

ARTIFICIALLY INTELLIGENT HOLOGRAM

BACKGROUND

Field of the Technology

[001] The present disclosure relates generally to digital assistant systems in humanoid form employing facial recognition software, natural language processing, artificial intelligence, text to speech software, real time 3D rendering of computer animations and a holographic image display system.

Brief description of the Prior Art

[002] Currently available digital assistant systems may be in the form of software running on mobile cell phones or browser based website applications, or, may be in the form of in-home devices that look like speakers, in order to provide users with a way to ask questions and receive information through voice inputs. For example, interested readers may review US Patent 9,548,050, titled “Intelligent Automated Assistant,” and US Patent 6,584,439, titled “Method and Apparatus for Controlling Voice Controlled Device.” Although these are functional ways for a user to interact with a digital assistant in order to receive information (such as the weather and driving conditions), these by no means provide a necessarily satisfying experience and lack in providing the user with the experience of interacting with another human being.

[003] Kiosks, vending machines and automated teller machines are examples of physical consoles that a user can walk up to, and based on a series of requested inputs, and receives something, tangible or non-tangible, back. In the case of kiosks the tangible output might be something like a prepaid phone card, or even a device, like headphones. Vending machines obviously provide tangible output in the form of drinks and snacks. Similarly, automated teller machines usually dispense cash after receiving a set of detailed inputs from the user.

[004] Existing digital assistants do not typically use facial recognition software. Facial recognition software is still limited in practical applications, primarily being used for security

and threat assessment technologies by the government as well as social media platforms. Existing facial recognition software involves uploading pictures, or dozens of pictures of a specific person to a database, and then running them through an advanced algorithm to determine the individual's identity. Commercial applications for facial recognition software are limited to social media and photo sharing applications that utilize the software to differentiate individuals in photos. There are no commercially available digital assistants, kiosks, vending machines, or automated teller machines that utilize facial recognition software to validate users, and differentiate between users who are speaking to the system.

[005] Natural language processing is currently used by several major technology corporations for a variety of reasons. The two primary purposes are digital assistant software which is embedded into mobile cell phones and into pieces of hardware that look like speakers, for the purposes of giving users the ability to ask questions, or to play music. There are currently no commercial applications of natural language processing software utilized for the purposes of carrying on a two-way conversation with computer or holographic simulation of a person, with the intent to conduct business or purchase something from the area or retail location.

[006] Artificial intelligence is an expansive term that comprises the goal of a machine, device or software program to perceive its environment, take actions and influence outcomes. A program is deemed to be artificially intelligent when it is able to mimic the cognitive functions of a human and create the illusion that a user is speaking with another person. Early examples of this software include Chatbots that have been developed over the past two decades. More recently artificial intelligence software has expanded through various devices like IBM's Watson. That server based software program is now being extended and provided to governments, universities and businesses to find patterns within massive amounts of seemingly disparate data. Although Watson, and other devices like Watson, have been packaged inside of hardware for interaction in the real world, beyond the internet and localized computers, there currently doesn't exist any artificial intelligent systems in the retail and office environments that allow customers and employees to converse with the artificial intelligence through a holographic representation of a human in order to achieve a goal or seek some desired outcome.

[007] Some existing systems may incorporate machine learning which provides the ability for

the software platform to learn without being specifically programmed by a person. Machine learning is a form of advanced pattern recognition that utilizes past experiences to build assumptions about the inputs and make informed guesses about the best possible solution based on incomplete information. Machine learning is being utilized by major corporations and governments around the world for the purpose of gaining insights from massive amounts of data related to populations, citizens, and customers. Existing digital assistant technology utilizes basic machine learning concepts in order to remember things like driving directions, where users live, when they should leave for a meeting, and what type of music and news a specific user enjoys. Additionally, certain smart home devices, like thermostats, can learn your preferences over time and automatically adjust their settings based on users, time and location for things like temperature or lawn watering schedules.

[008] These forms of basic machine learning or conceptual awareness programs have started to permeate into commercial applications and do make users lives easier. However, as with the previous sections, there are currently no commercial or business applications for human like computer generated imagery, to remember your preferences and tastes, based on a user's name or facial recognition software. This new application would be taking what currently exists in machine learning and applying it to a completely new and different application in the marketplace.

[009] Text to speech software is the process of converting text, into speech based on a pre-synthesized voice. Currently most individuals interact with computers and software through touch pads, keyboards, computer mice, computer monitors and mobile phone screens. As a result there is not currently a strong need in these mediums to expand upon the existing infrastructure of predominantly text based forms of digital communication with auditory ones. One of the more widely used forms of text to speech are digital assistant software programs, for providing audio responses to user's questions or requests. Most major global positioning systems that provide turn by turn directions utilize text to speech communication in order to allow the driver to keep their eyes on the road while still receiving directions. Other common applications for commercial and residential text to speech software programs are used by individuals with disabilities, for example the famed physicist Stephen Hawking.

[0010] Speech based training algorithms involve the process of using spoken language to provide feedback to an artificially intelligent software application. There are no existing direct comparisons for speech based training programs to update the programming of a software application.

[0011] Computer generated imagery (CGI) is a very well-established industry, with major uses for things like entertainment, making movies, music videos, and video games. CGI is also utilized in commercials, to create simulated environments and even to create advertisements. Computer generated imagery is most often pre-rendered, or created in advance of a user being able to watch or interact with the CGI. For example, a cartoon movie that is made with CGI, is pre-rendered, and the whole movie is created, before it is shown to users. There are very few applications where CGI is rendered, or moved from the creation environment, to an environment where it can be enjoyed in real time. The reason for this is that most CGI programs require very large and complex files that need a lot of time to create the final version from the environment where it is created. Currently used CGI do not generate real-time responses, especially within consumer and business settings.

[0012] Projection systems exist in many applications across, retail, office and personal settings to display images. For example, they are utilized by movie theaters and home users who wish to project movies, television shows and video games on to large surfaces in order to create massive screens. Projection systems are also used in advertising settings to display products or services on to a wall or window in order to catch the attention of users passing by the projection system. Certain retail environments may use a projection system, coupled with a glass or plastic surface in order to present music videos and advertisements to users in the area. There does not currently exist any applications in the consumer or personal market that utilizes projection systems to display a human like computer generated image for the purpose of carrying on conversations and completing specific business tasks, like buying movie tickets, or purchasing food.

[0013] In summary, no product currently exists that brings together different items to create a humanoid holographic digital assistant and bundles them into one package.

SUMMARY

[0014] This disclosure describes an enhanced digital assistant system that displays a holographic computer-generated human character (“a holographic person”) on a transparent display screen. The holographic person is capable of carrying on conversations in real time with a user, remembering things about past interactions with the user to make the user experience realistic and more human-like. The system (“holographic person”) is intended to be utilized in retail, office, business and personal settings. For business, the holographic person can help in staff augmentation. For example, the holographic person can interact with retail point of sale systems in order to process orders on behalf of a user, provide users with detailed directions and answer questions about the holographic person’s surroundings. In personal settings the holographic person can integrate with existing internet of things devices an enhanced interactive experience. The holographic person is implemented through the unique use of facial recognition software, natural language processing, artificial intelligence, text to speech conversion, speech based training, computer generated imagery, and a holographic image display software and hardware.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other aspects and features of the present disclosure will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the disclosure in conjunction with the accompanying figures, wherein:

[0016] FIG. 1(a) and FIG. 1(b) respectively show a front and side views of the holographically enhanced digital assistant system described herein;

[0017] FIG. 2 illustrates various key components of the system;

[0018] FIG. 3 illustrates flow of information between various components of the system; and

[0019] FIG. 4 illustrates an overview of the software components and functionality in an example embodiment.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0020] Embodiments of the present disclosure will now be described in detail with reference to

the drawings, which are provided as illustrative examples of the disclosure so as to enable those skilled in the art to practice the disclosure. Notably, the figures and examples below are not meant to limit the scope of the present disclosure to a single embodiment, but other embodiments are possible by way of interchange of some or all of the described or illustrated elements.

[0021] Moreover, where certain elements of the present disclosure can be partially or fully implemented using known components, only those portions of such known components that are necessary for an understanding of the present disclosure will be described, and detailed descriptions of other portions of such known components will be omitted so as not to obscure the disclosure.

[0022] In the present specification, an embodiment showing a singular component should not be considered limiting; rather, the disclosure is intended to encompass other embodiments including a plurality of the same component or nested stages, and vice-versa, unless explicitly stated otherwise herein. Moreover, applicants do not intend for any term in the specification or claims to be ascribed an uncommon or special meaning unless explicitly set forth as such. Further, the present disclosure encompasses present and future known equivalents to the known components referred to herein by way of illustration.

[0023] In general, the present application is designed to create the illusion of a person standing and talking with the user. The hardware can be deployed in almost any location, and there is no requirement for additional hardware from the user in order to interact with the holographic person. The user can simply walk up to the device and start talking to the hologram.

[0024] The present disclosure is motivated by the need to provide a human like interactive experience on top of different, pre-existing software and hardware platforms that have never been combined together. The resulting product is a completely new disclosure that does not exist anywhere, or in any form. The key software programs include facial recognition software, natural language processing, artificial intelligence, text to speech, speech based training, computer generated imagery, and a holographic imaging system.

[0025] The new proposed system improves upon every one of these existing machines in a variety of different ways. The new system could converse with the user in any language, answer

questions about the products, provide reviews, and even utilize sales software to increase conversion rates and sales of devices, beverages, snacks or banking related products. As the interaction between the system and the user would occur through natural human language, the user wouldn't have to try and figure out a touch pad, or keypad system, but instead they could simply talk to the holographic person as if they were speaking directly with a sales person. The owner of the holographic digital assistant could then track all data points about the customer interaction in order to update the capabilities of the system, in the situation where it wasn't able to answer a specific customer question, or pull statistics on what sales text converted the most sales and generated the most revenue.

[0026] There are a number of key components required to successfully create the holographic person. They include, but are not limited to, facial recognition software, natural language processing, artificial intelligence, text to speech, speech based training, 3D computer generated imagery, and a holographic image display system.

[0027] Facial recognition software is an existing technology that is utilized in a new way in combination with other components of the system described in this new disclosure. The system uses hardware for tracking faces in order to assign a name, and create a record for the user that is interacting with the system. This provides numerous advantages to the software, including the ability to tell the difference between multiple speakers in a group, remember previous users in order to recall preferences, expand upon the current knowledge of a user, and for security purposes in order to determine if someone is a potential threat, or if that person is exhibiting any worrying characteristics. Also, optionally, a facial recognition software may have an eye-tracking software component which is able to track a user's gaze to provide feedback to the CGI software that renders the holographic person to make "eye contact" with the user while conversing.

[0028] Natural language processing is utilized to record incoming speech from users, tagged to a specific user in the case of a group based on the facial recognition, and then convert the incoming speech into text. The natural language processing system, in conjunction with the facial recognition software, also enables the system to determine who is currently speaking. Once the user's speech has been converted to text, it passes through an application programming

interface and into the onboard or cloud based artificial intelligence software.

[0029] Artificial intelligence is the key cornerstone of the entire software platform. This is where the new system breaks down the meaning of the text that was received from the natural language processing software and determines the correct response to deliver back to the user. As the system is designed to be used in very specific settings, for example restaurants, hotels, and office buildings, the amount of content and answers that are required can be greatly reduced from a general purpose artificial intelligence software system. This helps to enhance user experience by creating a feeling that there is an actual person behind the software. In any situation where the user asks a question outside of the scope of the specific use of the software, the system is capable of returning a generic response about limiting the scope of the questions to the core functions of the holographic person's capabilities and uses. For example, if the holographic person is being used to check in guests at a hotel, and a user asks the holographic person how to build a spaceship, the holographic person can simply thank the user for asking, but reiterate that their purpose is to check them into their hotel room as fast as possible and with as pleasant of an experience as possible.

[0030] Another example would be the use of this disclosure outside movie theater box office ticket locations, to carry on conversations with potential customers who are not sure what movie they would like to see. The holographic person is capable of asking the user questions, gaining insight into the user's tastes, likes and dislikes; and then providing that user with a recommended movie that is currently showing and the show time. Furthermore, once the user determines what movie they would like to see, in this example, they are then able to pay the holographic person by swiping their credit card through the onboard credit card processing system that can be attached as an add-on or via a customer account that is already linked with a credit card and validated through the facial recognition software. The holographic person is then able to print out a ticket for that user, with an add-on printer or by sending a digital ticket to the user's smartphone and the movie theater's customer mobile application. The overarching goal is to provide the user with the sense, or feeling that they were communicating with an intelligent entity, just like a natural person.

[0031] Machine learning is intimately connected into the artificial intelligence. As the artificial

intelligence begins to build a database of information about customers, their preferences, common questions, and requests, the system builds upon its existing knowledge base in order to provide new and unique ways of responding to future users who have similar requests and needs. Users are also able to enhance the internal machine learning capabilities of the system through voice and text inputs to expand the systems knowledge base.

[0032] Given the correct security code entered by an administrator of the system, users are able to talk to the holographic person and teach it new responses, and new ways of handling customer responses and questions. The system can track all of these new capabilities, and utilize them in future customer interactions. A sophisticated web application is utilized in order to track all customer requests, and provide the administrator for the holographic person to manually enter new responses, and update the software via text inputs.

[0033] Administrators that have duplicates of the same holographic person at multiple retail locations, like a restaurant or movie theater, are able to see the responses from all locations, the training each individual holographic person has received, and duplicate those new learned capabilities in order to expand them to all holographic systems currently in use by that administrator. Every holographic person may be connected to the internet and may have the ability to be remotely updated by its system administrator.

[0034] The administrator may also be able to create tests in order to see how customers respond to multiple numbers of different responses from the holographic person, based on similar requests from customers. If the administrator determines that one form of response from the holographic person is more ideal than others, for example the disclosure encourages customers to make additional or larger purchases; the selected response can be moved from the test environment and pushed to all holographic units currently in use by that administrator.

[0035] Text to speech within the new disclosure involves taking the text responses determined by the artificial intelligence and using a digital synthesizer to convert that text in to audio files. The audio files are then pushed to the database for storage and eventually passed on to the computer generated imagery program.

[0036] Speech based training algorithms involve the process of using spoken language to

provide feedback to an artificially intelligent software application. This feedback can be used to modify the responses the artificial intelligence program would give to a user. For example, if new information were to become available, or a better answer was discovered for helping a user with their request, the artificial intelligence could be updated through verbal instructions, as opposed to computer programming. An administrator with access credentials would receive authorization from the holographic person to modify existing input responses, and then use a special set of commands in order to provide those modified instructions to the software program. As an example, if a movie theater were to use the application to promote a new movie, the theater manager could enter the administrator credentials, and then provide the holographic person with information about a new movie, using natural language to convey the information.

[0037] 3D computer generated imagery is one of the most critical elements of the entire platform. This new disclosure renders human-looking CGI to provide users responses in real time, meaning they are generated at the same time they are requested. This is something that is very unique, and doesn't currently exist, especially within consumer and business settings. Once the artificial intelligence and machine learning algorithms have determined the correct response to provide to a user based on their requests, then the computer graphics program converts that text speech back to speech audio, and then animate the computer generated persons mouth, in order to give the impression that the computer generated person, or holographic person, is speaking back to the user. For example, if the user were to say hello, and the artificial intelligence system decided to also respond with hello, the text 'hello' would pass from the artificial intelligence software to the computer graphics program, and then the holographic persons mouth would be animated to mimic the look of saying the word hello, while the speaker embedded in the hardware played the audio clip 'hello' via text to speech software.

[0038] A holographic image generation component, such as a holographic projection system, is the key hardware component to provide the complete experience. Once the computer graphics program has rendered the desired result for the response, including moving the lips and generating the sound, the image of the holographic person is projected on to piece of hard plastic or glass panel. The piece of plastic or glass panel may have an arbitrary dimension, for example, five foot, by three foot, as long as it is large enough to provide the user the experience of taking to a real human being. The transparent nature of the plastic or glass helps to continue the illusion

that the hologram is actually standing in front of the user and conversing with them in real time. At the base of the projection system there is a box that contains the high-performance computer which is required to host all of the previously mentioned software, and render the computer graphics image. A rear mounted projector may take the feed of the computer graphics from the computer, and then project the image on to the piece of plastic or glass panel.

[0039] FIG. 1(a) and 1(b) respectively show the front and side views of the holographic digital assistant system, where an on-board high-performance computer (1) is at the base of the system, and a transparent piece of glass or plastic panel (2) of suitable size is mounted on top of the computer's housing. A display device, such as a projector (6) shown in the side view of FIG. 1(b), may display an image of a CGI holographic human on the panel (2). An on-board camera (4) may be coupled to the panel (2). Other components that can be coupled to the panel are a microphone (3) and a speaker (5).

[0040] FIGs. 2 and 3 describe the functional flow of the system shown in FIGs. 1(a) and 1(b). The computer (1) is designed to render high quality 3D graphics in real time to generate the holographic person. The panel (2) provides the interface with which a user (10) can interact with the holographic person. The user in this diagram is the individual that is speaking to the holographic person and requiring the feedback from the disclosed system.

[0041] A microphone is installed on top of the panel (2) or at any other suitable location on the panel. The microphone picks up the user's (10) speech in order to feed the audio file into a database (12). The database (12) is the central hub for the entire software platform as it is the central location that communicates with each of the separate and complex programs required to make the entire disclosure work as designed.

[0042] The onboard computer (1) receives an audio file (14) from the database (12). The computer then incorporates the audio into the animation program, in order to project the updated response from the CGI holographic person (16) projected on to the panel (2).

[0043] A camera (4) is also installed on top of the panel (or at other suitable location coupled to the panel) and is utilized to take pictures of the user (10) in which to build a profile for the facial recognition software (17). Eye tracking sensors may also be coupled with the facial recognition

software as an optional feature.

[0044] The holographic person is what is created by the CGI program, and presented to the user via a user interface on the panel (2). The holographic person looks, sounds and acts like a person to give the user a realistic experience of human interaction.

[0045] The facial recognition system utilizes the photos taken of the user (10) by the onboard camera (4) in order to create a visual record for that user. This allows the holographic person to differentiate between speakers and in future interactions to be able to remember the user and their previous conversations. The ability for the holographic person to build upon past interacts is a very important component in building out the illusion of carrying on a conversation with another sentient person.

[0046] A speaker is also be installed on the panel (2) and is utilized for playing the audio file (14) generated in response to the user's (10) input or question.

[0047] In an embodiment, where the holographic image display is based on projection technology, a built in ultra-short projector may take the video output signal from the computer (1) to project the updated spoken sounds from the holographic person.

[0048] The natural language processor (NLP) (7) may exist locally or in the cloud. It converts the speech that was recorded from the user, for the purposes of converting it to text. Once the natural language processor has converted the file, the text string is sent to the database (12).

[0049] The artificial intelligence program (A. I.)(8) receives the text file from the database (12) and determines the appropriate response to the text file. The response is generated via text and then sent to the database.

[0050] The text to speech program (9) receives the text file from the database (12) and generates an audio file of the text as a spoken response. The audio file is then sent back to the database.

[0051] A web application (11) is developed in order to provide the owners/administrators of the system the ability to review data, usage, metrics, sales performance, and areas where the holographic person was unable to answer questions. Owners/administrators are able to update the response the holographic person is capable of providing, and push entirely new sets of data when

appropriate.

[0052] The training capability (13) in the software application allows owners/administrators or authorized users to update the holographic person's responses, similar to the web app (11), with the key difference that they can do it through speech and natural language.

[0053] The audio file is based on the artificial intelligence's (8) determined response to the user's (10) question or request. It is sent from the cloud database to the CGI software program installed onboard the hardware's computer (1).

[0054] The computer generated image is the software rendering of a human like holographic person (16). The software program generates a 3D representation of a person (16) and pushes that image to the projector for display on the panel (2). The outfit of the holographic person (16) can be changed depending on the customer and location that they are stationed. For example, the outfit of the holographic person should represent the dress code for the retail or business location where it is in use.

[0055] FIG. 3 is a summary of the functions of the components as described above. FIG. 4 is an overview of the main software components in a particular embodiment where facial recognition software is used as a critical component of the platform.

[0056] There are numerous advantages to the use of a holographic person, the overarching advantages being cost-efficient for companies that employ the holographic digital assistants. It can also be efficient for the user in that the user can get access to information that he is looking for quicker than a human person would be able to provide.

[0057] Some of the advantages for the companies include, but are not limited to: augmenting existing staff with holograms; reduction of overhead (taxes, health care, HR, and paid time-off, reduction of legal liabilities and risk, potential reduction of retail footprint with less on-site staff (for example, removing sales counters where customers place orders), providing identical customer service experience at any location, covering labor shortages (e.g. during customer surge, or inclement weather situations), reduction of customer wait times, testing different sales messages to see what response generates most sales, providing uniform training company-wide (including providing automated updates when new information is available), and, generating

real-time data and customer insight (e.g. from detailed description of conversation, identification of patterns that resulted in increased or decreased sales, update response in real time etc.). For example, in a movie theater kiosk, theater operators can test various messages to see what conversation converts to more ticket sales. It is also possible to track sales in real time with onboard credit card processing.

[0058] The hologram can speak with customers in any language, or display text in any language, enhancing the user's personalized experience. It can reduce customer wait times, provide additional holographic "employees" to help customers faster. Customers can receive additional visual material based on the request. Examples include maps, points of interest, visual cues for complex topics, and order summaries.

[0059] Staff training can be facilitated by this system, because it is possible to write one program, and update all holographic employees around different geographic location uniformly, and if needed, simultaneously. Speech based training allows for immediate updates to the AI system.

[0060] As described before, one of the main applications of the system is in a retail sales environment, office environment, or other location that requires information (ex. shopping mall directions). Some specific non-limiting illustrative use cases are described below.

[0061] Use case 1: A fast food restaurant decides to deploy this platform at one of their restaurants. The system greets customers as they arrive, takes their order, and then passes the order to the cooks. Eventually retail areas may be redesigned to remove the customer order counter, and instead provide people with a row of holograms from which to place their orders when walking into the store.

[0062] Use case 2: Movie theaters use the holographic persons in the box office area to provide potential customers with answers to questions like movie ratings, reviews, show times and summaries of various movies. When users enter the area, they can talk to the hologram using natural language to ask these questions. The movie theater can control the marketing message delivered to the customer and even A/B split test the sales message to determine what drives the highest number of ticket sales.

[0063] Use case 3: Airlines can use the holographic persons at the airport to speed up the check-in process by ensuring the proper numbers of holograms are available for the expected demand during check-in. The holograms can use facial recognition software to search for any signs of potential violent activities.

[0064] Use case 4: Hotels can utilize holographic persons inside their hotels to greet customers as they arrive. The holograms can check in users, and provide them with a Bluetooth encryption code for their hotel rooms. Since the system can detect faces, it can welcome in customers by name, and even pull up their previous history to assign them the same room, or set their room preferences (like temperature).

[0065] The disclosure has been described in terms of particular embodiments. Other embodiments are within the scope of the following claims. For example, the steps of the disclosure can be performed in a different order and still achieve desirable results.

CLAIMS

1. A holographically enhanced digital assistant system providing a conversational holographic person providing assistance to a user, the system comprising:

a computer having functional modules that include:

facial recognition module;

natural language processing module;

artificial intelligence module;

text to speech conversion module;

CGI generation and rendering module;

a transparent rigid panel providing an interface to the user to request for information, on which the conversational holographic person is displayed; and

display hardware to display the conversational holographic person generated by computer graphic imagery (CGI).

2. The system of claim 1, wherein the display hardware includes a projection system to optically project the conversational holographic person generated by computer graphic imagery (CGI).

3. The system of claim 1, wherein the system further comprises: a microphone and a camera coupled to the transparent rigid panel.

4. The system of claim 1, wherein the computer has a machine-learning based training module.

5. The system of claim 1, wherein the transparent rigid panel is made of glass or plastic.

6. The system of claim 5, wherein the transparent rigid panel is a 5 feet by 3 feet rectangle.

7. The system of claim 1, wherein the system is installed in a retail sales environment.
8. The system of claim 1, wherein the system is used as a personal digital assistant.
9. The system of claim 1, wherein the facial recognition software stores images of repeat users.
10. The system of claim 1, wherein the holographic person is trained to provide personalized user support.
11. The system of claim 11, wherein the personalized user support includes conversation in the user's preferred language.

ABSTRACT OF THE DISCLOSURE

A digital assistant system displays a computer-generated human character (“a holographic person”), capable of carrying on conversations in real time with a user, remembering things about past interactions with the user to make the conversation realistic and more human-like. The system (“holographic person”) is intended to be utilized in retail, office, business and personal settings. The holographic person can interact with retail point of sale systems in order to process orders on behalf of a user, provide users with detailed directions and answer questions about the holographic person’s surroundings. In personal settings the holographic person can integrate with existing internet of things devices. The holographic person is implemented through the unique use of facial recognition software, natural language processing, artificial intelligence, text to speech conversion, speech based training, computer generated imagery, and a holographic image display software and hardware.

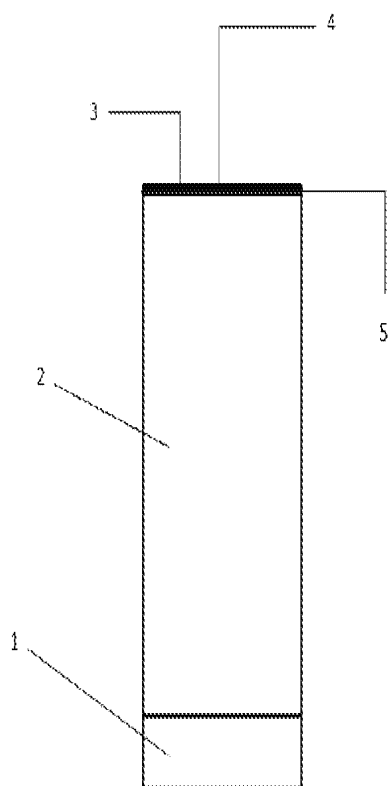


FIG. 1(a)

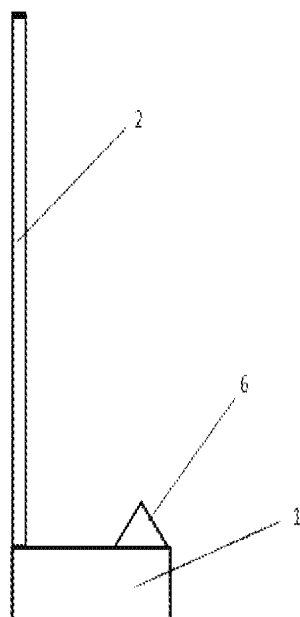


FIG. 1(b)

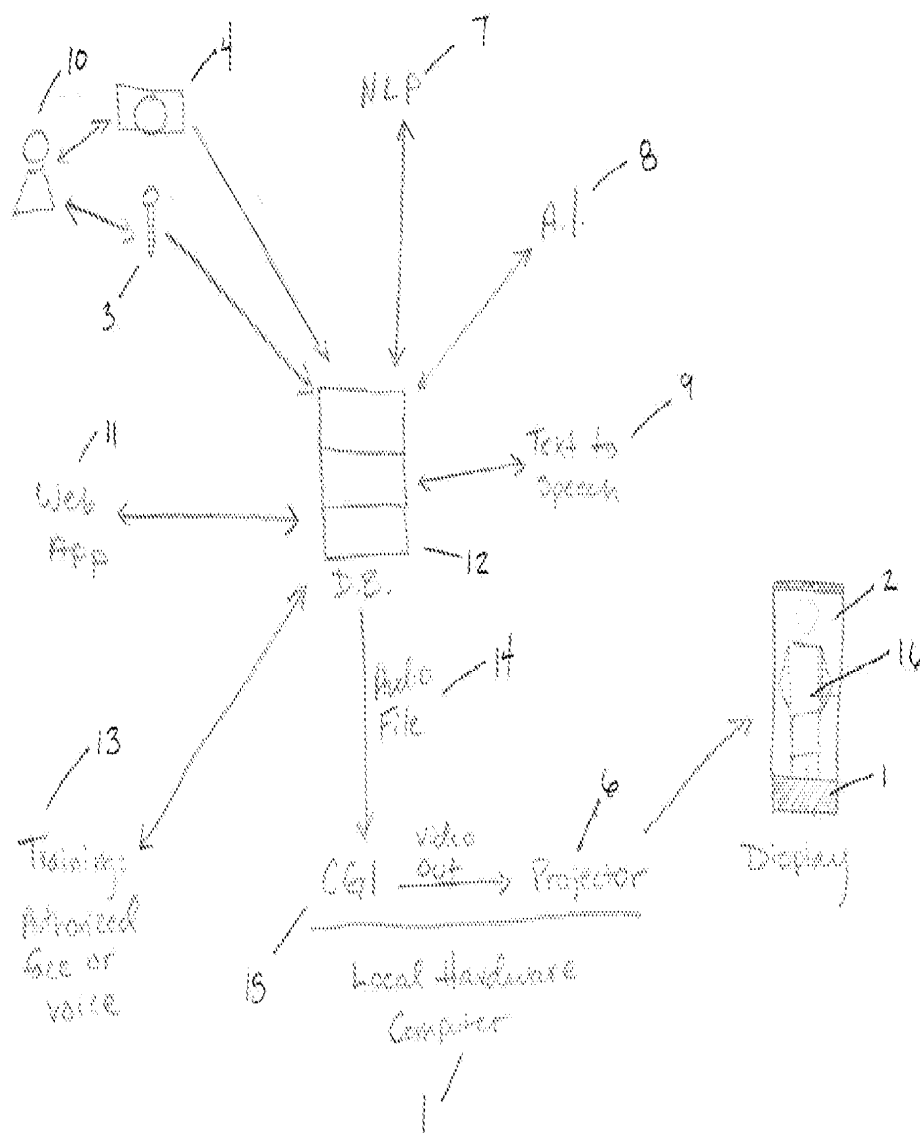


FIG. 2

Microphone (3) → User (10) → Microphone (3) →
 Camera (4) → User (10) → Camera (4) → DB (12) → NLP (7) →
 DB (12) → A.I. (8) → DB (12) → Text to speech (9) →
 DB (12) → G1 (15) → Projector (6) → Display (1, 2 + 16)
 DB (12) → Training Program → DB (12)

FIG. 3

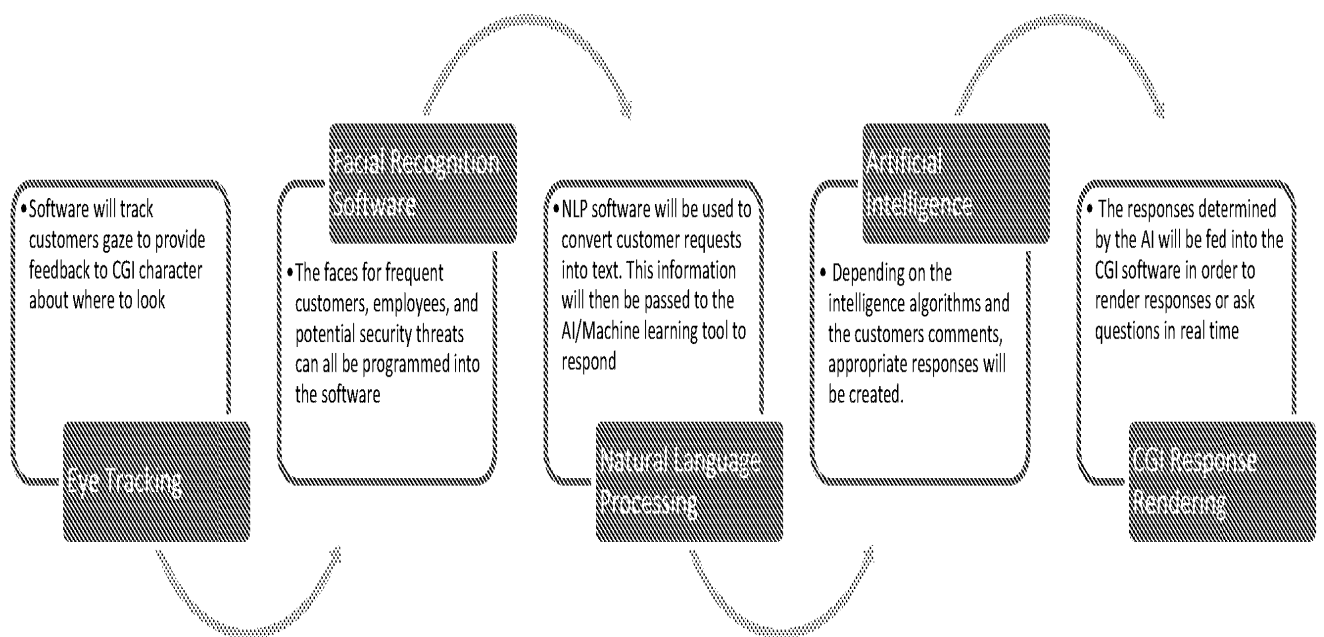


FIG. 4