

US Patent & Trademark Office

Patent Public Search | Text View

United States Patent	12394447
Kind Code	B2
Date of Patent	August 19, 2025
Inventor(s)	Aher; Ankur Anil et al.

System and method for provision of individualized meeting platform content

Abstract

Systems and methods for providing individualized meeting content to participants in online meetings. Participant preferences may be summarized and displayed for speakers to see and attempt to follow, thus increasing the likelihood that meetings will progress according to the preferences of their attendees. Participants may also have their individual meeting feeds tailored to their preferences, if those preferences can be met in real time, during the meeting. Participants may further receive individual recordings of the meetings afterward, for those preferences that cannot be met in real time. In this manner, meeting participants may experience personalized versions of meetings, tailored to their particular preferences. This may improve participant interest in, and engagement with, online meetings.

Inventors: Aher; Ankur Anil (Maharashtra, IN), Jain; Sakshi (Karnataka, IN), Singh; Amanpreet (Punjab, IN), Yang; Cato (San Jose, CA)

Applicant: Adeia Guides Inc. (San Jose, CA)

Family ID: 1000008765503

Assignee: Adeia Guides Inc. (San Jose, CA)

Appl. No.: 18/610820

Filed: March 20, 2024

Prior Publication Data

Document Identifier	Publication Date
US 20240233772 A1	Jul. 11, 2024

Related U.S. Application Data

Publication Classification

Int. Cl.: **G11B27/031** (20060101); **G06F3/16** (20060101); **H04N5/76** (20060101); G06Q10/109 (20230101)

U.S. Cl.:

CPC **G11B27/031** (20130101); **G06F3/165** (20130101); **H04N5/76** (20130101); G06Q10/109 (20130101)

Field of Classification Search

CPC: G11B (27/031); G06F (3/165); H04N (5/76)

References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
11651796	12/2022	Aher et al.	N/A	N/A
2008/0172406	12/2007	Takeda et al.	N/A	N/A
2008/0263010	12/2007	Roychoudhuri et al.	N/A	N/A
2019/0171716	12/2018	Weber	N/A	N/A
2020/0174739	12/2019	Boss et al.	N/A	N/A
2020/0243094	12/2019	Thomson et al.	N/A	N/A
2022/0414349	12/2021	Rathnam et al.	N/A	N/A
2023/0013497	12/2022	Aher et al.	N/A	N/A
2023/0260551	12/2022	Aher et al.	N/A	N/A

Primary Examiner: Hunter; Mishawn N.

Attorney, Agent or Firm: Haley Guiliano LLP

Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application is a continuation of U.S. patent application Ser. No. 18/131,495, filed Apr. 6, 2023, which is a continuation of U.S. patent application Ser. No. 17/377,224, filed Jul. 15, 2021, now U.S. Pat. No. 11,651,796, the disclosures of which are hereby incorporated by reference herein in their entireties.

BACKGROUND

(1) Embodiments of the disclosure relate generally to online meeting platforms. More specifically, embodiments of the disclosure relate to provision of individualized meeting platform content.

SUMMARY

(2) Online meeting platforms are widely used to allow groups of people to communicate with each other in real time, without the need to be in the same physical location. This has many benefits,

such as reducing time wasted in traveling or commuting to meeting sites, allowing participants to join, leave, mute, or amplify a meeting at any time without disturbing any other meeting participants, allowing for easy viewing of presentation materials, and the like. Online meeting platforms also present certain challenges, though. Meeting platforms display the same meeting content to every participant, which can lead to annoyance and lack of engagement if the content parameters are disliked by some participants. For example, some meeting participants may lose interest in speakers that speak too fast or too slow, or in a language that those participants do not understand.

(3) Accordingly, to overcome the limited ability of computer-based online meeting platforms to maintain engagement of meeting participants, systems and methods are described herein for a computer-based process that determines meeting participants' preferred parameters for listening to a meeting, and attempts to deliver customized meeting content for each participant according to his or her preferred parameters. For example, participants may be allowed to view the meeting at their individually-preferred volume, speed, or the like. Participants may also be sent a recording of the meeting that can be played back according to their individual preferences, e.g., in the language of their preference, at the speed of their preference, or the like. Meeting participant preferences may also be displayed for each meeting speaker or presenter, so that he or she may adjust their presentation style according to the displayed preferences. In this manner, meetings may be more likely to progress according to the preferences of each participant, thus increasing participant interest and engagement in the meeting.

(4) In some embodiments of the disclosure, a computer-based online meeting system retrieves preferences of meeting participants, and determines those preferences that cannot be satisfied by meeting content, such as live or real time presentations of the meeting, during the meeting itself. For example, when a preference exists for Spanish to be spoken during the meeting, but the speaker or speakers do not speak Spanish, the speakers cannot meet this preference during the meeting. Accordingly, a personalized recording of the meeting is generated for each participant according to those individual preferences that cannot be satisfied during the meeting. In this example, audio of the recording is translated into Spanish, and sent to those participants with a preference for Spanish.

(5) The system may also determine those participant preferences that can be satisfied during the meeting, and display the meeting for those participants according to their preferences. That is, for those participant preferences that can be met during the meeting itself, the meeting is shown to those participants according to those preferences.

(6) In summary, each meeting participant may receive a live feed of the meeting, with each feed tailored to the individual participant's preferences to the extent possible during the meeting. Each participant may also, or alternatively, receive a recording of the meeting that is tailored to each individual participant's preferences, including those preferences that cannot be met by a live feed. This may help increase participant interest and engagement with the meeting subject matter.

(7) Participant preferences may be any preferences for manner of content delivery. For example, preferences may include preferences for a particular language, a particular speech speed or speed at which content is delivered, a preferred volume, or any other parameter by which content may be adjusted for delivery.

(8) Participant preferences may also be displayed for speakers, presenters, or anyone else to see during the meeting. For example, preferences may be displayed in the same screen or interface as the online meeting. This allows speakers or presenters to see the preferences of their fellow meeting attendees, and adjust their speaking style as appropriate. As examples, meeting speakers can adjust the speed at which they talk to better suit other participants, may speak louder or quieter, speak in different languages if possible, or the like.

(9) Preferences can be selected for display to participants in any manner. In some embodiments, every participant preference may be displayed to speakers, presenters, or the like. In some

embodiments, preferences such as speaking speed (e.g., preferred number of words per minute, or wpm) may be averaged in any manner, with this average presented to speakers as a single preferred value. In some embodiments, if a particular preference is expressed by a majority or any other threshold number or portion of meeting participants, that preference may be displayed to speakers. For example, if a majority but not all participants express a desire for Spanish as the language of the meeting, the system may indicate that Spanish is the desired language for the meeting. In some embodiments, one or more preferences may be used to determine a presentation style which may be displayed for the speaker, rather than the preference itself. For example, if a speaker is detected as speaking approximately 30 wpm but a majority of participants have a preference for 50 wpm, the system may simply inform the speaker that the audience wishes him or her to speak faster, rather than (or in addition to) speaking at a particular wpm value.

Description

BRIEF DESCRIPTION OF THE FIGURES

- (1) The above and other objects and advantages of the disclosure will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference characters refer to like parts throughout, and in which:
- (2) FIG. 1A is an online meeting interface illustrating participant preferences displayed in accordance with embodiments of the disclosure;
- (3) FIG. 1B is a diagrammatic representation illustrating operation of an online meeting system in accordance with embodiments of the disclosure;
- (4) FIG. 2 is a block diagram of an illustrative user equipment device in accordance with embodiments of the disclosure;
- (5) FIG. 3 is a block diagram of an illustrative user equipment device in accordance with some embodiments of the disclosure;
- (6) FIG. 4 is a block diagram of an illustrative online meeting system in accordance with some embodiments of the disclosure;
- (7) FIG. 5 is a block diagram representation of an illustrative server constructed according to embodiments of the disclosure;
- (8) FIG. 6 is a flowchart illustrating determination and display of participant preferences in accordance with embodiments of the disclosure; and
- (9) FIG. 7 is a flowchart illustrating meeting display and recording generation according to embodiments of the disclosure.

DETAILED DESCRIPTION

- (10) In one embodiment, the disclosure relates to systems and methods for providing individualized meeting content to participants in online meetings. Participant preferences may be summarized and displayed for speakers to see and attempt to follow, thus increasing the likelihood that meetings will progress according to the preferences of their attendees. Participants may also have their individual meeting feeds tailored to their preferences, if those preferences can be met in real time, during the meeting. Participants may further receive individual recordings of the meetings afterward, for those preferences that cannot be met in real time. In this manner, meeting participants may experience personalized versions of meetings, tailored to their particular preferences. This may improve participant interest in, and engagement with, online meetings.
- (11) FIG. 1A is an online meeting interface illustrating participant preferences displayed in accordance with embodiments of the disclosure. Here, a meeting interface **10** may be the user interface of an online meeting program or application. In some embodiments, the interface **10** may display a meeting, providing an online forum for each meeting participant to discuss and view materials related to the subject matter of the meeting. The interface **10** may display audience

preferences **20** which are preferences expressed by meeting participants, current metrics **30** which are metrics of the current speaker, and recommendations **40** presented to the current speaker. Interface **10** may also include a window **50** for display of any meeting-related materials such as presentation materials, as well as thumbnails **60** displaying meeting participants. Speakers and other meeting participants may each be presented with an individual interface **10** displaying other participants **60**, and meeting materials window **50**. Meeting speakers or presenters may have preferences **20**, metrics **30**, and recommendations **40** displayed on their interfaces **10**, which may induce them to speak according to styles preferred by the other meeting participants. In some embodiments of the disclosure, preferences **20**, metrics **30**, and recommendations **40** are presented only to the current speaker, or alternatively to each planned speaker. In some other embodiments of the disclosure, preferences **20**, metrics **30**, and recommendations **40** may be presented to any or all meeting participants.

(12) FIG. 1B is a diagrammatic representation illustrating operation of an online meeting system in accordance with embodiments of the disclosure. The meeting system of FIG. 1B includes a central server **80** providing online meeting services for each display device **70** belonging to meeting participants **60**. In particular, server **80** generates audio and video signals for display in interfaces **10** of each device **70**, retrieves and displays audience preferences **20**, and generates and displays metrics **30** and recommendations **40**. Each interface **10** of each display device **70** allows its associated participant **60** to speak as well as view those speaking. That is, each device **70** may both transmit audio and video to, and receive audio and video from, server **80**. Server **80** may generate an individualized interface **10** for each separate participant **60**, displaying its constituent images and information according to the preferences expressed by each participant **60**. That is, for those participant **60** preferences that can be met in real time, server **80** modifies the audio and video signals accordingly, and transmits meeting content to each participant **60** according to his or her individual preferences. Accordingly, each different display device **70** receives and displays a different version of interface **10** with meeting content customized according to the individual preferences of each participant **60**. Thus, for example, each participant **60** may view the meeting at a different volume, according to their preferences. Display devices **70** may be any device capable of displaying a computer-based interface **10**, and transmitting and receiving audio and video signals, such as a cellular phone, tablet computer, laptop computer, desktop computer, server, or the like.

(13) After the meeting, server **80** may also generate a customized recording of the meeting for each participant **60**. More specifically, server **80** may record the meeting as it occurs, alter the recording according to the preferences of each participant **60**, and subsequently send the recording to each participant **60** for playback according to his or her individual preferences. As one example, a meeting may be conducted in English, but some participants **60** may express a preference for Spanish instead. The meeting speakers or presenters may not speak Spanish, and accordingly the meeting may not be capable of being translated into Spanish in real time by the speakers. Furthermore, other participants may prefer English rather than Spanish. After the meeting, server **80** may thus automatically translate the recorded audio signal of the meeting into Spanish, and transmit the recording to those participants **60** that expressed a preference for Spanish. Similarly, server **80** may generate recordings that are sped up or slowed down to meet the wpm preferences of each different participant **60**, and send each participant **60** a custom recording set for playback at their preferred speed. In this manner, server **80** may generate a custom live broadcast of the meeting for each participant **60** according to those individual preferences that can be satisfied during the meeting, and generate a custom recording for each participant **60** set to those individual preferences that cannot be satisfied during the meeting. In some embodiments then, each participant **60** thus receives both a custom individualized live meeting feed altered to match perhaps some of their preferences, as well as a custom individualized recording altered to match perhaps all of their preferences.

(14) FIG. 2 shows generalized embodiments of illustrative user equipment device **200** that may be used in provision of individualized meeting platform content according to embodiments of the disclosure. For example, user equipment device **200** may be an implementation of a display device **70**, and in exemplary embodiments may be a smartphone device or a remote control. In another example, user equipment system **201** may be a user television equipment system. User television equipment system **201** may include a set-top box **216**. Set-top box **216** may be communicatively connected to speaker **214** and display **212**. In some embodiments, display **212** may be a television display or a computer display. In some embodiments, set top box **216** may be communicatively connected to user interface input **210**. In some embodiments, user interface input **210** may be a remote-control device. Set-top box **216** may include one or more circuit boards. In some embodiments, the circuit boards may include processing circuitry, control circuitry, and storage (e.g., RAM, ROM, hard disk, removable disk, etc.). In some embodiments, circuit boards may include an input/output path. More specific implementations of user equipment devices are discussed below in connection with FIGS. 3 and 4.

(15) Each one of user equipment device **200** and user equipment system **201** may receive content and data via input/output (hereinafter “I/O”) path **202**. I/O path **202** may provide content (e.g., broadcast programming, on-demand programming, Internet content, content available over a local area network (LAN) or wide area network (WAN), and/or other content) and data to control circuitry **204**, which includes processing circuitry **206** and storage **208**. Control circuitry **204** may be used to send and receive commands, requests, and other suitable data using I/O path **202**. I/O path **202** may connect control circuitry **204** (and specifically processing circuitry **206**) to one or more communications paths (described below). I/O functions may be provided by one or more of these communications paths but are shown as a single path in FIG. 2 to avoid overcomplicating the drawing.

(16) Control circuitry **204** may be based on any suitable processing circuitry such as processing circuitry **206**. As referred to herein, processing circuitry should be understood to mean circuitry based on one or more microprocessors, microcontrollers, digital signal processors, programmable logic devices, field-programmable gate arrays (FPGAs), application-specific integrated circuits (ASICs), etc., and may include a multi-core processor (e.g., dual-core, quad-core, hexa-core, or any suitable number of cores) or supercomputer. In some embodiments, processing circuitry may be distributed across multiple separate processors or processing units, for example, multiple of the same type of processing units (e.g., two Intel Core i7 processors) or multiple different processors (e.g., an Intel Core i5 processor and an Intel Core i7 processor). In some embodiments, control circuitry **204** executes instructions for an application program stored in memory (e.g., storage **208**). Specifically, control circuitry **204** may be instructed by the application to perform the functions discussed above and below. For example, the application may provide instructions to control circuitry **204** to generate a content curation interface. In some implementations, any action performed by control circuitry **204** may be based on instructions received from the interface.

(17) Memory may be an electronic storage device provided as storage **208** that is part of control circuitry **204**. As referred to herein, the phrase “electronic storage device” or “storage device” should be understood to mean any device for storing electronic data, computer software, or firmware, such as random-access memory, read-only memory, hard drives, optical drives, digital video disc (DVD) recorders, compact disc (CD) recorders, BLU-RAY disc (BD) recorders, BLU-RAY 2D disc recorders, digital video recorders (DVR, sometimes called a personal video recorder, or PVR), solid state devices, quantum storage devices, gaming consoles, gaming media, or any other suitable fixed or removable storage devices, and/or any combination of the same. Storage **208** may be used to store various types of content described herein as well as media guidance data described above. Nonvolatile memory may also be used (e.g., to launch a boot-up routine and other instructions). Cloud-based storage, described in relation to FIG. 4, may be used to supplement storage **208** or instead of storage **208**.

(18) A user may send instructions to control circuitry **204** using user input interface **210**. User input interface **210** may be any suitable user interface, such as a remote control, mouse, trackball, keypad, keyboard, touchscreen, touchpad, stylus input, joystick, voice recognition interface, or other user input interfaces. Display **212** may be provided as a stand-alone device or integrated with other elements of each one of user equipment device **200** and user equipment system **201**. For example, display **212** may be a touchscreen or touch-sensitive display. In such circumstances, user input interface **210** may be integrated with or combined with display **212**. Display **212** may be one or more of a monitor, a television, a liquid crystal display (LCD) for a mobile device, amorphous silicon display, low temperature poly silicon display, electronic ink display, electrophoretic display, active matrix display, electro-wetting display, electrofluidic display, cathode ray tube display, light-emitting diode display, electroluminescent display, plasma display panel, high-performance addressing display, thin-film transistor display, organic light-emitting diode display, surface-conduction electron-emitter display (SED), laser television, carbon nanotubes, quantum dot display, interferometric modulator display, or any other suitable equipment for displaying visual images.

(19) The online meeting platform application may be implemented using any suitable architecture. For example, it may be a stand-alone application wholly implemented on each one of user equipment device **200** and user equipment system **201**. In such an approach, instructions of the application are stored locally (e.g., in storage **208**), and data for use by the application is downloaded on a periodic basis (e.g., from an out-of-band feed, from an Internet resource, or using another suitable approach). Control circuitry **204** may retrieve instructions of the application from storage **208** and process the instructions to generate any of the displays discussed herein. Based on the processed instructions, control circuitry **204** may determine what action to perform when input is received from input interface **210**. For example, movement of a cursor on a display up/down may be indicated by the processed instructions when input interface **210** indicates that an up/down button was selected.

(20) FIG. 3 illustrates user equipment device **200** in block diagram form. In the representation of FIG. 3, device **300**, input/output **302**, user input interface **310**, display **312**, speakers **314**, control circuitry **304**, processing circuitry **306**, and storage **308** may correspond to embodiments of user equipment device **200**, input/output path of circuit boards of set-top box **216**, user interface input **210**, display **212**, speaker **214**, circuit boards of set-top box **216**, circuit boards of set-top box **216**, and storage on circuit boards of set-top box **216**, respectively. As shown in FIG. 3, processing circuitry **306** executes commands retrieved from storage **308**, input/output path **302**, and/or user input interface **310**, and transmits results to display **312**, **314**, and/or output path **302**. Such commands may include commands for implementing an online meeting platform such as by generating and displaying interface **10** on display **312**, and retrieving and/or playing meeting recordings on display **312** and speaker **314**. Commands may also include commands for transmitting meeting preferences to other computing devices such as server **426** described below, retrieving interface **10** data from server **426**, requesting and retrieving selected content from server **426**, and playing back retrieved content.

(21) Each one of user equipment device **200** and user equipment system **201** of FIG. 2 can be implemented in system **400** of FIG. 4 as a user communications device **402**, wireless user communications device **406**, or any other type of user equipment suitable for accessing content, such as a non-portable gaming machine. For simplicity, these devices may be referred to herein collectively as user equipment or user equipment devices and may be substantially similar to user equipment devices described above. User equipment devices, on which an online meeting platform application may be implemented, may function as a stand-alone device or may be part of a network of devices. Various network configurations of devices may be implemented and are discussed in more detail below.

(22) A user equipment device utilizing at least some of the system features described above in connection with FIG. 2 may not be classified solely as a user communications device **402**, or a

wireless user communications device **406**. For example, means for consuming content **402** may like some system controller **404**, be Internet-enabled allowing for access to Internet content, while system controller **404** may like some television equipment **402**, include a tuner allowing for access to television programming. The online meeting application may have the same layout on various different types of user equipment or may be tailored to the display capabilities of the user equipment. For example, on system controller **404**, the meeting application may be provided as a website accessed by a web browser. In another example, the guidance application may be scaled down for wireless user communications devices **406**.

(23) In system **400**, there is typically more than one of each type of user equipment device but only one of each is shown in FIG. **4** to avoid overcomplicating the drawing. In addition, each user may utilize more than one type of user equipment device and also more than one of each type of user equipment device.

(24) The user equipment devices may be coupled to communications network **414**. Namely, means for consuming content **402** and wireless user communications device **406** are coupled to communications network **414** via communications paths **408** and **412**, respectively.

Communications network **414** may be one or more networks including the Internet, a mobile phone network, mobile voice or data network (e.g., a 4G or LTE network), cable network, public switched telephone network, or other types of communications network or combinations of communications networks. Paths **408** and **412** may separately or together include one or more communications paths, such as a satellite path, a fiber-optic path, a cable path, a path that supports Internet communications (e.g., IPTV), free-space connections (e.g., for broadcast or other wireless signals), or any other suitable wired or wireless communications path or combination of such paths. Path **412** is drawn with dotted lines to indicate that in the exemplary embodiment shown in FIG. **4** it is a wireless path and path **408** is drawn as a solid line to it is a wired path (although these paths may be wireless paths, if desired). Communications with the user equipment devices may be provided by one or more of these communications paths but are shown as a single path in FIG. **4** to avoid overcomplicating the drawing.

(25) Although communications paths are not drawn between user equipment devices, these devices may communicate directly with each other via communication paths, such as those described above in connection with paths **408** and **412**, as well as other short-range point-to-point communication paths, such as USB cables, IEEE 1394 cables, wireless paths (e.g., Bluetooth, infrared, IEEE 402-11x, etc.), or other short-range communication via wired or wireless paths. BLUETOOTH is a certification mark owned by Bluetooth SIG, INC. The user equipment devices may also communicate with each other directly through an indirect path via communications network **414**.

(26) System **400** includes storage **416** coupled to communications network **414** via communication path **420**. Path **420** may include any of the communication paths described above in connection with paths **408**, **410**, and **412**. Communications with the storage **416** may be exchanged over one or more communications paths but are shown as a single path in FIG. **4** to avoid overcomplicating the drawing. In addition, there may be more than one storage **416**, but only one is shown in FIG. **4** to avoid overcomplicating the drawing. If desired, storage **416** may be integrated as one source device. Although communications between storage **416** and user equipment devices **402**, **404**, and **406** are shown as occurring through communications network **414**, in some embodiments, storage **416** may communicate directly with user equipment devices **402**, **404**, and **406** via communication paths (not shown) such as those described above in connection with paths **408** and **412**.

(27) Server **426** is coupled to communications network **414** via communication path **424** and coupled to storage **416** via communication path **440**. Paths **424** and **440** may include any of the communication paths described above in connection with paths **408** and **412**. Server **426** may obtain or receive media content from storage **416** via communication path **440**.

(28) Storage **416** may include preferences of meeting participants, as well as recorded meeting content, and may be any storage employing any one or more memories of any types, as well as

associated controllers and the like. Storage **416** may be the originator of content (e.g., a television broadcaster, a webcast provider, etc.) or may not be the originator of content (e.g., an on-demand content provider, an Internet provider of content of broadcast programs for downloading, etc.). Storage **416** may include a remote server or memory used to store different types of data and content (including video content selected by a user), in a location remote from any of the user equipment devices.

(29) Content and/or data delivered to user equipment devices **402**, **404**, and **406** may be over-the-top (OTT) content. OTT content delivery allows Internet-enabled user devices, including any user equipment device described above, to receive content that is transferred over the Internet, including any content described above, in addition to content received over cable or satellite connections. OTT content is delivered via an Internet connection provided by an Internet service provider (ISP), but a third party distributes the content. The ISP may not be responsible for the viewing abilities, copyrights, or redistribution of the content, and may only transfer IP packets provided by the OTT content provider. Examples of OTT content providers include YouTube, Netflix, and Hulu, which provide audio and video via IP packets. YouTube is a trademark owned by Google Inc., Netflix is a trademark owned by Netflix Inc., and Hulu is a trademark owned by Hulu, LLC. OTT content providers may additionally or alternatively provide curation data described above. In addition to content and/or data, providers of OTT content can distribute curation applications (e.g., web-based applications or cloud-based applications), or the content can be displayed by curation applications stored on the user equipment device.

(30) System **400** is intended to illustrate a number of approaches, or network configurations, by which user equipment devices and sources of content and curation may communicate with each other for the purpose of providing online meeting services. The embodiments described herein may be applied in any one or a subset of these approaches, or in a system employing other approaches for provision of online meetings.

(31) Cloud resources may be accessed by a user equipment device using, for example, a web browser, a media guidance application, a desktop application, a mobile application, and/or any combination of access applications of the same. The user equipment device may be a cloud client that relies on cloud computing for application delivery, or the user equipment device may have some functionality without access to cloud resources. For example, some applications running on the user equipment device may be cloud applications, i.e., applications delivered as a service over the Internet, while other applications may be stored and run on the user equipment device. In some embodiments, a user device may receive content from multiple cloud resources simultaneously. For example, a user device can stream audio from one cloud resource while downloading content from a second cloud resource. Or a user device can download content from multiple cloud resources for more efficient downloading. In some embodiments, user equipment devices can use cloud resources for processing operations such as the processing operations performed by processing circuitry described in relation to FIG. 2.

(32) FIG. 5 is a generalized embodiment of an illustrative server **426** constructed for use according to embodiments of the disclosure. Here, device **500** may be a server **426**. Device **500** may receive content and data via I/O paths **502** and **504**. I/O path **502** may provide content and data, such as online meetings, to the various display devices **70**, while I/O path **504** may provide data to, and receive content from, one or more storages **416**. Like the user equipment device **300**, the device **500** has control circuitry **506** which includes processing circuitry **508** and storage **510**. The control circuitry **506**, processing circuitry **508**, and storage **510** may be constructed, and may operate, in similar manner to the respective components of user equipment device **300**.

(33) Storage **510** is a memory that stores a number of programs for execution by processing circuitry **508**. In particular, storage **510** may store a number of device interfaces **512**, an online meeting platform module **514**, translation module **516** for translating meeting audio into different languages, and user preferences **518**. The device interfaces **512** are interface programs for handling

the exchange of commands and data with the various display devices **70**. Online meeting platform module **514** is a code module for implementing an online meeting according to the processes described herein, and user preferences **518** are stored meeting presentation preferences entered by meeting participants. A separate interface **10** may exist for each different display device **70**. Interface code may be stored in storage **510** and implemented by device **500**, or may be stored in and implemented by each display device **70**.

(34) The device **500** may be any electronic device capable of receiving meeting audio and video and transferring them to one or more display devices **70** within an interface **10**. For example, the device **500** may be a server located at any site, such as co-located with one or more of the meeting participants, or located remote from any or all of the meeting participants. The device **500** may alternatively be a laptop computer or desktop computer configured as above.

(35) FIG. **6** is a flowchart illustrating determination and display of participant preferences in accordance with embodiments of the disclosure. As above, embodiments of the disclosure contemplate display of participant preferences to other meeting participants, such as those speaking, sharing their screen, or otherwise presenting during the meeting. A process for determination and display of participant preferences may include meeting module **514** retrieving preference data for each meeting participant (Step **600**). Preference data may be stored in, and retrieved from, any suitable memory such as storage **416**, and may be determined in any suitable manner. For example, module **514** may query meeting participants for their preferences at the beginning of the meeting or any time prior thereto, e.g., when participants create an account. Retrieved preference data may also include saved preferences from prior meetings, previously generated participant profile information, or the like. Preferences may be of any type describing any meeting parameter. As above, preferences, may include parameters such as preferred language spoken in the meeting, preferred speech speed (e.g., wpm), preferred volume, preferred video settings, or the like. Preference data may also be retrieved for each meeting invitee rather than just those who are actually participating in the meeting, for each invitee who has confirmed their attendance, or the like. Preference data may also be determined from information including participant location, time zone, company or industry information, demographics, or the like. For example, in some embodiments of the disclosure, the language preference of participants located in a particular country or region may by default be set to the official language of that country, or the predominant language of that region. To that end, storage **416** may store a database of geographic areas and their associated demographic information, such as predominant or official language, known cultural preferences, predominant businesses or industries and any known associated meeting preferences, or the like.

(36) Meeting module **514** may then determine preference values currently employed in the meeting (Step **605**). That is, meeting module **514** determines current values of those preferences retrieved in Step **600**. For example, if module **514** retrieved preferences for language, speech speed, and volume at Step **600**, current values of each of language, speech speed, and volume are determined. Current values of retrieved preferences may be determined in any manner, such as from presenter profiles or other meeting information entered by or displayed for participants. For instance, the currently-spoken language may be determined via one or more machine learning models trained to identify a spoken language from audio input of speech. In some embodiments, current meeting volume may be determined via decibel measurements of meeting audio. In some embodiments, current speech speed may be estimated according to the rate at which identified syllables or other characteristic audible speech is uttered, determined via natural language processing (NLP) or other methods which identify and transcribe spoken words of a portion of speech. In this example, identified words may be counted and their number divided by the amount of time taken by that portion of speech, to determine, e.g., words per minute spoken.

(37) Meeting module **514** may then determine which current preference values or factors do not match the preferences of at least one audience member (Step **610**). For every such current

preference value (Step **615**), module **514** checks whether that current preference value can be adjusted individually for each meeting participant (Step **620**). If the answer to this inquiry is negative, module **514** adds this factor to a recommendation list (Step **635**) for subsequent presentation to meeting speakers or others. If the answer to the inquiry of Step **620** is instead positive, module **514** then checks whether every participant's device **70** provides controls to adjust this factor's value (Step **625**). If the answer to this inquiry is negative, module **514** proceeds to Step **635**, adding this factor to the recommendation list. Otherwise, this factor can be adjusted individually for every participant, and module **514** does so accordingly (Step **630**). Individual adjustment may be performed in any manner, such as by transmission of instructions to each device **402, 406** by server **426**, to adjust or set these factors accordingly. In some embodiments, an alert may also be transmitted to each device **402, 406** allowing users to confirm or cancel the adjustments. After Step **630**, module **514** proceeds to Step **655**, as further described below.

(38) The result of Steps **600-625** is a recommendation list containing those factors or preferences which at least one meeting participant wants the current speaker to change. For each factor in the list, meeting module **514** takes certain actions (Step **640**), including determining the preferred factor value suited to the audience (Step **645**). This may be the preferred value of any portion of the meeting participants, determined in any manner. In some embodiments, module **514** may determine the preferred value according to majority preference. Thus, for instance, the preferred language may be the language expressed as a preference by the majority of participants. In some embodiments, the preferred value may be determined as the value preferred by the most participants, even if not a majority. In some embodiments, the preferred value may be that preferred by all participants, or by any portion thereof.

(39) Meeting module **514** may then present this recommendation list to the current speaker, such as via an actionable instruction, action item, or suggestion to meet the audience preference (Step **650**). For example, as in FIG. **1A**, audience preferences **20** may be presented within the current speaker's interface **10**, instructing or suggesting to the speaker to adjust his or her delivery in a manner that more closely meets the audience's preferences. In this manner, module **514** encourages meetings to progress more closely along participant preferences, thus increasing participant interest and engagement with the meeting. Recommendations may also be presented as templates or any predetermined format for presenting recommendations. For example, in some embodiments, meeting module **514** may determine recommendations and insert them into the following template: "There is an audience preference to please (increase/decrease) (factor name) to around (factor value)." Thus, for instance, when a speaker is speaking faster than a preferred participant speech speed, module **514** may display a message such as "There is an audience preference to please decrease speech speed to around 40 words per minute."

(40) In embodiments of the disclosure, meeting module **514** also updates its preference values, to more accurately track and respond to participant preferences that may change over time. Thus, in some embodiments, module **514** may check to determine whether any audience member or meeting participant has left the call (Step **655**), and if so, returns to Step **640** to update the recommendation list. Otherwise, if no audience member has left the meeting, module **514** determines whether the speaker or presenter has changed (Step **660**), such as by determining whether a self-designated speaker flag has changed state, automatically designating a current speaker according to detected words, i.e., who is speaking at any given time or who has been speaking for greater than some threshold period of time, who is sharing their screen, who is the designated speaker according to a meeting agenda or schedule, an analysis of verbal cues such as words or phrases indicating transition to another speaker (e.g., "Now I would like to give David the floor . . . "). Thus, for example, meeting module **514** may analyze a meeting agenda and designate current speakers according to the times allotted for certain speakers. Any method of detecting a speaker is contemplated, and checks for current speaker may be made at any time, such as periodically at any intervals, upon detection of any amount of speech from any participant, and the like. If a change in

speaker or presenter is detected, the process returns to Step **605** to determine the presentation factor values used by the new speaker, e.g., how fast he or she is speaking, the language used, how loud he or she is now speaking, and the like. Otherwise, if no change has been made to the meeting speaker, module **514** may determine whether any new participant has joined the meeting (Step **665**), and returns to Step **600** to retrieve his or her preferences, if so, beginning the process of FIG. **6** again for the newly-revised set of meeting participants. This process may continue until the end of the meeting.

(41) In some embodiments, module **514** may keep track of those participants who leave the meeting early (i.e., at Step **655**), and those who join late (i.e., at Step **665**), to note those participants who missed a portion of the meeting. Module **514** may also keep track of those invitees who missed the meeting entirely. These participants/invitees may be sent a recording of those portions of the meeting that they missed, according to times when they joined/left.

Participants/invitees may also, or alternatively, be sent a recording of the entire meeting with missed portions marked or indicated in any manner. In this manner, participants/invitees may be able to catch up on missed meeting content.

(42) As above, embodiments of the disclosure also contemplate individualized display and recording of meetings that meet each participant's preferences. FIG. **7** is a flowchart illustrating meeting display and recording generation according to embodiments of the disclosure. Here, meeting module **514** may retrieve meeting playback preferences of participants of a meeting (Step **700**). Similar to Step **600** of FIG. **6**, module **514** may retrieve the stored preferences of each participant from storage **416**, may query participants for their preferences, or may determine participant preferences in any other manner. Preference data may also be retrieved for each meeting invitee rather than just those who are actually participating in the meeting, for each invitee who has confirmed their attendance, or the like. Preference data may also be determined from information including participant location, time zone, company or industry information, demographics, or the like.

(43) Module **514** may then determine a first set of meeting playback preferences, according to which meeting content cannot be generated and played back during the meeting (Step **710**). That is, module **514** may determine those preferences that cannot be met in real time, or during the meeting itself. For instance, audience preferences for a language that the current speaker does not speak, may not be able to be met during the meeting. Module **514** also determines a second set of meeting playback preferences, according to which meeting content can be generated and played back during the meeting (Step **720**). That is, unlike in Step **710**, module **514** determines those meeting preferences that can be met in real time, or during the meeting itself. For example, the volume level of meeting broadcast or playback may be readily altered to match participant preferences. That is, the volume level at which each participant's audio and video stream is played is a preference that can be altered as desired in real time or during the meeting, according to participant preferences.

(44) For each meeting participant, module **514** then generates meeting content, e.g., a live feed of the meeting, for playback (Step **730**). In some embodiments, meeting content is generated according to the second set of meeting playback preferences determined above in Step **720**. That is, module **514** generates a separate meeting feed for each call participant, where this individualized feed is generated according to those participant preferences that can be adjusted in real time, during the meeting. For example, each participant may receive live meeting video via his or her interface **10**, played at his or her individual preferred settings, e.g., at his or her preferred volume, or the like. Different participants may thus receive their meeting feeds through their interface **10**, at differing settings, providing more individualized meeting experiences.

(45) Here, meeting content may be any content of or related to the meeting. For example, meeting content may include recorded audio and video signals of the meeting, as well as any presentations or other material displayed for the meeting participants, by, e.g., meeting speakers.

(46) For each meeting participant, module **514** also generates a recording of meeting content for

playback according to each participant's first set of meeting playback preferences (Step 740). That is, meeting module 514 records the meeting, and sends individual copies of the recording to each participant, for playback according to each separate participant's preferences. Thus, for example, after the meeting, one participant may receive a copy of the meeting recording, set to his or her desired volume, speed, and language settings, while another participant may receive a copy of the meeting recording set for playback at different volume, speed, and language settings, according to his or her individual preferences.

(47) Recordings may be set to different languages in any manner. In some embodiments, recordings may be automatically translated into each participant's desired language using machine learning-based methods, as above. In some embodiments, recordings may be set for playback at each participant's preferred speed, so that playback is performed at each individual's preferred speaker wpm, or a corresponding metric such as meeting-average wpm, speaker-average wpm, or the like. In this manner, even if certain individual preferences cannot be satisfied during the meeting itself, each participant may be sent a recording of the meeting which is set for playback according to those preferences. Thus, regardless of whether preferences can each be met in a live context, each participant may receive at least a recording that helps to meet various preferences.

(48) Module 514 may also customize recordings in any manner besides, or in addition to, following participant preferences. In some embodiments, preferences may include preferences for particular camera views, and module 514 may record from separate video and/or audio source(s) such as alternate cameras or the like, according to those view preferences. Similarly, recordings may include content such as chat content and the like, according to participant preferences. In some embodiments, recordings may also include a transcript of the meeting, such as a closed caption, if preferred by individual participants. Module 514 may in some embodiments, also send transcripts to participants prior to sending the recording, for transcript review, editing, and/or approval. In some embodiments, module 514 may also notify participants whether their recording has been personalized according to their preferences, or is an unaltered recording. In this manner, module 514 may generate separate meeting recordings for each individual participant or invitee, customized according to his or her individual preferences, where those preferences may include particular video and/or audio sources, any meeting content, any presentation style, any closed captions in any language, dubbing or translation into any language, at any speed and/or volume, and according to any other preference.

(49) As above, embodiments of the disclosure may also include display of preferences during the meeting, to speakers and/or other meeting participants. Meeting module 514 may thus determine playback preferences of meeting participants (Step 750), and transmit these playback preferences to at least one meeting participant, e.g., meeting presenters or speakers, each participant, or the like (Step 760). As previously described, playback preferences may be determined in any manner, such as by determining an average value for each preference based on every participant's preference value, common preference values preferred by more than one participant, values preferred by a majority or by more than any other value but less than a majority, or the like. Playback preferences may be transmitted as numerical or other values, such as display metrics 30, or may be formulated as recommendations 40, e.g., presentation style recommendations, such as recommendations to speak faster, speak louder, or the like, rather than numerical value recommendations such as a specific wpm or volume level.

(50) The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the disclosure. However, it will be apparent to one skilled in the art that the specific details are not required to practice the methods and systems of the disclosure. Thus, the foregoing descriptions of specific embodiments of the present invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. For example, any type of participant preference may be retrieved, and any

corresponding metrics may be calculated and displayed for any meeting participants. Display and recording may also be performed and altered for playback according to any values of any preferences. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the methods and systems of the disclosure and various embodiments with various modifications as are suited to the particular use contemplated. Additionally, different features of the various embodiments, disclosed or otherwise, can be mixed and matched or otherwise combined so as to create further embodiments contemplated by the disclosure.

Claims

1. A method comprising: retrieving a first set and a second set of meeting playback preferences for a first and a second participant, respectively, joined into a live conference call; determining that a live conference call feed associated with content presented during the conference call can be generated with only a subset of the first set and the second set of meeting playback preferences during the progress of the conference call; and in response to the determination: automatically, for the first and second participant, generating a distinct customized user interface for first and second participant's devices, wherein the distinction is based on distinct meeting playback preferences of the first participant from the second participant, and displaying a live broadcast on the generated distinct user interfaces of the first and second participant's user devices of the customized live conference call feed with only the subset of the first set and second set of meeting playback preferences for which a live broadcast can be displayed; and automatically, for the first and second participant, generating a recording of the live conference call with all the first set and a second set of meeting playback preferences.
2. The method of claim 1, further comprising: determining that the live conference call feed cannot be generated with a first preference, from the first set meeting playback preferences; and in response to determining that the live conference call feed cannot be generated with a first preference: adding the first preference to a recommendation list; and providing the recommendation list to a subsequent speaker of the conference call.
3. The method of claim 1, wherein the subset of the first set of meeting playback preferences is distinct from the subset of the second set of meeting playback preferences.
4. The method of claim 1, wherein the customized live conference call feed is a live conference call video provided on a user interface of the first user.
5. The method of claim 1, further comprising automatically adjusting volume of the customized live conference call feed for the first user based on a preference, from the first set of meeting playback preferences, of the first user.
6. The method of claim 1, wherein a meeting playback preference, from the first set of meeting playback preferences, is a preference for a preferred language.
7. The method of claim 1, further comprising: determining a speed preference of the first user, from the first set of meeting playback preferences; and either slowing down or speeding up a speed of the recording of the live conference call for the first user based on the determined speed preference.
8. The method of claim 1, further comprising, transmitting an alert to the first user, wherein the alert informs the first user of adjustments made to the customized live conference call feed due to an inability to incorporate all preferences in the first set of meeting playback preferences.
9. The method of claim 8, further comprising, providing an option to the first user to confirm or cancel the adjustments made to the customized live conference call feed.
10. The method of claim 1, further comprising, determining a language preference of the first user based on a current geographical location of the first user.
11. A system comprising: a storage device; and control circuitry, based on instructions received from one or more processors associated with the storage device, configured to: retrieve a first set

and a second set of meeting playback preferences for a first and a second participant, respectively, joined into a live conference call; determine that a live conference call feed associated with content presented during the conference call can be generated with only a subset of the first set and the second set of meeting playback preferences during the progress of the conference call; and in response to the determination: automatically, for the first and second participant, generate a distinct customized user interface for first and second participant's devices, wherein the distinction is based on distinct meeting playback preferences of the first participant from the second participant, and display a live broadcast on the generated distinct user interfaces of the first and second participant's user devices of the customized live conference call feed with only the subset of the first set and second set of meeting playback preferences for which a live broadcast can be displayed; and automatically, for the first and second participant, generate a recording of the live conference call with all the first set and a second set of meeting playback preferences.

12. The system of claim 11, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to: determine that the live conference call feed cannot be generated with a first preference, from the first set meeting playback preferences; and in response to determining that the live conference call feed cannot be generated with a first preference: add the first preference to a recommendation list; and provide the recommendation list to a subsequent speaker of the conference call.

13. The system of claim 11, wherein the subset of the first set of meeting playback preferences is distinct from the subset of the second set of meeting playback preferences.

14. The system of claim 11, wherein the customized live conference call feed is a live conference call video provided by the control circuitry on a user interface of the first user.

15. The system of claim 11, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to automatically adjust volume of the customized live conference call feed for the first user based on a preference, from the first set of meeting playback preferences, of the first user.

16. The system of claim 11, wherein a meeting playback preference, from the first set of meeting playback preferences, is a preference for a preferred language.

17. The system of claim 11, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to: determine a speed preference of the first user, from the first set of meeting playback preferences; and either slow down or speed up a speed of the recording of the live conference call for the first user based on the determined speed preference.

18. The system of claim 11, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to transmit an alert to the first user, wherein the alert informs the first user of adjustments made to the customized live conference call feed due to an inability to incorporate all preferences in the first set of meeting playback preferences.

19. The system of claim 18, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to providing an option to the first user to confirm or cancel the adjustments made to the customized live conference call feed.

20. The method of claim 11, further comprising, the control circuitry, based on the instructions received from the one or more processors associated with the storage device, configured to determine a language preference of the first user based on a current geographical location of the first user.
