

Inter Partes Review U.S. Patent No. 11,470,243

Oral Argument, October 16, 2024

TVision Insights, Inc. v. The Nielsen Company (US), LLC
Case No. IPR2023-01014

Petitioner's Grounds

Original Grounds	Basis	Disputed Claims
Ground 1: Lu-577/Tian	§ 103	1, 4-6, 8, 9, 11-14, 16, 18-20
Ground 2: Nielsen-372/Steinberg	§ 103	1, 9, 16
Ground 3: Nielsen-372/Steinberg/Tian	§ 103	1, 4-6, 8, 9, 11-14, 16, 18-20

- ▶ Ground 2 is no longer at issue.
 - ▶ Patent Owner disclaimed claims 1, 9, and 16.
- ▶ Grounds 1 & 3 only at issue for remaining disputed claims.
 - ▶ Disputed claims are 4, 6-8, 11-14, 18-20.

Claims 1, 4, and 5 of the '243 Patent

1. An audience measurement system to obtain exposure data for a media exposure environment, the audience measurement system comprising:

memory;

machine readable instructions; and

processor circuitry to execute the machine readable instructions to:

generate an audio signature of media content presented by a television within the media exposure environment;

obtain content identifying data corresponding to the presented media content, the content identifying data based on the audio signature of the media content presented by the television within the media exposure environment;

analyze a sequence of images of the media exposure environment to detect a head appearing in one or more of the images, the sequence of images obtained by a camera while the media content corresponding to the content identifying data is presented by the television;

determine an orientation of the head with respect to the camera; and

determine audience identification information based on a match of the head to a known person associated with the media exposure environment; and

network interface circuitry to output a signal indicative of the content identifying data and the audience identification information to a data collection facility.

4. The audience measurement system of claim 1, wherein the processor circuitry is to:

reduce a resolution of a first image of the one or more of the images of the media exposure environment to obtain a reduced-resolution image, and

determine the orientation of the head with respect to the camera based on the reduced-resolution image.

5. The audience measurement system of claim 4, wherein the processor circuitry is to determine the audience identification information by: (i) generating a facial signature from a region of a second image of the one or more of the images corresponding to a location of the head in the reduced-resolution image, and (ii) comparing the generated facial signature to a database of facial signatures.

Ex. 1001, Claims 1,4, 5

Tian's Ambiguities Do Not Establish Unpatentability

- ▶ Tian's teachings are ambiguous and speculative
 - ▶ Petitioner asks the Board to infer teachings
 - ▶ Nothing in Tian precludes obtaining reduced-resolution images from another source
- ▶ The Parties' experts present conflicting opinions
- ▶ Per *GMG Products*, all disputed claims are patentable as a matter of law

Experts Disagree About Tian's Ambiguous Teachings

- ▶ Dr. Saber (Patent Owner): “Table I discloses an exemplary image set of five different resolutions from Cohn-Kanade database that are investigated. A POSITA would read the caption of Table I as indicating all images, including the lower resolution images, come from the Cohn-Kanade database.”

Ex. 2020, ¶ 5

- ▶ Dr. Doermann (Petitioner): “Dr. Saber states that ‘a POSITA would read the caption of Table I as indicating all images, including the lower resolution images, come from the Cohn-Kanade database.’ This is different from my understanding of Tian. I understand Tian to obtain images of an original resolution of 640x480 from the Cohn-Kanade database.”

Ex. 1034, ¶ 2

Petitioner's Mapping of Tian for Claim 4 (Reducing a Resolution Limitation)

[4a]

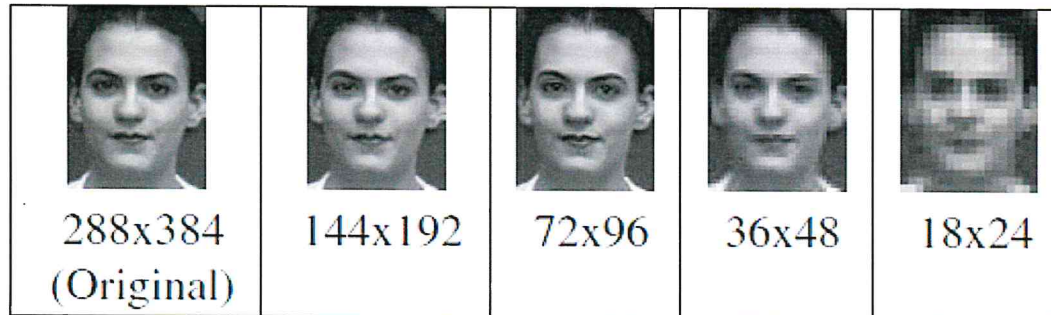
The combination teaches limitation [4a]. Ex-1003, ¶¶117-120. Tian describes “the effects of different image resolutions” for facial analysis. Ex-1005, Abstract; 000002; Ex-1003, ¶118. Tian creates lower-resolution images by down-sampling from original images. Ex-1005, 000002 (“The lower resolution images are down-sampled from the originals.”), Abstract; Ex-1003, ¶119.

Pet., p. 26

Petitioner's Citations to Tian for Reducing a Resolution Limitation Are Ambiguous

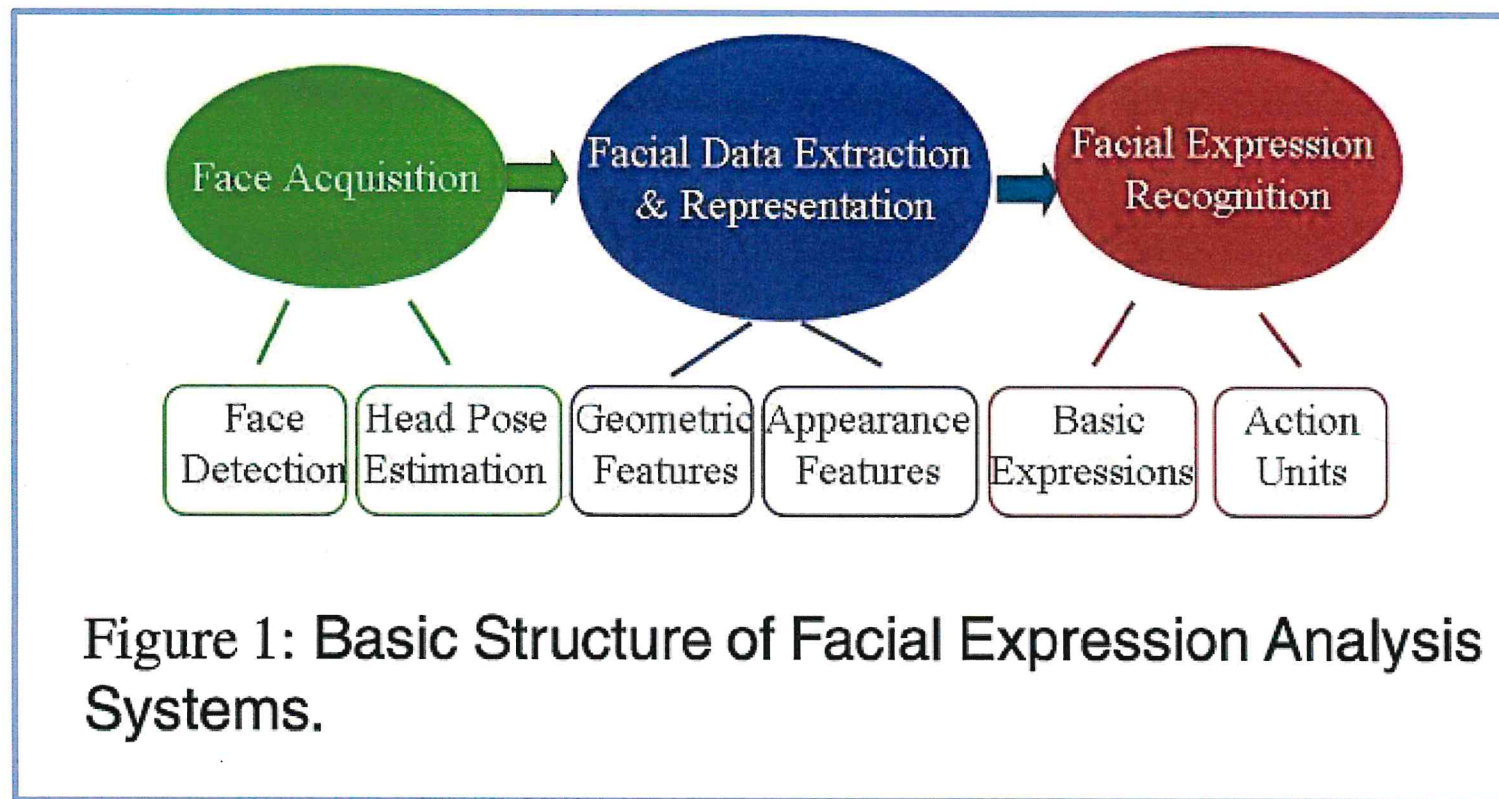
- ▶ Petitioner relies on two sentences from Tian:
 - ▶ “An example in five different resolutions from the Cohn-Kanade database.”
 - ▶ “The lower resolution images are down-sampled from the originals.”

Table 1: An example in five different resolutions from Cohn-Kanade database. The head region is cropped for display purpose only. The lower resolution images are down-sampled from the originals.



Tian (Ex. 1005), Abstract,
p. 2, Table 1

Tian's Facial Expression Analysis System



Tian (Ex. 1005), p. 1

Dr. Doermann's Supplemental Opinions Lack Support in the Record

4. To validate my understanding, I obtained a copy of the Cohn-Kanade database. I was previously familiar with the dataset while at the University of Maryland but no longer had access. Dr. Jeffrey Cohn lists the database on his personal website (<https://www.jeffcohn.net/Resources/>) under Databases, and provides an agreement form for its use. As instructed, I provided the form as a faculty member at the University at Buffalo, and received instructions to download it. The source and website from which I obtained the Cohn-Kanade database indicate that any reference to the database should include the citation “Kanade, T., Cohn, J. F., & Tian, Y. (2000). Comprehensive database for facial expression analysis. Proceedings of the Fourth IEEE International Conference on Automatic Face and Gesture Recognition (FG'00), Grenoble, France, 46-53.” Tian cites this paper as a reference [16] and states that “[m]ore details about the [Cohn-Kanade] database can be found at paper [16].” Ex-1005, 000005, 07.

Ex. 1034 (Doermann Supp. Dec.), ¶ 4

Petitioner's New Invalidity Theories in the Reply Should Be Rejected

▶ Petitioner Argues:

PO's assertion that Tian's "experimental setup" or "structure" does not include a step of reducing a resolution (POR, 3, 5-6, 9), even if accepted,² does not negate the obviousness of doing so in light of Tian's teachings.

Pet. Reply, p. 5

- ▶ Petitioner's Original Argument: Tian teaches resolution reduction.
- ▶ Petitioner's New Argument: Tian would render resolution reduction obvious.
- ▶ *Juniper Networks, Inc. v. Swarm Tech. LLC*, IPR2021-01445, Paper 62, 29 (PTAB Feb. 7, 2023) (declining a new theory of obviousness advanced in Petitioner's Reply).

The MTC for Claims 4, 11, 18 Fails to Properly Weigh the Advantages and Disadvantages of the Combination

Claimed Cost Savings in Head Orientation Determination

Petitioner's Analysis

Compared to

Cost of Downsampling

Pet., p. 27

Properly Comparing Advantages to Disadvantages

Unmodified System

Cost of Head Orientation Determination for Full Resolution

Compared to

Petitioner's Proposed Modification

Cost of Preprocessing (e.g., Anti-Aliasing)

Cost of Downsampling to New Resolution

Cost of Head Orientation Determination for New Resolution

No Reasonable Expectation of Success without Pre-Processing (e.g., Anti-Aliasing) Down-Sampled Image

- ▶ No MTC if No Reasonable Expectation of Success
- ▶ Dr. Saber's Opinions:
 - ▶ Down-sampling introduces artifacts from aliasing Ex. 2020, ¶¶ 20, 38
 - ▶ Anti-aliasing needs to be performed prior to determining head orientation
 - ▶ Anti-aliasing is slow and complex.
- ▶ Dr. Doermann's Opinions:
 - ▶ Admits “[i]n some situations these [antialiasing, interpolation] may help.” Ex. 1034, ¶ 9
 - ▶ Ignores preprocessing, which his own research states is “often” needed before subsampling:

Ex. 2020, ¶¶ 21-23, 38-39, 41-42

In digital video, a lowpass filter is often applied to filter the high resolution image before subsampling in order to eliminate aliasing.

Ex. 2015, p. 14

Tian Is Non-Analogous Art

- ▶ Tian is not in the field of audience measurement or (as Petitioner contends) media analysis POR, pp. 60-61; Pet. p. 5
- ▶ Petition does not contend Tian is analogous art based on “reasonably pertinent” analysis Pet., pp. 4-6; POR, p. 59
- ▶ Petition contends field of endeavor of the ’243 Patent is “media analysis” Pet., p. 5; Ex. 1003, ¶ 36

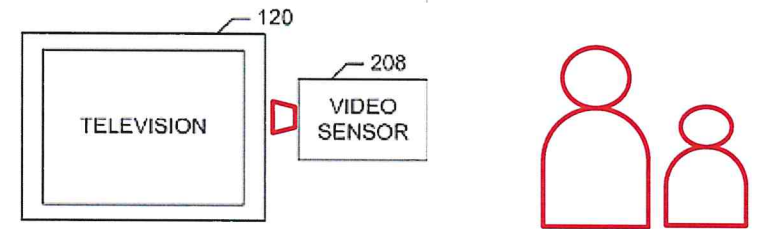
46. I have analyzed the ’243 patent and determined that the field of the patent is media analysis, including analysis of audio signals (e.g., audio signals of a television program) and image signals (e.g., images of individuals in a room).

Ex. 1003, ¶ 46

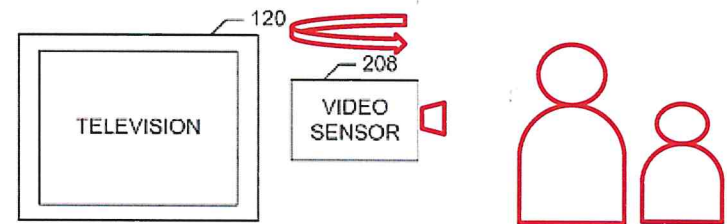
- ▶ Tian’s Field:
 - ▶ “This paper explores the effects of different image resolutions for each step of facial expression analysis.” Tian (Ex. 1005), Abstract

No Motivation to Combine Nielsen-372 / Steinberg

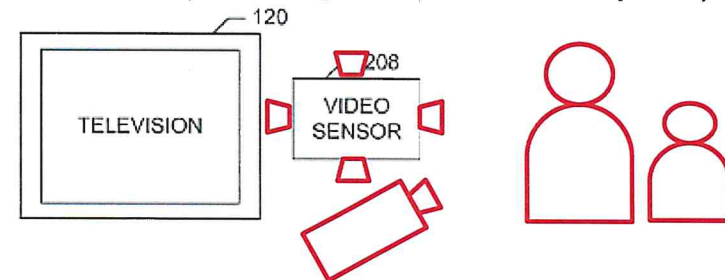
- ▶ Petition mapped Nielsen-372's camera for the “needed” hardware:
 - ▶ “Nielsen-372's system includes **needed hardware** (e.g., a computer **and a camera**) for implementing Steinberg's approach.” (Pet., pp. 44-45).
- ▶ But Nielsen-372's camera points faces the television to detect if the television is ON/OFF (Ex. 1006, [0050], [0081]). Petitioner's modification changes the principle of operation of Nielsen-372 and frustrates its purpose.
- ▶ Petitioner belatedly proposes **further** modification to include a second camera or special-purpose 360° camera — without motivation. (PO Sur-Reply, p. 22-25).



Nielsen-372, operating as taught (video sensor facing television, Ex. 1006, [0050], [0081])



Nielsen-372, operating per Petition (video sensor facing audience, Pet., p. 44)



Nielsen-372, operating as in Pet. Reply

Tian Does Not Teach Claims 5, 12, and 19

► Claim 5:

5. The audience measurement system of claim 4, wherein the processor circuitry is to determine the audience identification information by: (i) generating a facial signature from a region of a second image of the one or more of the images corresponding to a location of the head in the reduced-resolution image, and (ii) comparing the generated facial signature to a database of facial signatures.

- Tian does not teach performing facial recognition on a second image from a region of the second image corresponding to a location of the head in the reduced resolution image

Petitioner's combinations fail to teach the claimed two-frame process. Tian instead tracks the head location in every frame and uses the identified head location from the *second* frame to perform face recognition in the second frame rather than using the head location from the *first* frame (i.e., a single-frame recognition process).

PO Sur-Reply, p. 21

Petitioner Provides No MTC for Lu-577 with Lu-000 or Lert

- ▶ Petitioner's combination relies on Lu-577, incorporating Lu-000 and Lert by reference, as a single prior art reference. Pet., p. 4
- ▶ Petitioner relies on Lu-577, ¶ [0039], describing the “first embodiment” depicted in FIG. 2. Pet., p. 15
- ▶ But ¶ [0037] of Lu-577, describing the same “first embodiment,” gives two alternatives for audio processing: Thomas-739 and remote processing at a central office, neither of which is Lert's teaching of local circuitry for processing audio signature, relied upon by Petitioner.
- ▶ Petitioner is thus combining multiple embodiments disclosed in Lu-577 but has not provided a motivation to combine these embodiments.