the base node 36, said program 64 being adapted to receive arbitrary media content from one or a plurality of client processing devices 31 through said connection units 47, (optionally
20 49 or 52), and to show this plurality of arbitrary media content streams on one or a plurality of displays 44. The server program 64 may be adapted to allow display in accordance with one or more rules, e.g. FIFO, automatically, on request, forced, in accordance with a priority etc. To execute the rules, the server program 64 may have a decision module.

25

Preferably, the server program 64 is adapted to treat media content passed to it from any or all of the connection units 47 or 52 in an equal manner. The server program 64 may be adapted to auto compose the media content on the central display 44.

30 The server program 64 may be a portable application adapted to be loaded onto the base node 36 and to be run on the operating system of the base node 36. The portable application 64 runs a process on the base node 36 that is adapted to display an arbitrary media content received from the client processing device 31 via the

communication network 50, the process leaving a zero footprint on the base node 36 on termination. Optionally the portable application 64 is stored on each connection unit 49 and optionally 47 and can be installed therefrom.

- 5 The system may also include a central display device 44 and optionally a whiteboard 45 or other display means such as a printer. The display 44 being adapted to receive user selected arbitrary media content, and may be adapted to allow display of the received user selected arbitrary media content in accordance with one or more rules, e.g. FIFO, automatic, forced, on request or approval, in accordance with a priority etc.
- 10 Optionally, one of the connection units 47 can be adapted to be a master connection unit. Such a master connection unit may be adapted to instruct the base node when media content from a client processing device 31 may be displayed or which of the processing devices may be allowed to send content for display.
- 15 In embodiments of the present invention, at least one portable application is used, e.g. for the client software on a client processing device 31 or optionally on the base node 36. In these embodiments, one of the pre-installed generic drivers of the operating system on the relevant computer device 31, 36 is exploited for setting up
- 20 communication from the computer device 31, 36 to the network 50 via the connection unit 47, (optionally 49). The generic driver is used in connection with the connection unit 47, (optionally 49) operating as a peripheral device but the use can go beyond that of the standard class of peripheral devices for which the generic driver is intended. In some embodiments the connection unit 47, (optionally 49) operated as a peripheral
- 25 device communicates with the relevant processing device 31, 36 by using a generic communication protocol provided by the pre-installed generic driver. Pre-installed USB drivers are examples. Preferably the setting up of the communication of network 50 using connection unit 47, (optionally 49) does not alter or affect the networking capability of the relevant processing device 31, 36. For example, if a browser is started
- 30 on the client processing device 31, this browser can use the standard network interfaces on the processing device 31. This means that transfer of data via the connection unit 47 (optionally 49) is independent of transfer of data over the network interfaces of processing device 31 or 36. This has the advantage that each user can

carry out processing such as searching on the internet to gather data independently of the transfer of data to be displayed during a meeting, or receive emails etc.

5 The use of a portable application has the advantage that any modification to settings in the register or generally in the operating system can be avoided, so that upon any form of termination, e.g. disconnecting the electronic device, system crash, no trace is left. This is generally termed "zero footprint".

10 The present invention has the advantage of scalability. It can provide a display system for use by a plurality of users in meetings. Every user in the meeting thus can have a client processing device 31 for coupling to a connection unit 47. A first user action connects the client processing device 31 to the base node 36, e.g. by inserting a connection unit 47 into the relevant interface connector on the processing device 31, e.g. a USB interface. A second user action comprising activating a button or key on
15 the input device (e.g. by depressing it) then starts the process of transmitting arbitrary media content from the client processing device 31 to the base node 36. This process preferably includes screen scraping data from the processing device. Using screen scraping avoids special programs being installed on the base node 36 to carry out graphical commands sent from the processing device 31. When the base node 36
20 receives the plurality of arbitrary media content, it can allow auto composition of this media content on the central display connected to it.

The present invention will now be described further with reference to certain more specific embodiments.

25

With reference to Fig. 2, the base node software (6) running on a base node 36 can be adapted to display on the central display a splash screen (21) showing its readiness to receive arbitrary media content over its receiver. This splash screen (21) can also show instructions on how to use the system, as well as the configuration parameters (see
30 later) to reach the base node 36. These configuration parameters are also shown in a transparent canvas at the bottom of the central display (22).

A client processing device 31 that wants to have its arbitrary media content displayed

- on the central display connected to the base node 36 is connected to a connection unit 47. The portable application 60 will be executed on the client processing device 31 as a host device. A first user interaction creates a connection between the portable application 60 and the base node 36 using the transmitter in the connection unit 47 and the receiver in the base node 36. The first user interaction can be the connection of the unit 47 to the client processing device 31. A second user interaction, this time on the input device 48, activates screen scraping by the portable application of the arbitrary media content from the client processing device display, which is then sent over the connector unit 47 to the base node.
- The base node 36 receives the plurality of arbitrary media content coming from one or more connection units 47, and auto composes this media content for rendering on the central display.
- The visual indicator 61 on the connection unit 47 indicates to the user and to other participants in the meeting that media content is being sent by that connection unit 47 to the base node 36 for display.
- Repeating the second user interaction on the input device 48 of a connection unit 47 decouples the media content from that connection unit 47 from the base node 36. The base node 36 removes that media content from the composed image on the central display and recomposes the remaining content on the central display.
- The content on the central display/projector is auto arranged as shown in figure 2.
- When user 1 adds content, his/her display will be scaled to fill the available central display canvas as much as possible, but without affecting the aspect ratio. When user 2 adds in, his content is added to the side of the first image. When user 3 adds his content, the arrangement is, for example, triangle wise. Adding user 4, the image becomes a 2 by 2 tiling, which is the maximum available. When an additional user attempts to add content, he will be blocked. When a user initiates action to remove his/her content, his/her media content is removed from the central display and one moves backward in the composition sequence shown in figure 2.

Base node software

The base node software has one or more of the following features:

- First code for providing a means or a method step for correctly configuring the receiver of the base node.
- 5 - Second code for providing a means or a method step for listening for output of connection units trying to connect on a specific port.
- Optionally, third code for providing a means or a method step for a GUI for administration purposes, offered for example over a web interface.
- Optionally, fourth code for providing a means or a method step for publishing
10 its presence over the network using the zeroconf protocol.
- Optionally, fifth code for providing a means or a method step for accepting and installing software updates of the base node as well as for the portable application software for the connection units.
- Sixth code for providing a means or a method step for providing facilities for
15 pairing of connection units to the base node.
- Seventh code for providing a means or a method step for auto-composing of different incoming arbitrary media streams and rendering of composited image on display or projector screen.
- Eighth code for providing a means or a method step for receiving, decrypting
20 and decoding incoming arbitrary media content.
- Optionally ninth code for providing a means or a method step for scaling of incoming arbitrary media streams
- Optionally tenth code for providing a means for displaying incoming arbitrary media content in accordance with a set of one or more rules.

25

Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, USB mass storage device etc.

30 Portable application for the client processing device

The portable application comprises an algorithm for screen scraping. Screen scraping algorithms include VNC and RDP or similar. The algorithm may include a

combination of algorithms such as VNC and RDP that are optimized for different content, e.g. static text or video. The portable application has one or more of the following features:

- 5 - Eleventh code for providing a means or a method step for connecting to a network including the base node.
- Twelfth code for providing a means or a method step for capturing video frame buffers of the client processing device, i.e. computer (C), also called screen scraping.
- 10 - Thirteenth code for providing a means or a method step for encoding, compressing and optionally encrypting these video frames and sending them over a secure link to the base node. Only changed areas such as rectangles or triangles of the screen (or other suitable geometrical shapes) need to be transferred, and different types of rectangles or triangles are encoded in different ways (e.g. RLE, JPEG,...) to optimise performance.
- 15 - Fourteenth code for providing a means or a method step for handling the connection unit.
- Fifteenth code for providing a means or a method step for initiating connection to base node.
- Sixteenth code for receive inputs from the input device on the connection unit.
- 20 - Seventeenth code for providing a means or a method step for sending state changes to the visual indicator on the connection unit.
- Optionally, eighteenth code for providing a means or a method step for presenting the user a GUI (18).
- Optionally, nineteenth code for presenting GUI for administration of the portable application.
- 25 - Optionally, twentieth code for providing a means or a method step for displaying and activating a key on the display of the client processing device for allowing a user input to start the transfer of data from the client device to the base node.

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Any of the above code may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

In this embodiment the portable application stored on the connection unit, and is executed in an execution context on the client processing device. The portable application does not need to be copied to or installed on the computer. It can be
5 executed directly from the connection unit. It will only be copied temporarily into an execution context on the client processing device. There are also no changes in configuration required or settings in the client processing device. This means that nothing will remain on the client processing device when the connection unit is removed. It also implies that the portable application will run on client processing
10 devices where the user does not have the necessary access rights to install software.

The portable application is designed in such a way that

- No specific drivers need to be installed on the client processing device.
- Pre-installed drivers are used, e.g. for classes of peripheral devices.
- 15 - It is independent from vendor specific graphics hardware.
- It runs on at least one and preferably on a variety of different client processing devices, including Windows, Mac OS/X, Linux, Android, iOS and many others.

20 Advantages

The present application has one or more of the following advantages:

- No need for a master role in the meeting
- Standard plug and play connectivity of connection units to base node
- 25 - Simple and well known user actions are employed
- Own networking facilities of client processing devices not blocked
- No configuration changes on the client processing device
- Input devices are easily accessible; e.g. large size
- Program updates of portable application and server program can be performed
30 locally
- Portable applications are used, no installation, multi-platform, no vendor specifics
- Particular implementation of screen scraping done by portable application

- avoids vendor specific graphics devices
- Standard drivers are used so no drivers have to be installed
 - No configuration changes on the client processing devices
 - Zero footprint applications on client processing devices – nothing to clear up or
- 5 adjust or reset
- Own networking facilities of client processing devices not blocked
 - No configuration changes on the user computers
 - Low virus, malware and spyware risk
- 10 The portable application may be stored on a non-transitory machine readable storage medium such as an optical disk, a magnetic disk, magnetic tape, solid state memory, nand Flash etc.

Second Embodiment

- 15 In the second embodiment, referring to Figs. 2 to 5, the base node is a separate physical processing device called base unit (B), comprising permanent storage, memory, a processing engine, a wireless access point (4), a plug and play interface such as a USB port (11), a graphics display output adapter (5) like
- 20 VGA/DP/DVI/HDMI, and optionally an audio output adapter (27). An input device having an actuator such as a button 13 and a visual indicator 14 are optional.

- The connection unit is a physical device in the form of an external peripheral device (shown in the drawings as a “dongle” D) comprising permanent storage storing the
- 25 portable application (7) and configuration parameters (12), memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter such as WiFi (3) or other wireless transmitters such as LiFi, a plug and play interface such as a USB interface (2), a button as input device (9), an LED ring as visual indicator (10). The portable application is stored on the peripheral device (7).

- 30 The client processing device is host device, for example a computer or laptop comprising a display, a plug and play interface such as a USB port (2), memory, and a processing engine such as a microprocessor.

The system thus comprises

- an external peripheral device (D) that has a plug and play interface such as a USB interface (2) on one end and a communications interface such as a wireless interface configured as client (3) on the other end.
- a base unit (B) that has a communications interface such as a wireless interface configured as access point on one end (4) and a video card adapter (5) like VGA, DVI, DP or HDMI on the other end.
- a portable application (7) stored on the peripheral device (D) but executed on the client processing device (C)
- a base node software (6) stored and executed on the base unit (B)

The external peripheral device (D) also preferably has any one or any combination of:

- a large button as actuator for the input device (9) allowing user interaction with the peripheral device. The button preferably has an actuation surface area of between 100 and 14,400 square mm.
- visual indication such as a LED (10) allowing user feedback from the peripheral device. The user feedback can be in the form of a light ring.

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An advantage of embodiments of the present invention is to provide data transfer to the peripheral device via a peripheral interface such as a USB interface on any processing device such as a computer in a manner that is largely operating system independent and without leaving a footprint (Zero-Footprint). Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably not necessary. To avoid the need for administrator rights, embodiments of the present invention use other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. Embodiments of the present invention route at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a peripheral device such as a USB device. This bypasses any network interface of the processing device C (and hence many firewalls) but only

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for the specific client software. Other applications are not affected and can make use of the standard network interfaces, i.e. packets from/to the TCP/IP stack are transferred to a network device as normal. The client software is launched from the peripheral device such as a USB composite device or storage device as a portable
5 application, which can avoid that any traces are left on the host OS.

Basic usage scenario of the second embodiment

The base node software (6) displays on the projector a splash screen – (21) in figure 5
10 - showing its readiness to receive arbitrary media content over its receiver (4). This splash screen (21) also shows instructions on how to use the system, as well as the configuration parameters (see later) to reach the base node. These configuration parameters can also be shown in a transparent canvas at the bottom of the central display (22).

15

To avoid user interaction for the configuration of the connection between peripheral device and base unit, a pairing process is used. This pairing process provides the peripheral device, i.e. the connection unit with networks parameters needed to set up the local network. As an example, the peripheral device can be briefly plugged into the
20 USB port (11) of the base unit (B). The base unit then optionally does a software validity check, optionally does a software update of the portable application stored on the peripheral device, and writes the connection parameters on the peripheral device (D) required for the peripheral device and base unit to find each other to the permanent storage (8). For example, when using WiFi, this would be the SSID, WEP/WPA2 keys
25 and IP address of the base unit's receiver, as well as the port number used by the base node software although not all of this data is necessarily exchanged.

A client processing device that wants to have its arbitrary media content displayed on the central display connected to the base node (5) connects a peripheral device (D) to
30 its USB port via (2). The peripheral device presents itself to the computer over interface (2) as a composite device comprising a mass storage device and a keypad. This has the major advantage that no specific driver is required, since all these devices are natively supported in every personal computer system that has a USB port. If

autorun is enabled, then the computer will automatically execute the client software (7) stored in mass storage (8) on the peripheral device. The first user interaction mentioned in the general case is then just the connection of the peripheral device to the USB port. If security measures disabled auto-run, the user needs to explore the mass
5 storage on the mass storage of the peripheral device and start the portable application manually.

The portable application will use the wireless, e.g. WiFi or LiFi interface of the peripheral device (3) to connect to the correct base node. To know the right base unit
10 to connect to, the configuration parameters needed to make this connection are stored in the database (12) on the mass storage device (8) during the pairing process described earlier.

Once the connection is made, the peripheral device goes into connected mode. This
15 means that there is now at least one channel from the peripheral device to the base unit. The content is not shown yet. The LED (10) on the peripheral device now turns white to give a visual indication of this new state.

When the user at the computer (C) wants to show her content, she presses the button
20 (9). When the button was previously in state “connected” (see figure 6), it will check the state of the base unit (P). If the base unit is not in state “full”, the peripheral device will send the screen scraped arbitrary media content to the base unit (B), which will add the media content to the composition on the central display. The peripheral device LED (10) now turns red to indicate “showing” state (figure 6).

25

The button (9) acts as a toggle. When the user presses the button again, that computer displays content will be removed from the projector. The LED (10) goes back to white.

30 Use of the auto-run feature is optional if possible and enabled on the computer (C) to start the client software (7) as soon as the peripheral device is plugged in. On Windows for example, this means mounting the peripheral device as a mass storage device and using the autorun.inf file stored on the peripheral device.

In many cases however, this auto-run feature will be disabled for security reasons. In that case, we will, if possible and enabled on the computer (C), use the auto-play feature to show the logo of the connected peripheral device on the desktop of the computer. The user then needs to double click on that logo to start the client software. If the auto-play feature as described above is also not possible or enabled, the user must browse to the file system of the connected peripheral device and start the application manually. This means double clicking the client.exe file on Windows, client.app on Mac OS/X or tapping the appropriate application icon on a tablet or any mobile device with touch screen.

Third Embodiment: Portable application stored on standard solid state memory such as a USB stick.

In the third embodiment, the portable application is stored on a solid state memory such as a regular USB memory stick (figure 7).

With a solid state memory such as a regular USB memory stick, there is no input device, visual indicator or transmitter of the kinds described above for the connection unit. This means that the system needs to:

- Use the transmitter/receiver from the client processing device.
- Use as input device a key or button on the client processing device like a physical key on the keyboard, a special mouse press, a button area on a touch screen, a button displayed on the screen to be clicked on with a mouse pointer.
- Present the visual indicator on the client processing device's display.

The client processing device then looks like figure 8.

This embodiment provides a peripheral interface such as the USB interface on any processing device acting as a host device such as a computer in a manner that is largely operating system independent. Installation of drivers and/or applications onto such a processing device as a computer is not necessary wherever pre-installed generic drivers are present. Administrator rights on the processing device such as a computer are preferably

not necessary. To avoid the need for administrator rights, this embodiment uses other peripheral device pre-installed drivers such as USB class drivers supported without any extra installation. This embodiment of the present invention routes at least screen scraped data presented by client software running on the processing device for transfer to a communications network via a network connection of the processing device. The client software is launched from the peripheral device such as the USB device as a portable application.

The first user operation then comprises:

- 10 - plugging in the solid state device such as a USB memory stick,
- starting the portable application (if autorun is disabled)
- configuring the transmitter, such as a wired or wireless network interface, on the client processing device to connect to the correct base node, using the configuration parameters (22) shown on the central display
- 15 - triggering the connection of the portable application with the base node, for example by interacting with an element on the GUI (18) of the portable application presented on the display of the client processing device.

Presenting visual feedback on user actions is in this embodiment also done using elements in the GUI of the display of the client operating device.

In this embodiment, the advantage of zero footprint is partly realized by the portable application in the sense that no software is installed on or copied to the client operating device, but there is a configuration change needed to connect the transmitter of the client operating device with the base node, which needs to be undone afterwards.

Optionally, the portable application can make the configuration changes to the transmitter for the user automatically in the background.

Advantages lost in this embodiment

- Partial loss of zero footprint nature of portable application
- More complex first user interaction
- More expertise required from user
- GUI needed on client operating device display, which is possibly also shown on

central display

- Need to find free key on client operating device when using physical key for second user action
- Network interface is blocked from other uses by portable application

5

Optionally, the last point can be avoided by using the base unit as a gateway to the network that the client operating device wanted to connect to through its own interface.

Advantages are:

- 10
- tight control of user connectivity to corporate network through settings on the base unit
 - keep network connectivity intact even when transmitter is now also used for display purposes

- 15
- Disadvantage is a higher vulnerability of the system because the display connection is now possible a doorway into the corporate network.

What remains as advantages are

- 20
- the availability of a physical medium to distribute the portable application to users
 - no need to install or copy software to client operating device
 - easy way to maintain software updates on the connection units (here: memory sticks) via the base unit
 - possibility to write configuration data on the connection unit by the base unit, for example in the form of a configuration profile that can be read and used by the
- 25
- client operating device

Fourth Embodiment: Software only client installed on the client processing device.

- 30
- This embodiment is similar to the third embodiment, with as only difference that the software is copied on the client operating device (figure 9). In this case, no plug and play port such as a USB port is required on the client operating device.

This embodiment will typically be used for tablet PC's and mobile devices. In that case

- there is often no USB port available

- application distribution is easy and widely accepted through application stores

Fifth embodiment: Base node software OEM'ed to projector or display equipment

- 5 In this embodiment, the base node is not realized as a separate physical box, but integrated into the processing unit inside a display or projector. All other details are as previously described.

Sixth embodiment

10

In this embodiment, the base node is not realized as a separate physical box, but integrated into the codec of a video conferencing equipment. All other details are as previously described.

- 15 Seventh embodiment: Remote meeting participant

In this embodiment, one or multiple client operating devices are not in the direct vicinity of the base node but on a remote location.

- 20 To accommodate this case, the following adaptations are needed:

- further compression and or scaling of the arbitrary media content to allow use of low bandwidth connection
- possibility to communicate connection parameters of the base node to a remote user
- 25 - connectivity of the base node to the WAN network to which the remote user is connected

All other details are as previously described.

- 30 Eighth embodiment: multiple base nodes

In this embodiment, multiple base nodes are used. This can be done for different purposes:

- connectivity of multiple central displays
- extension of real estate of central display

- connectivity of base nodes in different remote locations

This provides the advantage that one can present on multiple base units from a single peripheral device. This is useful for a number of cases:

- 5 - personal peripheral device: user can have a personal peripheral device that is paired with multiple meeting rooms that he regularly uses
 - use in meeting room with multiple base units each controlling a different display in the same meeting room
- 10 The proposal uses a special variant of the peripheral device called a multi base peripheral device. The multi base peripheral device is equipped with a rotating wheel around the circular central "show me" button. This could be a mechanical rotating multi-position switch or something like the touch wheel on the iPod classic.
- 15 The pairing of this multi-base variant of the peripheral device:
- the rotation wheel is put in the position of the corresponding base unit.
 - the peripheral device is paired to the base node in the regular way
 - the configuration parameters are stored in a permanent storage location; every position of the rotating wheel has a corresponding set of connection parameters (e.g. different rows in
- 20 a table) each corresponding with a particular base

The connection of the peripheral device is as follows:

- multi-base peripheral device X is plugged into a PC
 - rotation wheel on peripheral device X is put in position A
- 25 - peripheral device X reads configuration parameters in position A of its internal memory
- peripheral device X connects to base node A
 - base node A indicates connection of multi-base peripheral device X on central display screen
 - rotation wheel on peripheral device X is put in position B
- 30 - peripheral device X reads configuration parameters in position B of its internal memory
- peripheral device X connects to base node B
 - base node B indicates connection of multi-base peripheral device X on screen
 - continue until correct base is selected with rotation wheel
 - click the peripheral device input device e.g. button to show content on central display of

base node

- rotating the wheel always first clicks away content from the base of the last position

Ninth embodiment

5

Fig. 10 shows a peripheral device 47 in accordance with an independent embodiment of the present invention including an input device. This embodiment can be used with any of the embodiments described above.

10 The peripheral device is configured as a connection unit and is a physical device in the form of a connector for a plug and play interface of a user processing device as a host computer such as a USB connection, a flexible data and power connection connected to the connector and a base, the base having an actuator, e.g. a button configured to be an input device with the functions as described above.

15

The base and/or the actuator is preferably large in size, e.g. having a surface area between 100 and 14,400 square mm. The base can be square, rectangular, round, hexagonal, oval, polygonal in shape or any other ergonomically suitable shape. The actuator is preferably round but can be square, rectangular, hexagonal, oval, polygonal in shape etc. there can be
20 more than one actuator on one base.

The length of the flexible data and power connection, e.g. cable is preferably adapted to place the peripheral device (when in its connected in its operating position), especially the base and the actuator, in the region between the boundary of the connected user processing
25 device and the ergonomic boundary as defined above. In addition the flexible data and power connection should be adapted so that the base lies flat on the meeting table independent of the orientation of the connector needed to insert the connector into the plug and play interface.

30 The base preferably includes electronics such as having permanent storage for storing the portable application and the network configuration parameters, memory, a processing engine (e.g. CPU, FPGA), a wireless transmitter/receiver such as for WiFi or LiFi, a plug and play interface such as a USB interface, a LED ring or strip as visual indicator. The portable application can be stored on the peripheral device, i.e. in the base. The visual

indicator is for allowing user feedback from the connection unit of the status of any activity.

- Some examples for activation of the actuator which can be used with any of the
5 embodiments of the present invention:
 - Sound activated (hand clap, voice recognition, computer sound, music, ...)
 - Remote controlled via wireless connected device (IR, Bluetooth, WiFi, LiFi...)
 - 10 ○ Light activated
 - Pressure activated, e.g. depression with a finger or hand.
 - Touch activated
 - Proximity ('near-touch' on the actuator or bringing the actuator close to some object)
 - 15 ○ Biometric reader such as Fingerprint reader, Iris scanner, DNA analyser
 - Keypad, e.g. for entering Keycode e.g. a password

Alternative embodiments

20 In the above embodiments, once the connection is made between the connection device and a host computer, the peripheral device goes into connected mode. This means that there is at least one channel from the peripheral device to the base node. In accordance with any of the embodiments of the present invention a plurality of channels can be set up between the connection device and the base node. These channels may be logical channels.

25

Some examples for such a multichannel arrangement may include the first and one or more of the additional channels:

- First channel is for the Scraped image stream (XDS)
- Second channel is for GPU commands (OpenGL, DirectX)
- 30 ○ Third channel is for Mouse pointer coordinates (absolute, relative)
- Fourth channel is for Mouse pointer icons
- Fifth channel is for Image data files (JPEG, PNG, GIF, ...)
- Sixth channel is for Multimedia data files or streams (MPEG2, MPEG4, OGG, H.26x, ...)

- Seventh channel is for Audio data files or streams (MP3, MP4, AAC, WMA, ...)
- Eighth channel is for text or Document data files (DOC, DOCX, PPT, PPTX, ODT, ODS, PDF, ...)
- 5 ○ Ninth channel is for transmission of a priority value 1,2, 3... as described above.

The support of audio, as discussed above when providing a seventh channel, in “screen scrape” like applications is non-trivial. When using devices which comprise a Windows
10 OS, a large variety of audio devices exist, each offering a separate API. On devices comprising a Mac OS, special drivers like for instance SoundFlower needs to be installed. SoundFlower is a Mac OS X (10.2 and later) system extension that allows applications to pass audio to other applications. Hence such programs do not meet the zero footprint requirements.

15

The present invention provides in embodiments a method and a system for connecting a processing device such as a laptop, smartphone, PDA, computer, tablet and suchlike to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications
20 protocol for communication between processing device and a standard class of peripheral devices. The method and/or system are adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- 25 b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- d) routing audio data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for
30 transferring the audio data between the processing device and the peripheral device.

In particular the method and/or system can be adapted for:

- a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;

- 5 c) coupling the processing device to a communications network via the peripheral device;
d) routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

10

Embodiments of the present invention advantageously use the availability of a plug and play interface such as a USB interface. A USB device is connected to a suitable port on the processing device. . For example, on every PC-like platform, there is standard built-in support for a USB audio device. Thus there is a standard generic audio driver available.

- 15 Using this audio interface is thus possible without special driver installation.

On the peripheral device in embodiment of the present invention one can implement a virtual audio device. This peripheral device can present itself as an audio out device to the processing device such as a laptop, PDA, laptop, smartphone, tablet, PC, etc it is connected to. As soon as the peripheral device is plugged in, the user of the processing device will see an additional audio out interface displayed on the processing device display to which it can stream the audio. Audio configuration advantageously can be done using the standard audio interface GUI on the processing device. The peripheral device can present itself as a USB composite device.

25

The virtual audio device on the peripheral device is preferably adapted to analyse the incoming signal. If no audio is received, the incoming signal is discarded. If audio is received, the peripheral device preferably will initiate an additional TCP/IP socket connection to the base unit and the communications network. The audio can be then optionally time-stamped synchronous with the video stream for lip synchronization, optionally encoded into for instance Orgg/Vorbis, optionally encrypted using for instance CryptoPP and sent over the TCP/IP link using the RTP/RTCP protocol. If no audio signal is received, then no audio packets will preferably be sent over the network to limit bandwidth usage. The audio channel over TCP/IP is disconnected synchronously with the

30

video channel.

In an embodiment of the present invention, the base unit is adapted to receive the audio stream packets for instance encoded in RTP and controlled with RTCP over a TCP/IP
5 socket. It will preferably then decrypt and decode the contained encoded audio stream if required, and deliver the resulting signal to the physical audio device in the base unit. The embedded time stamps can be used to synchronize the audio and video streams.

When audio is present on the client processing device to which the peripheral device is
10 connected and made available to the USB audio device presented by the peripheral device, then it will be streamed to the base unit. The base unit is notified that the additional multimedia stream presented to it contains audio. This additional meta-information is used in the auto composition engine on the base unit. Without audio, up to four such streams can be handled for example by the base unit simultaneously.

15 Thus, instead of "scraping" the audio like e.g. prior art products do, embodiments of the present invention provide a channel, as described above, which is adapted to capture the audio on the peripheral device using only standard drivers and not requiring any software installation in or on the processing device. The peripheral device preferably acts as a
20 composite device comprising for instance a (virtual) audio speaker device. However instead of operating like a speaker the audio is channelled over the communications network. The peripheral device can preferably capture the audio stream with a device driver, for instance a built in ALSA UAC1, and stream the audio to the base unit. In addition, to provide lip synchronisation, embodiments of the present invention further
25 provides a timer or uses a timer present in a processing device that preferably time stamps both the audio and the video stream. This time stamp is encoded in the video frames and passed on in the ALSA communication stream to the peripheral device. The peripheral device then encodes this time stamp into the audio stream (for instance RTP audio stream) that is streamed to the base unit. At the receiving end, the audio and video streams are then
30 preferably recombined taking into account the time stamp to reach lip synchronization.

A detailed embodiment of the present invention for audio capture will be described with reference to Fig. 11.

In this embodiment a peripheral device 32 as described above is used that can be coupled with a processing device 31 such as a laptop, tablet, smartphone, PDA, personal computer etc. The coupling can be by a plug and play interface such as a USB interface that has generic drivers installed on the processing device. For example the peripheral device 32
5 can be physically inserted into a USB port on the processing device 31. Commercially available processing devices currently support external USB audio devices through a generic built-in USB audio software driver. In the future any modifications, improvements or replacements of universal interfaces will have an equivalent audio solution. The generic drivers installed on the processing device make the audio available at the port 8 to the
10 peripheral device 32. For example, port 8 can be a USB port using a standardized interface, e.g. mostly UAC1. On the peripheral device 32 there is a matching port 11. In accordance with this embodiment audio data is captured at this interface 8-11 internally in the peripheral device 32. This data is then optionally re-encoded and streamed to the communications network to which the peripheral device 32 has access. An example is a
15 wireless communications network such as WiFi or LiFi. The communications network has a base node which can be in the form of a base station or base unit 33. The base unit can be a central base unit for use in meetings. For use in displaying a presentation this base unit is coupled to a display device as described for other embodiments of the present invention. In order to provide lip synchronicity, the audio and video signals captured are provided with a
20 high resolution time stamp upon packaging. By doing so, the combined audio and video signals can be reconstructed at the receiving end regardless of the paths and delays of the different packets.

For the processing of video data from the processing device 31, a software 2 is executed on
25 the processing device 31 e.g. a client PC, i.e. a screen scraping software as described in the other embodiments. This software 2 can be stored as a software program 30 in mass storage 12 on the peripheral device 32 as described in the other embodiments. This software program 30 is loaded onto the processing device 31 when it is coupled thereto, either automatically or by user action as described in the other embodiments. When the
30 software 2 is running on the processing device 31 it is preferred if it leaves zero footprint on termination has been described for other embodiments. That software 30 when executed on the processing device 31 captures the video data that is available on the processing device, e.g. from a presentation or video that is running on the processing device as described in the other embodiments. For example, the software 30 when executed on the

processing device 31, is adapted to screen scrape, e.g. to read one or more video frame buffers 1 from the graphics card in the processing device 31. Generally the processing device 31 will have its own display and hence will have a graphics card or something equivalent with a buffer for storing video data. This read video information is preferably
5 time stamped with a clock 9, to be able to later synchronize the captured video signal with the related audio signal. The video signal is then encoded in a video encoder 3, packetized in a video packetizer 4, prepared in an HID protocol packetizer 5 for transport over the plug and play interface using a generic driver 10, such as over a USB interface using generic pre-installed drivers, e.g. a generic pre-installed Human Interface Driver (HID).
10 The audio data is offered on the plug and play port e.g. the USB port 8.

On the peripheral device 32 the video packets are received at the corresponding plug and play port, e.g. the USB port 11, read by the Human Interface Driver (HID) interface handler 13, unpacked to remove HID protocol headers in an unpacker 20 and then
15 transmitted to the communications network by a transmitter 21. The network can be wireless for example WiFi or LiFi network.

Having been routed over a communications network to the base unit 33, the incoming stream is read from the communications interface such as a WiFi access point 22,
20 unpacked in an unpacker 25, decoded in a decoder 26 and then inserted into a suitable composition such as an OpenGL based composition in the compositor 29 for display on a central display device.

With reference to the audio data on the processing device 31 such as a client PC, the audio
25 is sent over a port using generic drivers such as over a USB port 8 using the standard built-in generic audio driver such as UAC driver 7. On the peripheral device 32, the audio packets are read from the generic port, e.g. USB port 11 by a dedicated audio device 14. These packets are then processed by any of a mixer a rate converter, an echo canceller, noise canceller or similar. Any of the mixing, rate conversion, echo cancelling, noise
30 cancelling can be executed using an ALSA driver 18. The ALSA driver offers the packets to a dummy audio device 16 such as an audio scraper. In this audio device 16 the audio packets can be time stamped from the clock 15 that can be synchronized with clock 9 of the processing device 31. This information is then encoded in an encoder 17 and packetized in a packetizer 19]before being transferred to the communications network. The

network can be a wireless network such as a WiFi or LiFi network For this purpose a suitable transmitter 21 is provided in the peripheral device 32. On the base unit 33 the audio information stream is recovered at a suitable communications interface such as the WiFi access point 22. The audio is then unpacked in an unpacker 23, decoded in a decoder 5 24 before being before being offered to an audio mixer 28. In order to synchronise the audio and video streams these are both sent to a synchronizer 27 in which the two streams are synchronized and thus keep lip synchronization.

10 In the above embodiments, a particular method of pairing the peripheral device with the base node has been described. Any of the embodiments of the present invention may include other pairing mechanisms of which some examples are given below.

- Some examples for pairing
 - 15 ○ Plug in the peripheral device, to a generic peripheral device port such as a USB port of the base node or other USB enabled device. Pairing info is transmitted over the generic peripheral interface such as USB.
 - The Signal strength of the wireless channel to the base node is used to identify which base node is to be used
 - 20 ○ The Signal strength of the wireless channel or any other channel. Example is an NFC/RFID transmitter can be provided underneath the meeting room table. Putting the user processing device such as a laptop and the peripheral device plugged in on this table automatically pairs the peripheral device with the base of this meeting room
 - 25 ○ Manual pairing (e.g. by entering IP address, hostname, wireless ID (like SSID on WiFi))

What is claimed is

1. A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising:
 - a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
 - b) setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;
 - c) coupling the processing device to a communications network via the peripheral device;
 - d) routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.
2. The method of claim 1 wherein Step b) comprises presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.
3. The method of claim 1 wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.
4. The method of claim 1 wherein Step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.
5. The method of any of claims 1 to 4 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.
6. The method of claim 5 wherein the client application is a portable application.

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7. The method of any of the claims 1 to 6 wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

5

8. The method of claim 7 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.

9. The method of any of claims 1 to 8 further comprising time-stamping synchronously with the audio with the data stream.

10

10. The method of claim 9 further comprising encoding, optionally encrypting the audio data.

11. A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system with pre-installed generic drivers providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the system comprising:

a) means for coupling a peripheral device to the processing device, the peripheral device having a transceiver;

b) means for setting up, by means of a first pre-installed generic audio driver of the operating system, a means for audio communication between the peripheral device and the processing device and by means of a second pre-installed generic driver of the operating system, a means for data communication between the peripheral device and the processing device;

c) means for coupling the processing device to a communications network via the peripheral device;

d) means for routing audio data between the processing device and the communication network via the means for audio communication, wherein the first pre-installed generic audio driver is used for transferring the audio data between the processing device and the peripheral device.

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12. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic

driver is a human interface device driver.

13. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic
5 driver is a mass storage device driver.

14. The system of claim 11 further comprising means for presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.
10

15. The system of any of claims 11 to 14 wherein a client application is stored on the peripheral device which when run on the processing device obtains screen scraped data.

16. The system of claim 15 wherein the client application is a portable application.
15

17. The system of any of the claims 11 to 16 wherein the peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

18. The system of claim 17 wherein if audio is received, the peripheral device will initiate an additional connection to the base unit through the communications network.
20

19. The system of any of claims 11 to 18 further comprising time-stamping synchronously with the audio stream with the data stream.
25

20. The system of claim 19 further comprising means for encoding, optionally encrypting the audio data.

21. An electronic meeting tool for use with the system according to any of the claims 11 to
30 20 and for communicating arbitrary media content from users at a meeting comprising: a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display, the node configuration means being adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and

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at least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network, wherein the peripheral device is a connection unit comprising:

- 5 (a) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and
 (b) a transmitter for communicating with the communications network,

10 a program adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and an input device to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.

15 22. The electronic meeting tool of claim 21 wherein the program is stored on the peripheral device.

23. The electronic meeting tool of claim 21 or 22 wherein the transmitter is a wireless transmitter or transceiver.

20

24. The electronic meeting tool of any of the claims 21 to 23 wherein the peripheral device is a plug-and-play device.

25 25. The electronic meeting tool of any of the claims 21 to 24 wherein the program is adapted to screen scrape content of the second display.

26. The electronic meeting tool of any of the claims 21 to 25 wherein the input device is physical actuator coupled to the peripheral device.

30 27. The electronic meeting tool of claim 26 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

28. The electronic meeting tool of any of the claims 21 to 27 wherein the input device is a key displayed on the second display.

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29. The electronic meeting tool of claim 28 wherein the key displayed on the second display is not screen scraped by the program.

- 5 30. A method for connecting a processing device to a communications network and for use with the system according to any of the claims 11 to 20, the processing device having a memory, a display and an operating system with at least one pre-installed generic driver providing a generic communications protocol for communication between processing device and a standard class of peripheral devices, the method comprising the steps of:
- 10 a) coupling a peripheral device to the processing device, the peripheral device having a transceiver;
- b) setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the processing device;
- c) coupling the processing device to a communications network via the peripheral device;
- 15 d) routing screen scraped data between the processing device and the communication network via the means for communication, wherein the generic communication protocol is used for transferring the screen scraped data between the processing device and the peripheral device.
- 20 31. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.
32. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.
- 25 33. The method of claim 30 wherein Step b) comprises presenting the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.
- 30 34. The method of any of claims 30 to 33 wherein a client application is stored on the peripheral device which when run on the processing device obtains the screen scraped data.

35. The method of claim 34 wherein the client application is a portable application.

36. A peripheral device for use with the system according to any of the claims 11 to 20 and
5 for providing communication connectivity to a processing device which is provided with
memory, a display and an operating system with at least one pre-installed generic driver
providing a generic communication protocol for communication between the processing
device and a standard class of peripheral devices, the peripheral device comprising a
memory in which executable software code is stored for execution on the processing
10 device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of
the operating system, a means for communication between the peripheral device and the
processing device;
a second software code portion for connecting the processing device to a communications
15 network via the peripheral device, the peripheral device having a transceiver;
a third software code portion for screen scraping data from the processing device; and
a fourth software code for routing screen scraped data between the processing device and
the communications network over the means for communication; wherein the first
software code portion is adapted to use the generic communication protocol for
20 transferring the screen scraped data between the processing device and the peripheral
device.

37. The peripheral device of claim 36, wherein the first software code portion is adapted to
present the peripheral device to the processing device as a human interface device and
25 wherein the pre-installed generic driver is a human interface device driver.

38. The peripheral device of claim 36, wherein the first software code portion is adapted to
present the peripheral device to the processing device as a mass storage device and
wherein the pre-installed generic driver is a mass storage device driver.

30

39. The peripheral device of claim 36, wherein the first software code portion is adapted to
present the peripheral device to the processing device as a composite device and wherein
pre-installed generic drivers drive different device interfaces independently.

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40. The peripheral device of any of the claims 36 to 39 wherein said executable software code comprises fifth code for providing a means for connecting to the communications network including a base node.
- 5 41. The peripheral device of any of the claims 36 to 40 wherein said executable software code comprises sixth code for providing means for capturing video frame buffers of the processing device.
- 10 42. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises seventh code for providing a means for encoding, compressing and optionally encrypting the screen scraped data and sending the screen scraped data the communication network.
- 15 43. The peripheral device of any of the claims 36 to 41 wherein said executable software code comprises eighth code for providing a means for handling the peripheral device.
44. The peripheral device of any of the claims 40 to 43 wherein said executable software code comprises ninth code for providing means for initiating connection to the base node.
- 20 45. The peripheral device of any of the claims 36 to 44 wherein said executable software code comprises tenth code for receiving inputs from an input device on the peripheral device.
- 25 46. The peripheral device of any of the claims 36 to 45 wherein said executable software code comprises eleventh code for providing a means for sending state changes to the visual indicator on the peripheral device.
47. The peripheral device of any of the claims 36 to 46 wherein said executable software code comprises Twelfth code for providing a means for presenting to the user a GUI.
- 30 48. The peripheral device of any of the claims 36 to 47 wherein said executable software code comprises thirteenth code for presenting a GUI for administration of the said executable software code when executed as a portable application.

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49. The peripheral device of any of the claims 36 to 48 wherein said executable software code comprises fourteenth code for providing a means for displaying and activating a key on the display of the client processing device for allowing a user to input the start the transfer of data from the processing device to the base node.

5

50. A peripheral device use with the system according to any of the claims 11 to 20 and for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver providing a generic communication protocol for communication between the processing
10 device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of the operating system, a means for communication between the peripheral device and the
15 processing device;
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver; and
a third processing software code for routing data between the processing device and the communications network over the means for communication; wherein the first software
20 code portion is adapted to use the generic communication protocol for transferring the data between the processing device and the peripheral device, and
an input device coupled to the peripheral device, the input device being adapted to react to a user action to trigger the transfer of the data from the processing device to the peripheral device.

25

51. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a human interface device and wherein the pre-installed generic driver is a human interface device driver.

30 52. The peripheral device of claim 50, wherein the first software code portion is adapted to present the peripheral device to the processing device as a mass storage device and wherein the pre-installed generic driver is a mass storage device driver.

53. The peripheral device of claim 50, wherein the first software code portion is adapted to

present the peripheral device to the processing device as a composite device and wherein pre-installed generic drivers drive different device interfaces independently.

5 54. The peripheral device of any of the claims 50 to 53 wherein the input device is physical actuator coupled to the peripheral device.

55. The peripheral device of claim 54 wherein the physical actuator has a surface area of between 100 and 14,400 square mm.

10 56. The peripheral device of any of the claims 50 to 55 wherein the input device is a key for display on the display.

15 57. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fourth code for providing a means for connecting to the communications network including a base node.

20 58. The peripheral device of any of the claims 50 to 56 wherein said executable software code comprises fifth code for providing a means for capturing video frame buffers of the processing device.

59. The peripheral device of claim 58 wherein said executable software code comprises sixth code for providing a means for encoding, compressing and optionally encrypting the video frames and sending them over a secure link to the base node.

25 60. The peripheral device of any of the claims 50 to 59 wherein said executable software code comprises seventh code for providing a means for handling the peripheral device.

30 61. The peripheral device of claim 59 or 60 wherein said executable software code comprises eighth code for providing a means for initiating connection to the base node.

62. The peripheral device of any of the claims 50 to 61 wherein said executable software code comprises ninth code for receive inputs from an input device on the peripheral device.

63. The peripheral device of any of the claims 50 to 62 wherein said executable software code comprises tenth code for providing a means for sending state changes to the visual indicator on the peripheral device.
- 5 64. The peripheral device of any of the claims 50 to 63 wherein said executable software code comprises eleventh code for providing a means for presenting the user a GUI.
65. The peripheral device of any of the claims 50 to 64 wherein said executable software code comprises twelfth code for presenting GUI for administration of the executable
10 software code when executed as a portable application.
66. The peripheral device of any of the claims 57 to 65 wherein said executable software code comprises thirteenth code for providing a means for displaying and activating a key on the display of the processing device for allowing a user input to start the transfer of data
15 from the processing device to the base node.
67. A peripheral device use with the system according to any of the claims 11 to 20 and for providing communication connectivity to a processing device which is provided with memory, a display and an operating system with at least one pre-installed generic driver
20 providing a generic communication protocol for communication between the processing device and a standard class of peripheral devices, the peripheral device comprising a memory in which executable software code is stored for execution on the processing device, said executable software code comprising:
a first software code portion for setting up, by means of the pre-installed generic driver of
25 the operating system, a means for communication between the peripheral device and the processing device;
a second software code portion for connecting the processing device to a communications network via the peripheral device, the peripheral device having a transceiver;
a third software code portion for receiving media content from the network and for
30 displaying the media content on the display in accordance with a set of rules; wherein the first software code portion is adapted to use the generic communication protocol for transferring the media content between the peripheral device and the processing device.
68. The peripheral device of claim 67 wherein said executable software code comprises

fourth code for providing a means for correctly configuring a receiver as an access point.

69. The peripheral device of claim 67 or 68 wherein said executable software code comprises fifth code for providing a means for listening for output of connection units trying to connect on a specific port.

70. The peripheral device of any of the claims 67 to 69 wherein said executable software code comprises sixth code for providing a means for a GUI for administration purposes.

71. The peripheral device of any of the claims 67 to 70 wherein said executable software code comprises seventh code for providing a means for publishing its presence over the network using the zeroconf protocol.

72. The peripheral device of any of the claims 67 or 71 wherein said executable software code comprises eighth code for providing a means for accepting and installing software updates.

73. The peripheral device of any of the claims 67 or 72 wherein said executable software code comprises ninth code for providing a means for providing facilities for pairing of connection units to the processing device.

74. The peripheral device of any of the claims 67 or 73 wherein said executable software code comprises tenth code for providing a means for auto-composing of different incoming arbitrary media streams and rendering of composited image on display.

75. The peripheral device of any of the claims 67 or 74 wherein said executable software code comprises eleventh code for providing a means for receiving, decrypting and decoding incoming arbitrary media content.

76. The peripheral device of any of the claims 67 or 75 wherein said executable software code comprises twelfth code for scaling of incoming arbitrary media streams.

77. The peripheral device of any of the claims 67 or 76 wherein said executable software code comprises thirteenth code for providing a means for displaying incoming arbitrary

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media content in accordance with a set of rules.

78. A method for use with the system according to any of the claims 11 to 20 and for communicating arbitrary media content from users at a meeting comprising:

- 5 operating a display node of a communications network, the display node being coupled to a first display, to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display; and
connecting a peripheral device to a port of a processing device and communicating the user selected arbitrary media content via the communications network,
10 loading a program onto the processing device and running the program on the operating system of the processing device to obtain user selected arbitrary media content, said program leaving a zero footprint on termination, and
triggering transfer of said user selected arbitrary media content to said transmitter through said port after a user action on an input device.

15

79. A peripheral device for use with the system according to any of the claims 11 to 20, comprising:

- a base
a connector for connection to a plug and play port of a host processing device,
20 a flexible connection between the base and the connector for transferring data signals and power,
an actuator on the base for actuating a signal and for transferring the signal to the connector for transfer to the port, wherein the base has electronics comprising permanent storage for storing a portable application, a processing engine, a transceiver and a visual
25 indicator.

80. A method for use with the system according to any of the claims 11 to 20 and for providing communication connectivity from a processing device,

- setting up a communications network between a base node of the communications network and a peripheral device coupled to the processing device;
30 transferring media content between the processing device and the peripheral device, transmitting the media content from the peripheral device to the communications network, receiving media content from the communications network at the base node and displaying the media content on a display in accordance with a set of rules.

81. Any of the above claims as software code stored on a non-transitory storage medium.

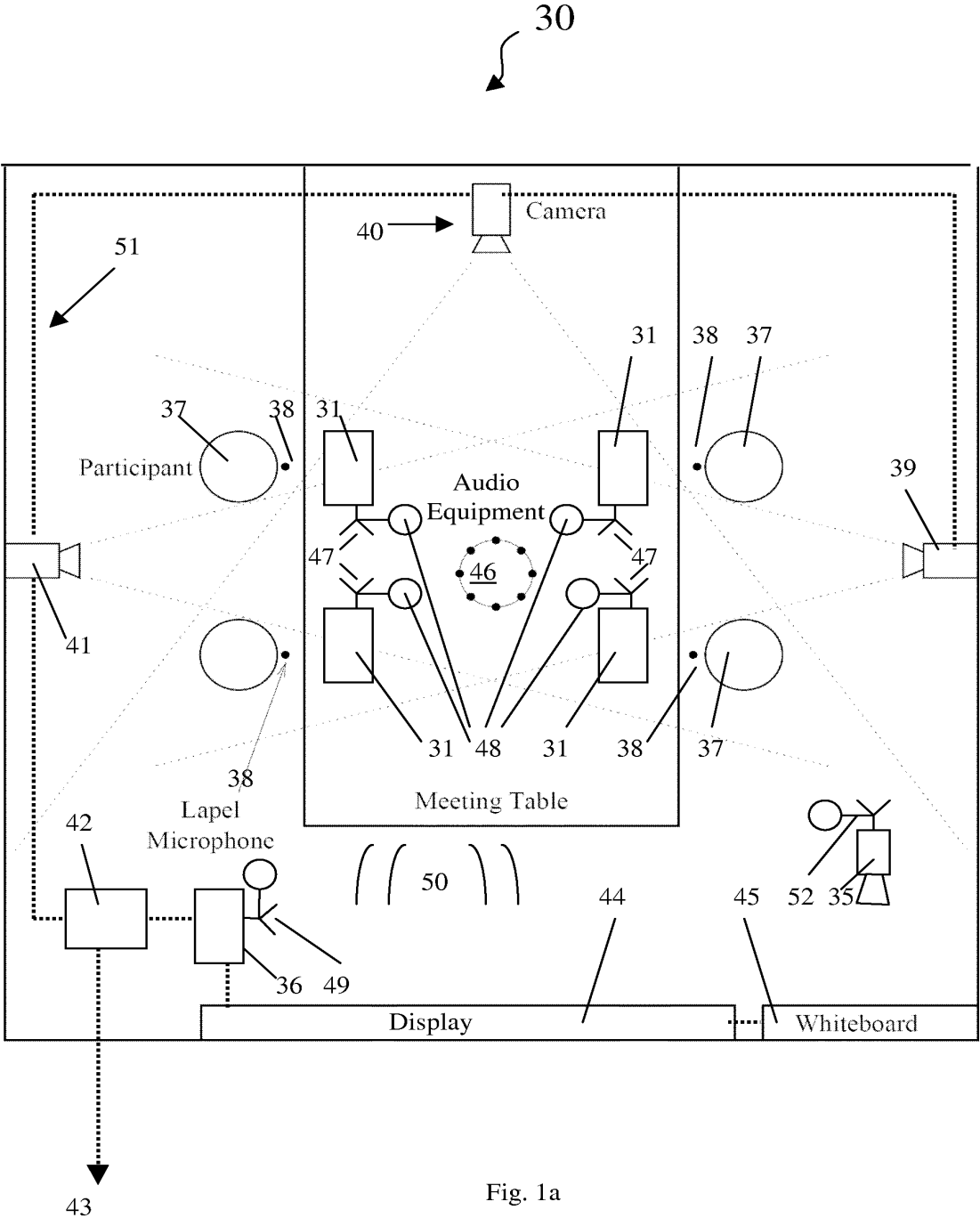


Fig. 1a

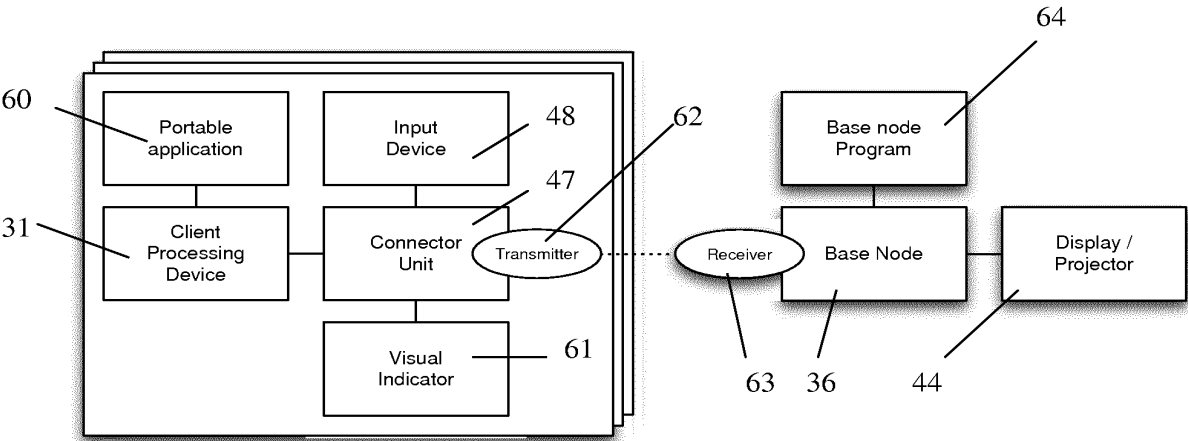


Fig. 1b

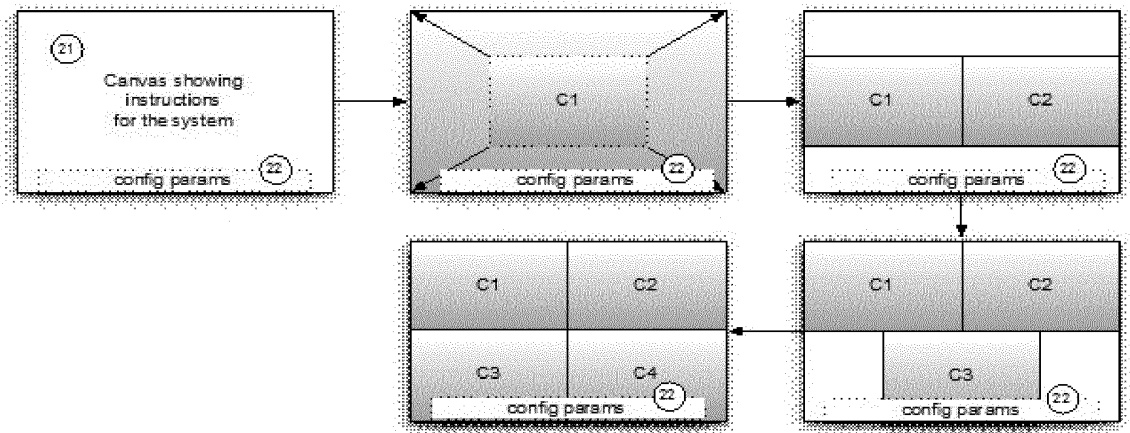


Fig. 2

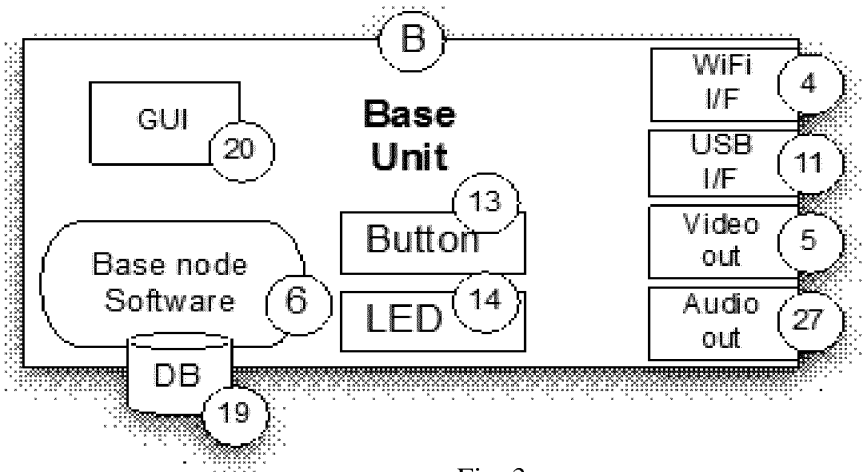


Fig. 3

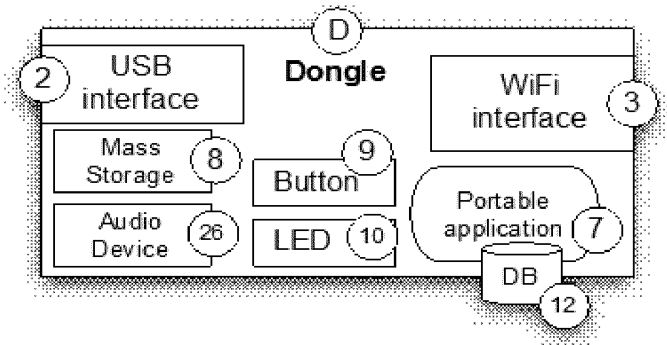


Fig. 4

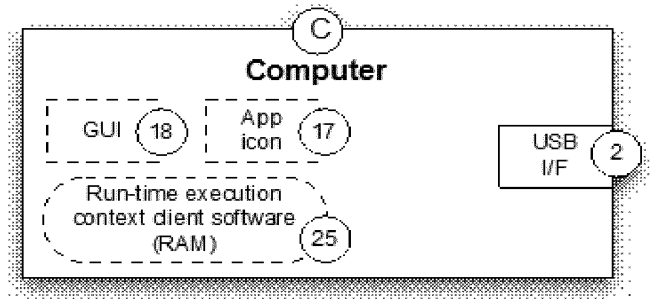


Fig. 5

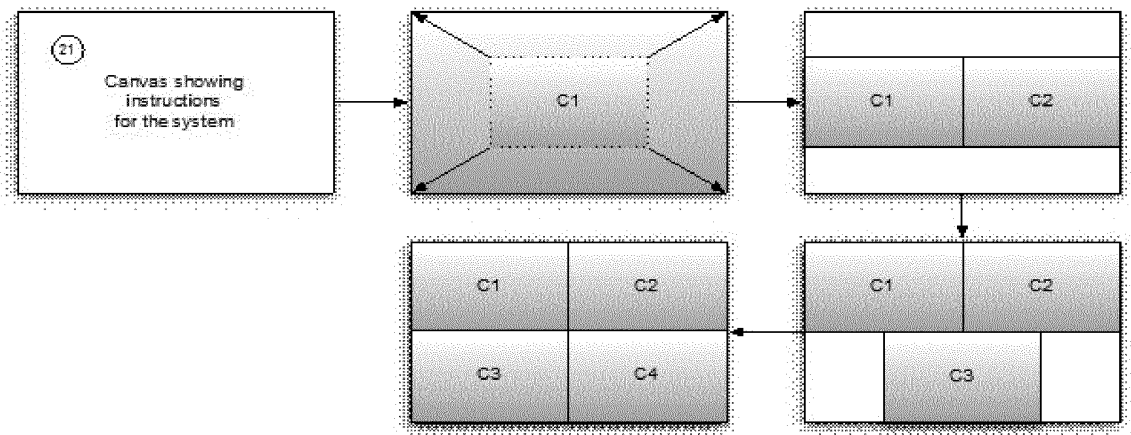


Fig. 6

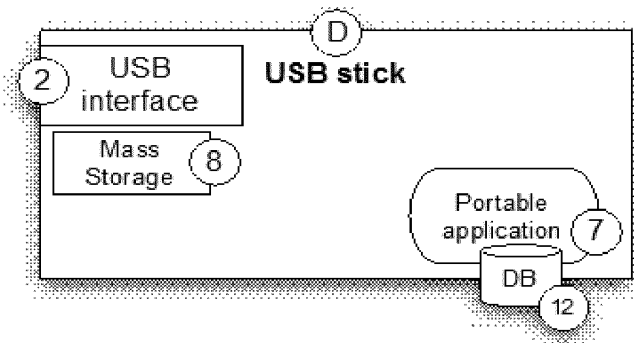


Fig.7

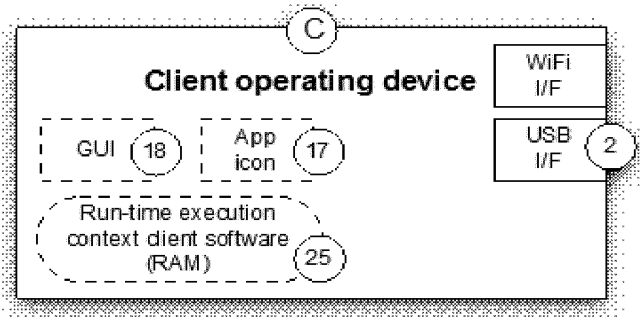


Fig. 8

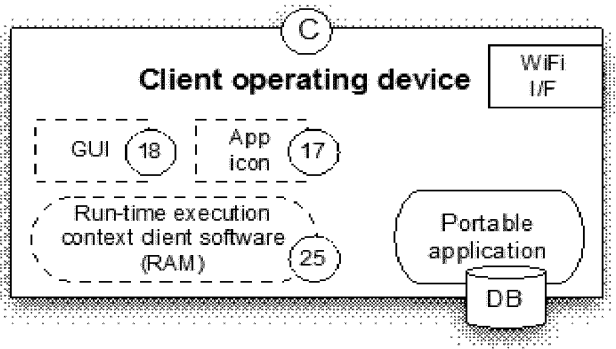


Fig. 9

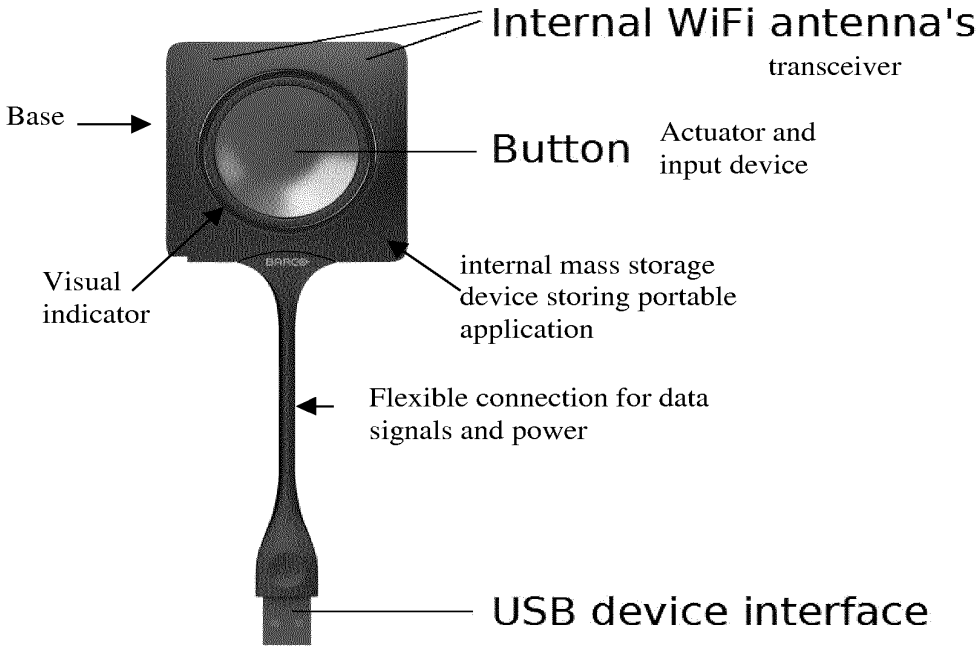


Fig. 10

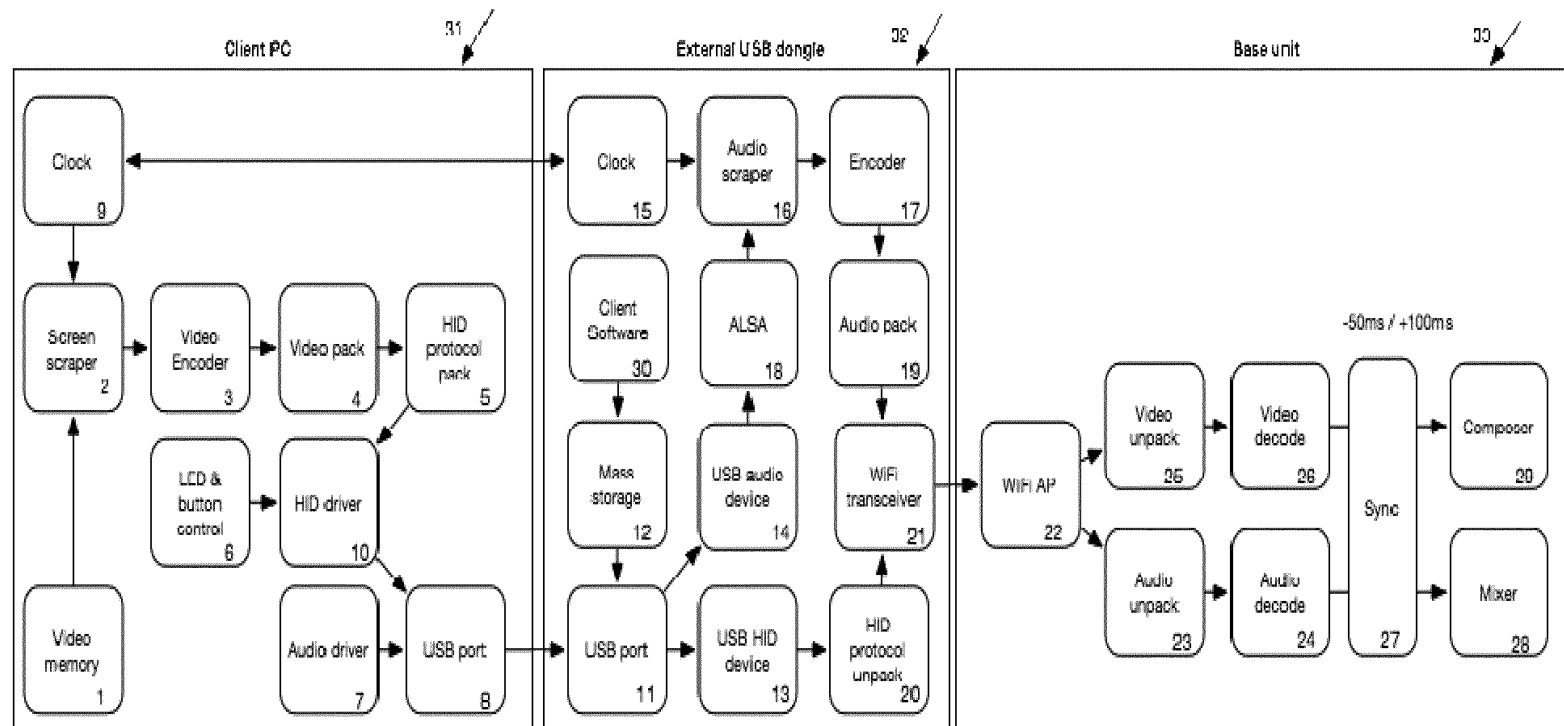


FIG. 11

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Continuation Patent Application of:
U.S. App. No. 14/344,836

Parent Filing Date:	March 3, 2015	Parent Art Unit:	2184
First Inventor:	Koen Simon Herman BEEL	Customer No.:	23364
Attorney No.:	BEEL3004C/TL	Confirm. No.:	TBD
For:	ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS		

PRELIMINARY AMENDMENT BEFORE EXAMINATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

INTRODUCTORY COMMENTS

This paper accompanies documents submitted to initiate processing of the above-identified patent application.

Before calculating the filing fee and before formal examination of the application on the merits, it is desired to amend the application in accordance with the following particulars.

AMENDMENTS

AMENDMENT TO THE ABSTRACT

An amendment to the abstract is shown in the following pages under the heading AMENDMENT TO THE ABSTRACT.

AMENDMENT TO THE SPECIFICATION

An amendment to the specification is shown in the following pages under the heading AMENDMENT TO THE SPECIFICATION.

AMENDMENTS TO THE CLAIMS

The claims are amended as shown in the following pages under the heading "LIST OF CURRENT CLAIMS". This listing of claims supersedes all prior listing of claims presented in this application, shows currently proposed amendments and shows the current status of all claims in the application.

AMENDMENTS TO THE ABSTRACT

The original Abstract is cancelled in favor of the new Abstract presented on the following page.

ABSTRACT

An electronic meeting tool and method for communicating arbitrary media content from users at a meeting comprises a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display. The node configuration means is adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display. A peripheral device adapted to communicate the user selected arbitrary media content via the communications network is a connection unit comprising a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system, and a transmitter. A program is adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. The user may trigger transfer of said user selected arbitrary media content to said transmitter.

AMENDMENT TO THE SPECIFICATION

Please add the following paragraph before page 1, line 3 of the specification:

--This application is a continuation application claiming benefit to U.S. patent application 14/344,836 filed March 3, 2015, which is a national stage application of international application PCT/EP2012/068167, filed September 14, 2012, which claims the benefit of U.S. provisional application No. 61/534,592 filed September 14, 2011, U.S. provisional application No. 61/635,234, filed April 18, 2012, and is a continuation-in-part application U.S. application 13/270,659, which was filed October 11, 2011 and granted as U.S. patent 8,756,348, where the entirety of said applications are incorporated herein by reference.--

LIST OF CURRENT CLAIMS

1-81. (Cancelled)

82. (New) A method for connecting a processing device to a communications network, the processing device having a memory, a display, an operating system and communication between processing device and a class of peripheral devices, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device;

b) communicating audio data and display data from the processing device to the external peripheral device;

c) reading the audio data from the port using an audio device on the external peripheral device,

d) connecting the processing device to a communications network via the transceiver, and

e) display data and audio data being routed between the processing device and the communication network via the transceiver and further to a base node.

83. (New) The method of claim 82, wherein the audio device comprises an audio output adapter device which is configured as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

84. (New) The method of claim 82, further comprising presenting the external peripheral device to the processing device as any of the following:

a human interface device;

a mass storage device; and

a composite device.

85. (New) The method of claim 82, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

86. (New) The method of claim 85, wherein the client application is a portable application.

87. (New) The method of claim 82, wherein the external peripheral device analyzes an incoming signal from the processing device and if no audio data is received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

88. (New) The method of claim 82, further comprising time-stamping synchronously a stream of the audio data with a stream of the display data.

89. (New) The method of claim 88, further comprising encoding, optionally encrypting the audio data.

90. (New) A system for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system and communication between processing device and a class of peripheral devices, the system comprising:

a) means for coupling an external peripheral device physically to a port of the processing device, the external peripheral device having a transceiver and a connector configured to couple to the port of the processing device;

b) means for display data communication and audio communication between the external peripheral device and the processing device;

wherein the external peripheral device is configured in a way to connect the processing device to a communications network via the transceiver; and

means for routing display data and audio data between the processing device and the communication network via the means for display data and audio data communication and the transceiver to a base node.

91. (New) The system of claim 90, wherein the external peripheral device comprises an audio device which is configured in a way to be implemented as a virtual audio device to transfer the audio data from the processing device to the base node via the communications network.

92. (New) The system of claim 91, further comprising any of the following:

means for presenting the external peripheral device to the processing device as a human interface device,

means for presenting the peripheral device to the processing device as a mass storage;
and

means for presenting the external peripheral device to the processing device as a composite device.

93. (New) The system of claim 92, wherein a client application is stored on the external peripheral device which when run on the processing device obtains screen scraped data.

94. (New) The system of claim 93, wherein the client application is a portable application.

95. (New) The system of claim 92, wherein the external peripheral device is adapted to analyse an incoming signal from the processing device and if no audio is received, the incoming signal is discarded.

96. (New) The system of claim 95, wherein if audio is received, the external peripheral device is adapted to initiate an additional connection to the base unit through the communications network.

97. (New) The system of claim 90, further comprising time-stamping synchronously the audio data with the display data.

98. (New) The system of claim 90, further comprising means for encoding, optionally encrypting the audio data.

99. (New) A peripheral device for providing communication connectivity to a processing device which is provided with memory, a display and an operating system and for communication between the processing device and a class of peripheral devices, the peripheral device comprising a connection configured to be physically coupled to a port of the processing device and the peripheral device being adapted to work with executable software code, said executable software code comprising:

a first software code portion for setting up, a means for display data audio data communication between the peripheral device and the processing device;

a second software code portion for connecting the processing device to a communications network via a transceiver of the external peripheral device; and

a third software code portion for routing the display data and the audio data between the processing device and the communication network via the transceiver to a base node.

100. (New) A method for connecting a processing device to a communications network, the processing device having a memory, a display and an operating system, the method comprising:

a) coupling an external peripheral device physically to a port of the processing device, wherein the peripheral device comprises a wireless transceiver and a connector, said connector configured to couple to the port of the processing device;

b) setting up audio communication between the peripheral device and the processing device and setting up data communication between the peripheral device and the processing device;

c) the peripheral device being configured to connect the processing device to a communications network via the wireless transceiver;

d) routing audio data from the processing device to the wireless transceiver via the connector of the peripheral device and the audio communication and routing the audio data from the wireless transceiver of the peripheral device to a base node over the communications network via at least one channel created between the external peripheral device to the base node.

101. (New) The method of claim 100, wherein the external peripheral device is configured to analyze an incoming signal from the processing device and if no audio data is received, the incoming signal is discarded and if audio data is received, the external peripheral device initiates a TCP/IP socket connection to the base unit through the communications network.

REMARKS

Examination of the application as amended is respectfully requested. No new matter is added by way of amendments.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants' attorney, the examiner is invited to contact the undersigned at the numbers shown below.

Respectfully submitted,
BACON & THOMAS, PLLC

/Thomas Lee/

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Attorney for Applicant
Registration No. 66,396

Dated: April 20, 2020

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**DECLARATION & ASSIGNMENT
(WITH APPLICATION DATA SHEET ONLY)**

DECLARATION

TITLE OF INVENTION: **ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS**

As the below named inventor, I hereby declare that:

This declaration is directed to:

- ☐ The accompanying utility or design patent application, or
- ☒ United States application number: 14/344,836 filed on March 13, 2014.

1. The above-identified application was made or authorized to be made by me.
2. I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.
3. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

Direct all correspondence to the address associated with **Customer Number: 23364**.

By signing this declaration, the inventor confirms that the application, including the claims, has been read and understood and that the inventor is aware of the duty to disclose to the U.S. Patent and Trademark Office all information known to the inventor to be material to patentability as defined in 37 CFR§1.56.

ASSIGNMENT

WHEREAS, I, the below named inventor, hereinafter referred to as ASSIGNOR, is the or an owner of certain new and useful improvements in the above identified application (hereinafter referred to as the INVENTION).

WHEREAS, **BARCO N.V.**, whose post office address is/are Pres. Kennedypark 35, Kortrijk, Belgium B-8500,

hereinafter referred to as ASSIGNEE, is desirous of acquiring the entire right, title and interest in and to the INVENTION in the United States;

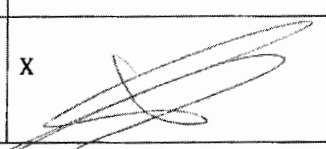
NOW, THEREFORE, for good and valuable consideration, receipt of which is hereby acknowledged, I, ASSIGNOR, by these presents do sell, assign and transfer unto said ASSIGNEE, the entire right, title, and interest in and to said INVENTION and application throughout the United States of America, including any and all Letters Patent granted on any division, continuation, continuation-in-part and reissue of said application.

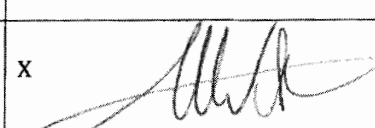
Declaration/Assignment Short rev. 10OCT12
Bacon & Thomas, PLLC

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) in the United States for said INVENTION, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said INVENTION, all without further consideration. ASSIGNOR also agrees, without further consideration and at ASSIGNEE's expense, to identify and communicate to ASSIGNEE at ASSIGNEE's request documents and information concerning the INVENTION that are within ASSIGNOR's possession or control, and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR's obligations under this instrument shall extend to ASSIGNOR's heirs, executors, administrators and other legal representatives.

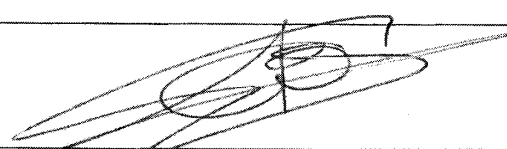
ALSO, ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE's sole use and behoof; and for the use and behoof of ASSIGNEE's legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this assignment and sale not been made.

ASSIGNOR authorizes any member of the firm of *Bacon & Thomas, PLLC* to insert or complete any information in the assignment portion of this document needed to effect its recordal in the U.S. Patent and Trademark Office.

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Signature:	X 		

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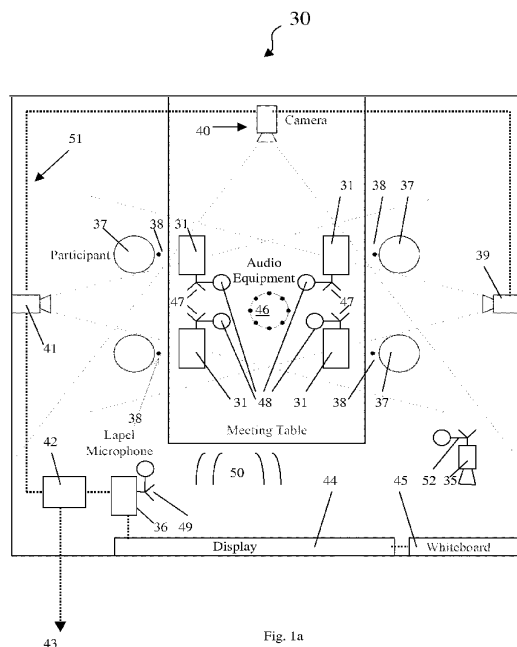
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[Continued on next page]

(54) Title: ELECTRONIC TOOL AND METHODS WITH AUDIO FOR MEETINGS



(57) Abstract: An electronic meeting tool and method for communicating arbitrary media content from users at a meeting is described. These can include a node configuration means adapted to operate a display node of a communications network, the display node being coupled to a first display. The node configuration means is adapted to receive user selected arbitrary media content and to control display of the user selected arbitrary media content on the first display. At least one peripheral device adapted to communicate the user selected arbitrary media content via the communications network is provided, wherein the peripheral device is a connection unit comprising: (e) a connector adapted to couple to a port of a processing device having a second display, a memory and an operating system; and (f) a transmitter for communicating with the communications network. A program is provided that is adapted to be loaded onto the processing device and to run on the operating system of the processing device, said program being adapted to obtain user selected arbitrary media content, said program leaving a zero footprint on termination. An input device is provided to allow the user to carry out a user action that triggers transfer of said user selected arbitrary media content to said transmitter through said port.



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