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## Emphatic Mute: Introducing a New Mute State for Use During a Video Conference

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## **Emphatic Mute: Introducing a New Mute State for Use During a Video Conference**

Modern-day video conferencing serves as a powerful communications tool, augmenting the capabilities of traditional communication methods. Due to the visual and collaborative aspects of video conferencing, such platforms have found success in many settings, for example, application in modern workplaces (including work-related meetings), educational contexts (including online classes), social visits, global conferences, community events, or medical appointments just to name a few current applications of the technology. With only increasing visual functionalities, such as screen sharing, recording, live chat, etc., video conferencing increasingly enhances users' ability to share information and communicate effectively, and overall works to deliver a smooth and collaborative communications experience between users.

Video conferencing platforms work to integrate more features that mimic in-person interactions. High-definition video and audio have improved the ability to pick up on non-verbal cues and tonal nuances. Breakout rooms can mimic the small group interactions that naturally occur in physical meetings. Virtual reality and augmented reality technologies are being explored to create more immersive and interactive meeting experiences. In pursuit of such a goal, in some cases, video conferencing platforms include functionality that allows users to signal their intent to speak. Such a feature may be a "hand raise" function, which incorporates a dedicated button to digitally signal to other participants that a particular attendee wishes to contribute to the discussion.

Despite such advancements, recreating or mimicking the level of non-verbal communication (e.g. body-language) provided within an in-person meeting can be an area where video conferencing faces some challenges. One such area, is the absence of a non-verbal cue within a video conference to indicate that someone is content with the discussions, finished

speaking, attending to a separate matter, or is otherwise unlikely to speak again. The digital equivalent of a satisfied nod or a content smile is lacking, and this can be a significant limitation for users and platforms and users attempting to recreate, and enhance, the deep level of communication accessible with face-to-face meetings.

Therefore, a video conferencing system is proposed including enhanced functionality for user non-verbal communication. In some cases, the video conferencing system can include an emphatic mute state and emphatic mute state activation feature. Such a state can be used by a user to show that the user does not intend to speak soon. Such a feature may be implemented in a number of ways, but may maintain the end goal of entering a user into an emphatic mute state, and delivering a signal that the user is finished speaking for a time. Upon entry into the emphatic mute state, the video conference can signal to other users, either through a visual signal or other type of alert, that the specific user has entered the emphatic mute state.

A first implementation of the emphatic mute state activation feature includes a dedicated emphatic mute button. In some cases, the user interface (UI) presented to a user during a video conference may already include a dedicated “regular” mute button. In some cases, a separate and dedicated, *emphatic* mute button can be presented to the user, that the user can activate by clicking the button.

A second implementation of the emphatic mute state activation feature can include use of the regular mute button, and can be activated through a long-hold, or long-press of the regular mute button. In such cases, a user can indicate an emphatic mute by holding down, or long-pressing, the regular mute button. In some cases, this may cause the UI to show a loading, or tracking icon, indicating how long the user has held down the button. Once such a loading icon

has reached its terminal point (e.g., the length of a press required to engage an emphatic mute state), the emphatic mute state may be entered into.

In some cases, an emphatic mute may be a way for a user to indicate that they would like to be muted for a significant period of time, that they are finished contributing to the current topic of conversation, or that they are in agreement with the current opinions and viewpoints that are being discussed.

For example, in some instances a presenting user may be presenting on a topic that requires significant audience engagement and may want to grant the audience an opportunity to process or brainstorm (e.g. either alone or amongst themselves), over a visual item or idea associated with the video conference. The presenting user may want to step away from the presentation and allow the audience a moment of time and silence. In such a case, a user could activate the emphatic mute state to indicate the beginning of such a moment of silence.

In a separate example, a user could require time away from the conference to attend to a separate matter, but may not desire to leave the meeting. For example, in some cases, a user in the home-setting may here a doorbell ring, or a user may receive a particularly important phone call on a separate device. In some cases, the user may experience technical difficulties they would like to attend to. In such instances, a user might appropriately indicate that they would like to be silent, or indisposed, for a considerable portion of time, while they attend to the matter. In such cases, such a user could activate the emphatic mute state to indicate their desired silence.

In a further example, the emphatic mute state can be used to non-verbally indicate an emotion of the user. For example, a user may activate an emphatic mute state to indicated they are in strong agreement with the conversation. In other cases, the user could activate the

emphatic mute state to signal disagreement, and an ending to their portion of discussions to the disagreed matter.

In some instances, the video conferencing software may respond to a user engaging their emphatic mute state, and appropriately respond by optimizing (or pausing) processing and/or transmissions of the user's associated data. In some instances, the video conferencing software may respond to a user engaging their emphatic mute state by providing an alert to other users of the meeting that the user has entered the emphatic mute state. In some instances, such an alert can be an icon associated with the user's name within a participant list of the meeting.

Figure 1 illustrates an example system for hosting a video conference that may include use of an emphatic mute state activation feature. Figure 1 shows two different version such an activation feature can be implemented, according to two different UIs.

Figure 1 illustrates a video conferencing system (e.g. system 100) for processing, transmitting and receiving data to enable users to connect to, and communicated with other users in a video conference (e.g. through conference transmissions 178). A video conferencing platform (e.g. conferencing platform 170) for hosting the video conference, can support a control module (e.g., control module 172), for performing overall control of modules and devices associated with the platform, a user-interface (UI) control module (e.g., UI control module 174), for performing generation of, and other processes associated with, the UI that will be presented to a user, and a data processing module (e.g., data processing platform 176), that may process, transmit, and receive, incoming and outgoing data and video streams. Multiple client devices (e.g. client devices 110A-N) may be connected to the virtual conference, and each may similarly transmit and receive one or more video and data streams. Each client device may present a UI

(e.g. either UI 130A, or 130B, or other UIs not shown) to a user of the video conferencing system 100.

Video conferencing platform 170 may host and manage a video conference for multiple users who connect to the conference via client devices (e.g., client devices 110A-N). As shown, the VC platform can integrate several components, including a control module 172, a UI control module 174, and a data processing module 176. These components can work collaboratively, and communicate internally, or externally (e.g. to further systems and/or through APIs), to facilitate video conferencing capabilities for users across a range of client devices.

Control module 172 may orchestrate the overall functioning of the VC platform 170. In some cases, control module 172 can include algorithms and processes to direct the setup, maintenance, and teardown of a video conferencing for the users. For example, when a user begins a video conference, the control module 172 may initiate and manage the associated process, including allocating resources, determining routing pathways for video and audio data streams, and managing user permissions, and so forth interact with client devices 110A-N to establish and maintain reliable connections. Control module 172 may also control internal modules of (e.g. that are within) Video conferencing platform 170.

UI control module 174 may perform user-display functionalities of the system such as generating, modifying, and monitoring the individual UIs and associated components that are presented to users of the video conferencing platform 170. UI control module 174 can generate the UIs (e.g. graphical user-interfaces (GUIs)) that users interact with during video conferences. For example, a UI may include many interactive (or non-interactive) visual elements for display to a user. Such visual elements may occupy space withing a UI and may be visual elements such as windows displaying video streams, windows displaying images, chat panels, file sharing

options, participant lists, or control buttons for functions such as muting audio, disabling video, screen sharing, and so forth. The UI control module 174 can work to maintain functions and manage interactions with the control module 172 to ensure that any user-generated commands or actions (like muting a participant, switching video feeds, sharing a file, etc.) are processed, executed, and reported on (e.g. that required responses are displayed) as necessary. Additionally, the UI control module 174 can adapt the interface based on the capabilities of client devices 110A-N. In such a way the UI control module 174 can provide a fluid and responsive interactive experience for users of a video conference.

The data processing module 176 may primarily receive, process, and transmit real-time video (and audio) data streams during a video conference. In some cases, data processing module 176 is equipped to receive, transmit, encode, decode, compress, or otherwise process video data streams for efficient delivery to or from devices, modules or platforms, etc. (and as controlled by control module 172).

In practice, processing module 176 can modify the quality of video streams in response to changes in network conditions (e.g., bandwidth fluctuations) or client device capabilities, to maintain stable and high-quality video streams and overall conference functionality. Video processing module 176 may also include advanced capabilities through access to more sophisticated computer algorithms, and may implement advanced processing features such as noise reduction, video enhancement (e.g. quality upscaling), and automatic framing and tracking of speakers, to name just a few examples, all with the intent of optimizing video processing in support of the control module, and the video conferencing system and its users at large.

Some data, such as text chats, participant reactions, and control commands are not received by the video processing module, but instead by the control module 172, which may

process such inputs and coordinate with other modules to update UIs, video streams, and data on all connected devices and modules as needed.

Once the data processing module 176 has received and processed video streams (as described in previous paragraphs), it may transmit the data to associated client devices over a network (or any other connection method) as video conference transmissions 178. Depending on the network conditions and capabilities of each client device, different versions of the same video stream, encoded at different bitrates or resolutions, may be sent to different devices to ensure the best possible video quality for each participant.

For other types of data, such as control commands, text chat messages, participant reactions, and shared files, etc. the control module 172 can perform the processing. After receiving and processing such data and events, the control module 172 may perform transmission to the client devices. For instance, when a text chat message is received, the control module 172 may perform processing (and leverage other modules) before forwarding the message to all the participants in the video conference. In the case of a control command, like a mute/unmute command from a client device, the control module 172 itself may transmit an update to all client devices so that their respective UIs can reflect the new state. In other cases, the control module may transmit such an update to the UI control module first, which may update data sent to devices through the data processing module. In such a way, transmitting, receiving, and processing of both video and non-video data by the video conferencing (VC) platform 170 from connected client devices 110A-N may be coordinated by the data processing module 176 and the control module 172, as seen in FIG. 1.

When a user interacts with a UI element, such as through pressing the mute button, an event is generated by the client device's UI (e.g. UI 130A or UI 130B). This event is then sent to



the video conferencing platform 170 as a control command. On receiving this control command, the control module may interpret it and initiate the corresponding action (in this case, muting the user's audio stream). To do this, the control module may communicate with other modules and components of the VC platform to implement the requested action. In the specific case of the mute button, the response pertains to the audio stream (as would unmuting, or activating/deactivating the emphatic mute state), and the control module 172 instructs the data processing module to pause audio processing, and transmission, for the specific user's client device.

Concurrently, the UI control module 174 may update the UI for the client devices on all connected client devices to reflect the new state. For example, if the mute button 140 is pressed, the mute button on the UI of every client device would change to indicate that the user is now muted. Analogously, if the emphatic mute state activation feature is engaged by a user, the UI of every client device may be alerted, and/or altered, to show such an event.

While the modules of the platform are described separately, it should be understood that the functionalities can be divided differently or integrated in various ways within the platform while still applying similar functionality for the system. Furthermore, VC platform 170 and associated modules can be implemented in various forms, such as standalone applications, web-based platforms, integrated systems within larger software suites, or dedicated hardware devices, just to name a few possible forms.

Client devices 110A-N (under direction by the VC platform when connected) can present (e.g. display) a UI to a user of a respective device, such as UI versions seen in version UI 130A or version 130B of a UI. Such a UI may can include various visual elements (as discussed

above) and may be the primary mechanism by which the user engages with the video conference (and video conference platform 170 and other users of the system).

A UI can include a number of visual elements to display to a user and/or for user interaction. Such visual elements can include one or more windows (e.g. video windows which may display the video streams or data streams associated with the video conference), chat boxes (e.g. chat boxes for a user to input textual information), informational displays (such as participant lists, document viewers, etc.), as well as input elements (such as buttons, sliders, chat interfaces etc. for a user to input data), or any other kind of visual element commonly associated with a UI.

Such visual elements can be arranged or divided into specific regions of the UI. For example, a UI (e.g. UI 130A) can hold a main region (e.g. main region 132A) that is divided into multiple further subregions that can host many user video streams. In a separate example, a UI (e.g. UI 130B) can hold a main region (e.g. main region 132B) that can display just one visual element or video stream, and a subregion (e.g. subregion UI 134B) to hold further visual elements or video streams.

Via the UI, users may be shown a participant list (e.g. participant list 136A or 136B) showing who is in the conference, possibly with indicators for the current speaker, and icons or other UI elements indicating each participant's state (e.g., muted, emphatically muted, video off, etc.).

A user of a specific client device can engage with a UI, through the multiple elements that are presented. For example, a user may customize the UI, including resizing, or displacing elements, with respect to the overall UI frame dimensions. All these visual elements and interactive components are updated in real time based on the ongoing interactions in the video

conference. For instance, when a user mutes their microphone (or emphatically mutes their microphone), the VC platform sends an update to all client devices, and an icon next to the user's name is updated accordingly in the UI.

The UI may also present to the user interactive elements like buttons and sliders for controlling various aspects of the video conference. For instance, buttons for muting/unmuting audio or video, adjusting audio volume, switching video layouts, sharing the screen, and other actions. In one example, as seen in the two versions of a UI seen in UI 130A and UI 130B, a user may be shown a list of command buttons (e.g. button list 138A or 138B) with which a list of commands (e.g. for muting, emphatically muting, turning certain video streams on/off, etc.) may be presented to the user.

As discussed above, the UI can include a command button for muting the audio stream associated with the UI, seen in mute button 140A and 140B of possible UIs 130A and 130B. In some cases, such UIs can also include an emphatic mute state activation feature. In some examples (e.g. an example seen in UI 130A) the emphatic mute state activation feature 142A can be a dedicated emphatic mute button, separate from mute button 140A, for a user to press to activate an emphatic mute state (according to the description given above). In other examples, (e.g. the example seen in UI 130B) the emphatic mute activation feature 142B may be incorporated into the existing mute button 140B, such as through use of a loading bar, or loading arrow that indicates the emphatic mute is in the state of being activated. Such a loading bar, or loading arrow can be activated by a holding, or long-pressing the “regular” mute button 140B. Once such a bar, or arrow reaches a certain point, the emphatic mute state can be engaged. In either version (or others that exist) the UI can provide an appropriate indicator to the user (and other users) of the system after such a user has activated the emphatic mute state.

In such a way (or ways) as described above, a user of the system may activate an emphatic mute state, and indicated to other users of the system that they are in agreement, would like to remain silent for a significant amount of time, or otherwise would like to step away from delivering speech to the video conference.

## **ABSTRACT**

A technique is proposed for an emphatic mute feature for a participant within a video conference. The emphatic mute state can be a state a given user enables that is more emphatic than simply muting. The emphatic mute state can indicate that user is in agreement, that a user has finished providing communications, or that the user has made the decision not to speak for significant amount of time. A technique for activating the emphatic mute state can be presented to the user via a video conference UI. In some cases, an emphatic mute state activation feature such as a dedicated button can be used. In some cases, holding down, or long-pressing the original mute button can be used. In such a way, a user can activate the emphatic mute state, and other participants of the virtual meeting can be appropriately alerted.

Keywords: mute state, emphatic mute state, user-interface, mute button, specialized mute button, emphatic mute button, emphatic mute state activation feature.

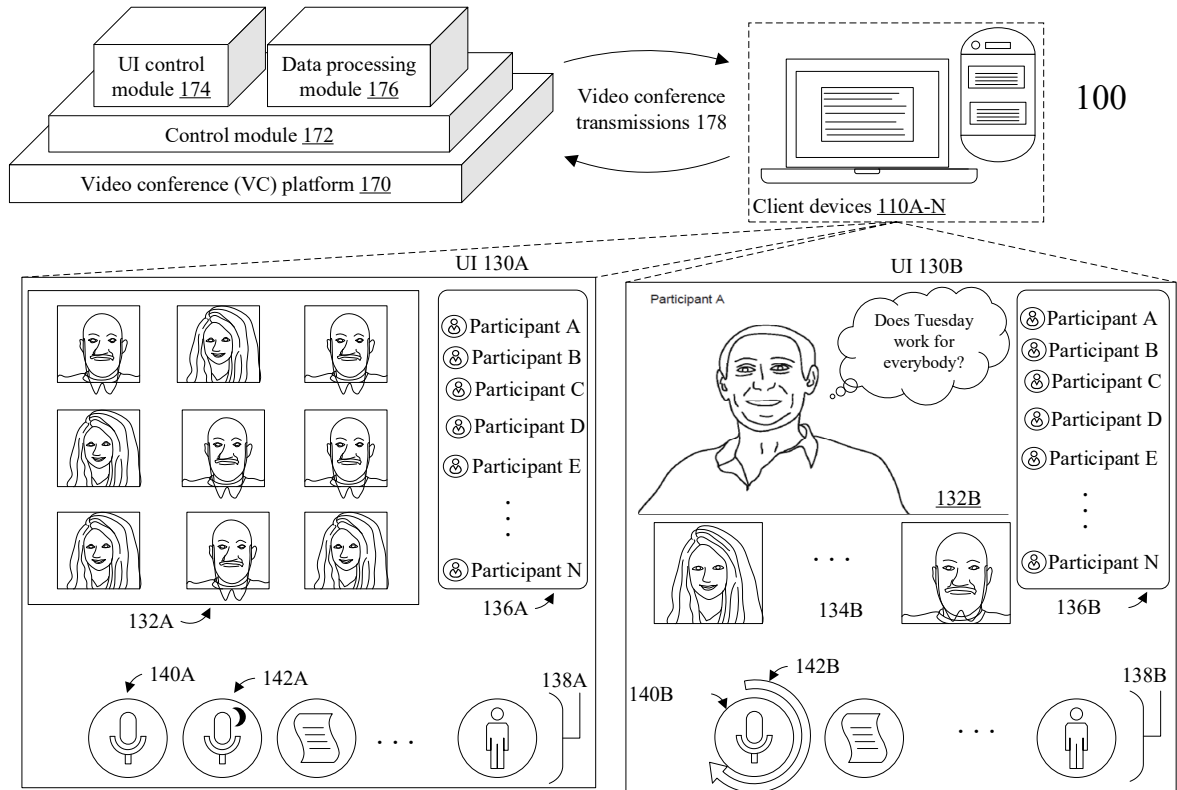


FIG. 1