US012389177B2

(12) **United States Patent**
Komiya et al.

(10) **Patent No.: US 12,389,177 B2**
(45) **Date of Patent: Aug. 12, 2025**

(54) **INFORMATION PROCESSING DEVICE AND INFORMATION PROCESSING PROGRAM**

(71) Applicant: **TOSHIBA TEC KABUSHIKI KAISHA**, Tokyo (JP)

(72) Inventors: **Kenichi Komiya**, Kawasaki Kanagawa (JP); **Kazuhiko Ohtsu**, Mishima Shizuoka (JP)

(73) Assignee: **Toshiba Tec Kabushiki Kaisha**, Tokyo (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 361 days.

(21) Appl. No.: **17/971,216**

(22) Filed: **Oct. 21, 2022**

(65) **Prior Publication Data**

US 2023/0209288 A1 Jun. 29, 2023

(30) **Foreign Application Priority Data**

Dec. 23, 2021 (JP) 2021-208970
Jun. 8, 2022 (JP) 2022-093114

(51) **Int. Cl.**
H04R 29/00 (2006.01)

(52) **U.S. Cl.**
CPC ***H04R 29/001*** (2013.01)

(58) **Field of Classification Search**
CPC H04R 29/001; H04R 29/007; H04R 27/00; H04R 29/00; H04N 7/147
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

9,706,321 B2 * 7/2017 Salter H04R 29/00
2014/0071225 A1 3/2014 Uchiyama

FOREIGN PATENT DOCUMENTS

JP 2009171197 * 7/2009 ..... G10K 15/04
JP 2009171197 A 7/2009

* cited by examiner

Primary Examiner — Yosef K Laekemariam
(74) *Attorney, Agent, or Firm* — Kim & Stewart LLP

(57) **ABSTRACT**

An information processing device for a web conference system includes a speaker to output sound, a microphone to receive sound, and a processor. The processor controls the speaker to output a predetermined tone and acquires first sound data from the microphone while the speaker outputting the predetermined tone. The processor sends the first sound data to another information processing device via a network or the like. Second sound data is then received from the other information processing device. The second sound data corresponds to the first sound data as output by the other information processing device. The processor then compares the first sound data and the received second sound data, outputs a notification indicating a result of the comparison between the first and second sound data.

20 Claims, 7 Drawing Sheets

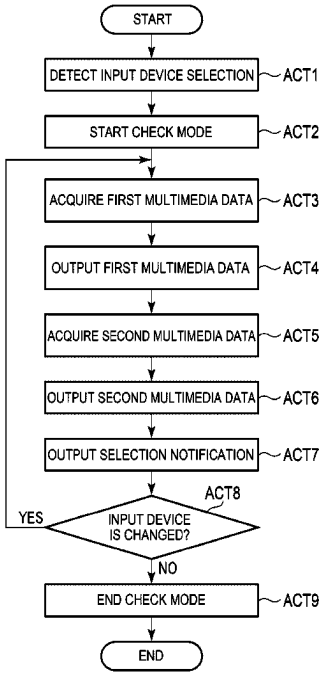


FIG. 1

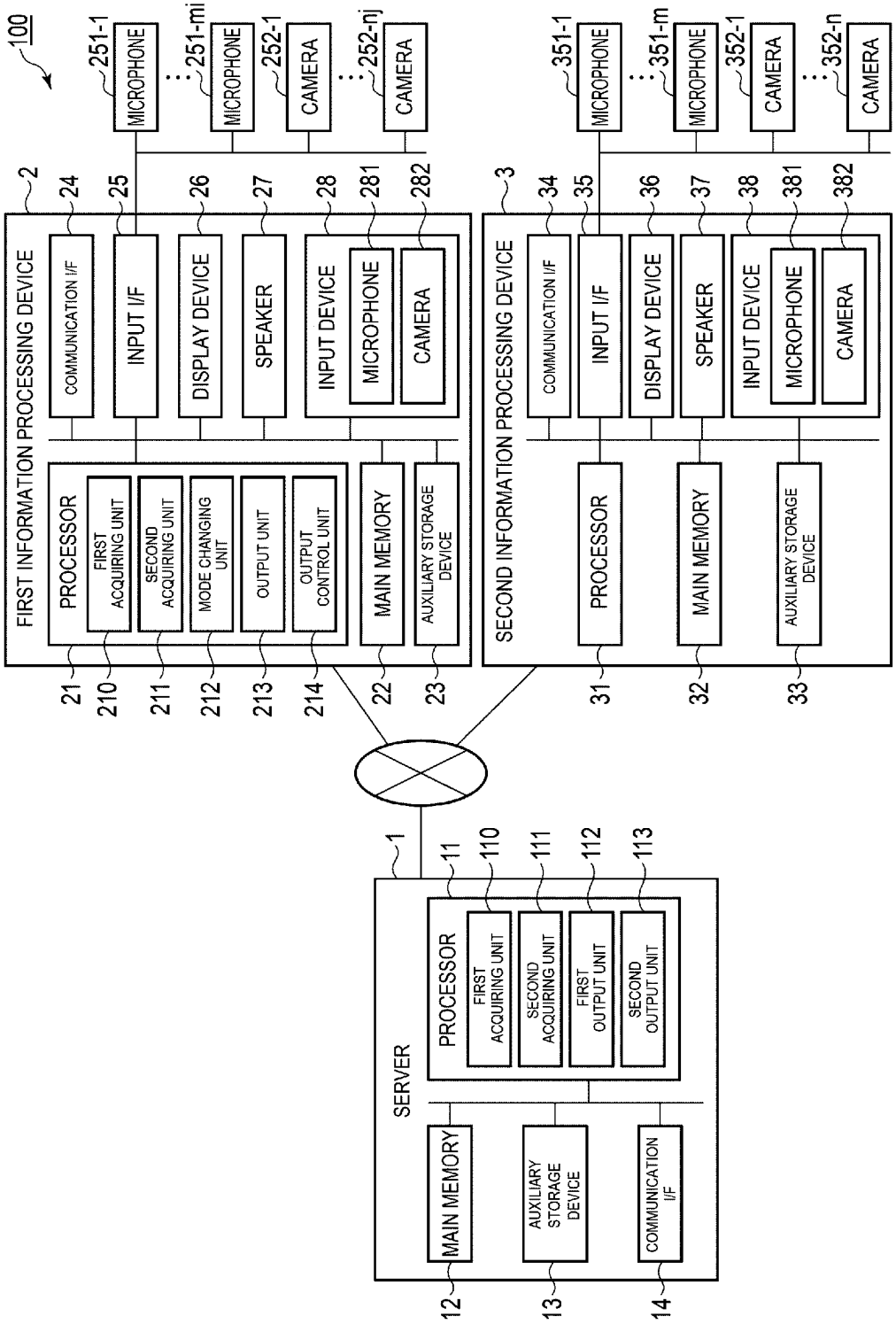

100
251-1
MICROPHONE
251-mi
MICROPHONE
252-1
CAMERA
252-nj
CAMERA
2
24
25
26
27
28
281
282
FIRST INFORMATION PROCESSING DEVICE
COMMUNICATION I/F
INPUT I/F
DISPLAY DEVICE
SPEAKER
INPUT DEVICE
MICROPHONE
CAMERA
PROCESSOR
FIRST ACQUIRING UNIT
SECOND ACQUIRING UNIT
MODE CHANGING UNIT
OUTPUT UNIT
OUTPUT CONTROL UNIT
MAIN MEMORY
AUXILIARY STORAGE DEVICE
21
210
211
212
213
214
22
23
3
34
35
36
37
38
381
382
SECOND INFORMATION PROCESSING DEVICE
351-1
MICROPHONE
351-m
MICROPHONE
352-1
CAMERA
352-n
CAMERA
31
32
33
1
11
110
111
112
113
SERVER
PROCESSOR
FIRST ACQUIRING UNIT
SECOND ACQUIRING UNIT
FIRST OUTPUT UNIT
SECOND OUTPUT UNIT
MAIN MEMORY
AUXILIARY STORAGE DEVICE
COMMUNICATION I/F
12
13
14

FIG. 2

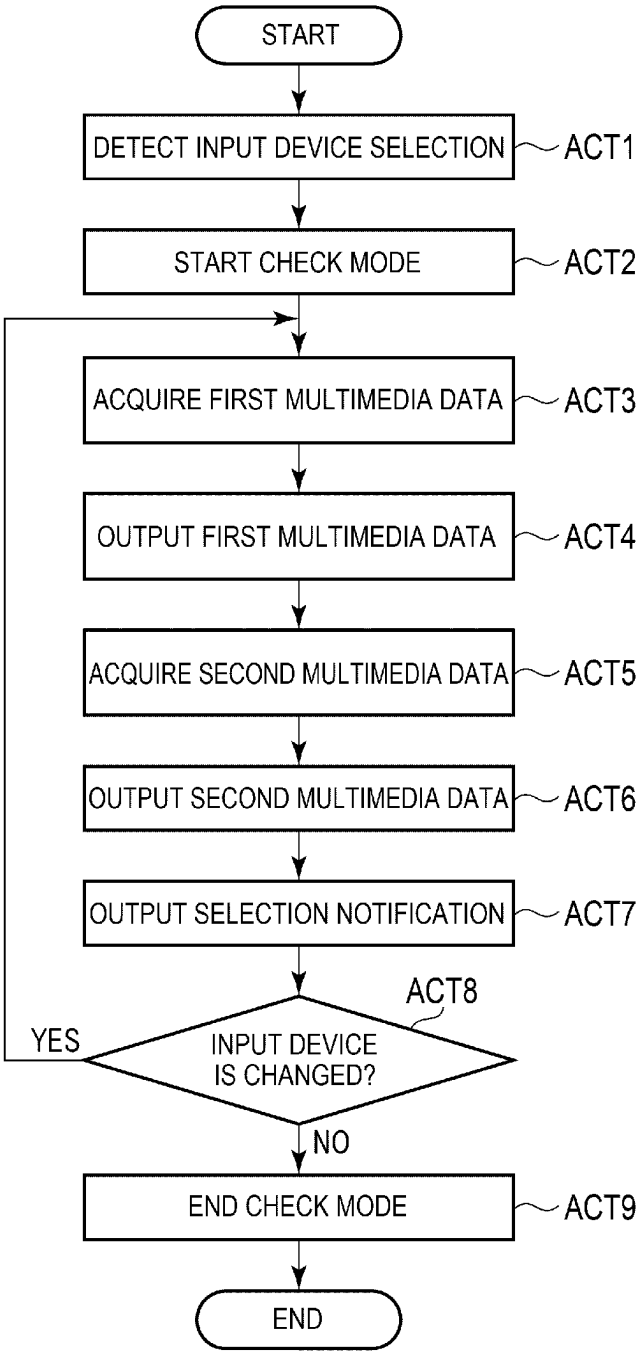

START
DETECT INPUT DEVICE SELECTION
ACT1
START CHECK MODE
ACT2
ACQUIRE FIRST MULTIMEDIA DATA
ACT3
OUTPUT FIRST MULTIMEDIA DATA
ACT4
ACQUIRE SECOND MULTIMEDIA DATA
ACT5
OUTPUT SECOND MULTIMEDIA DATA
ACT6
OUTPUT SELECTION NOTIFICATION
ACT7
ACT8
YES
INPUT DEVICE IS CHANGED?
NO
END CHECK MODE
ACT9
END

FIG. 3

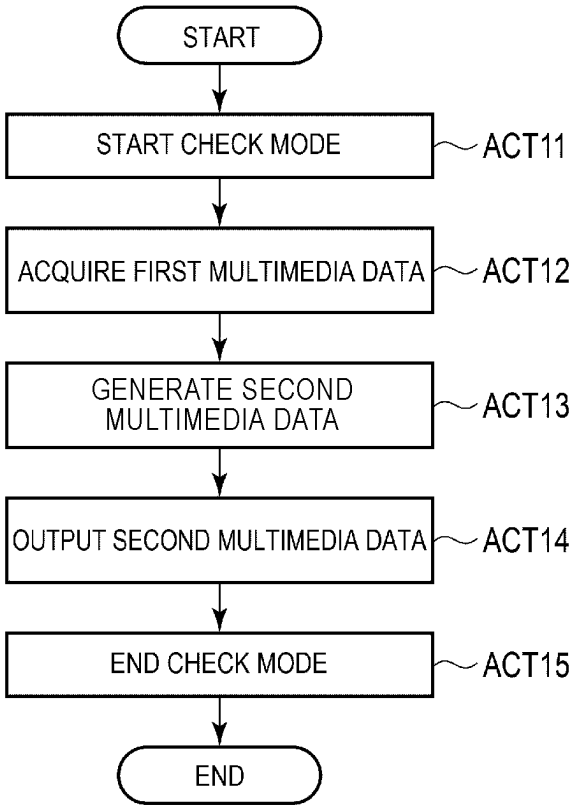

START
START CHECK MODE
ACT11
ACQUIRE FIRST MULTIMEDIA DATA
ACT12
GENERATE SECOND MULTIMEDIA DATA
ACT13
OUTPUT SECOND MULTIMEDIA DATA
ACT14
END CHECK MODE
ACT15
END

FIG. 4

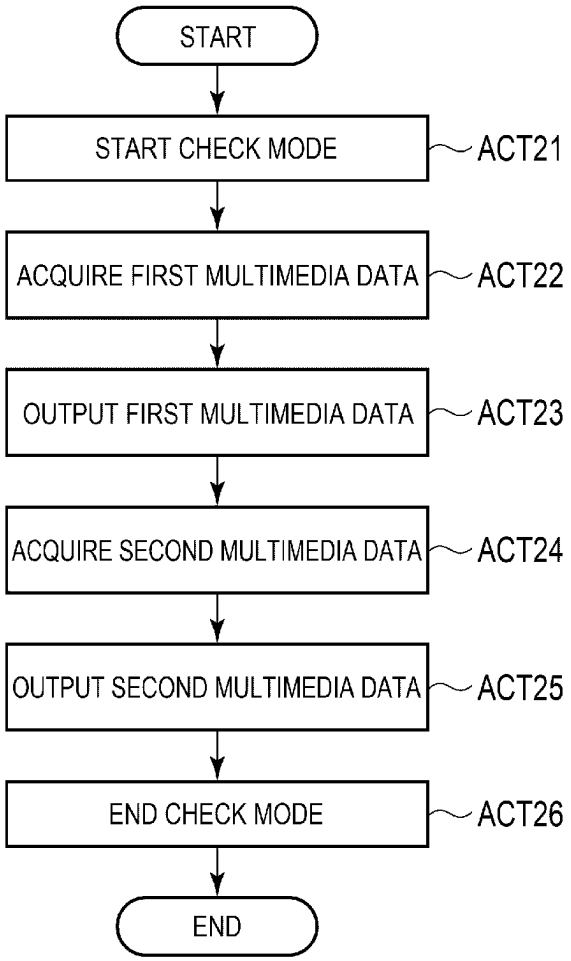

START
START CHECK MODE
ACT21
ACQUIRE FIRST MULTIMEDIA DATA
ACT22
OUTPUT FIRST MULTIMEDIA DATA
ACT23
ACQUIRE SECOND MULTIMEDIA DATA
ACT24
OUTPUT SECOND MULTIMEDIA DATA
ACT25
END CHECK MODE
ACT26
END

FIG. 5

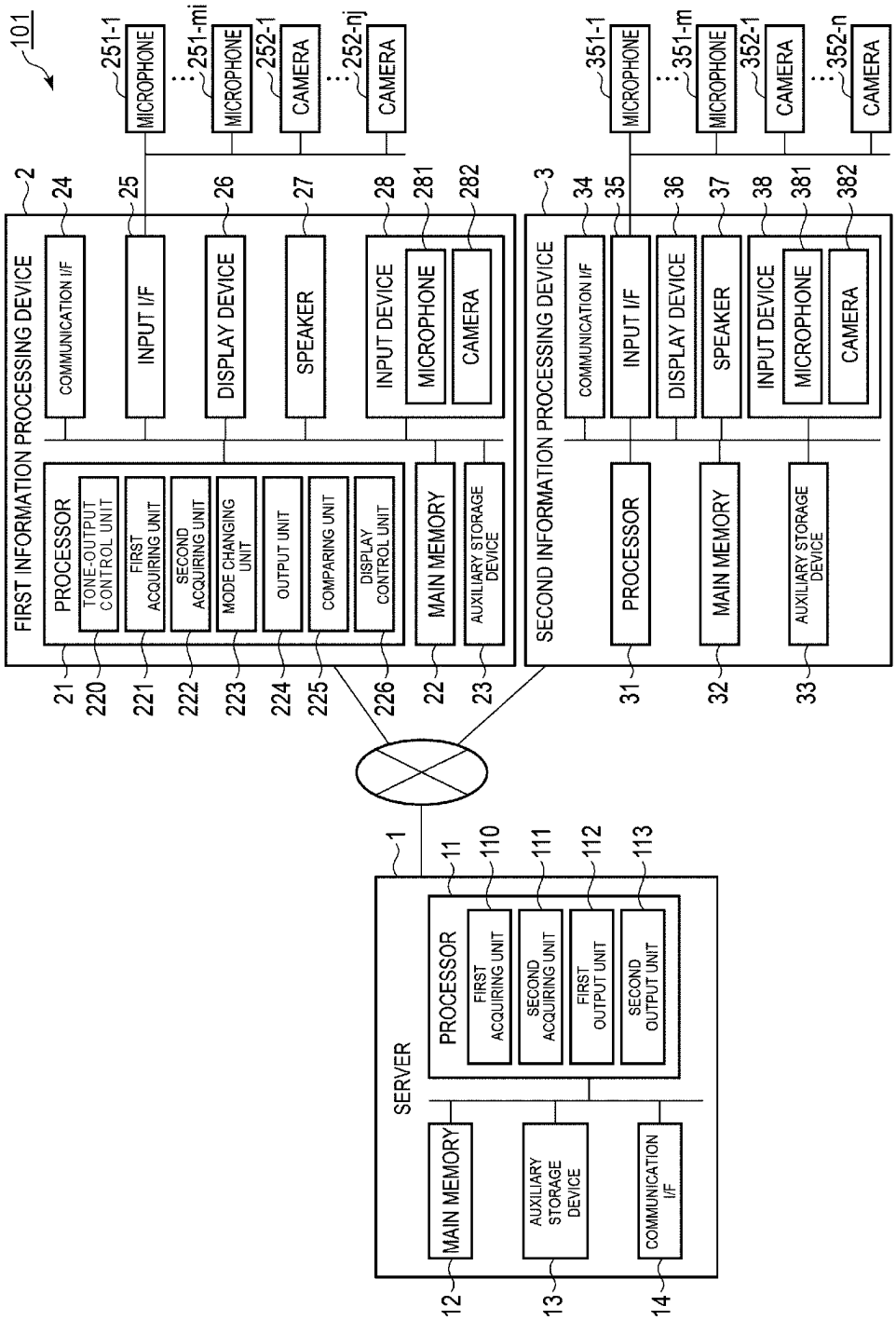
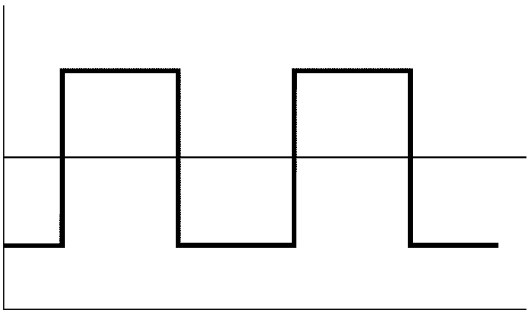
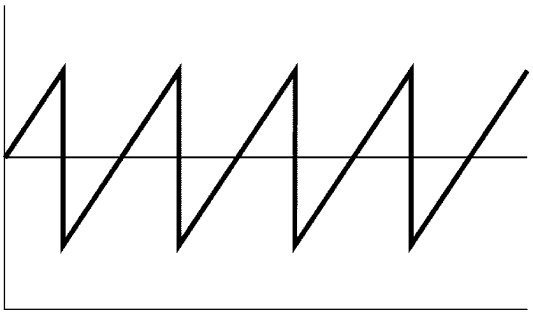

101
251-1
MICROPHONE
251-mi
MICROPHONE
252-1
CAMERA
252-nj
CAMERA
351-1
MICROPHONE
351-m
MICROPHONE
352-1
CAMERA
352-n
CAMERA
2
FIRST INFORMATION PROCESSING DEVICE
PROCESSOR
TONE-OUTPUT CONTROL UNIT
FIRST ACQUIRING UNIT
SECOND ACQUIRING UNIT
MODE CHANGING UNIT
OUTPUT UNIT
COMPARING UNIT
DISPLAY CONTROL UNIT
MAIN MEMORY
AUXILIARY STORAGE DEVICE
COMMUNICATION I/F
INPUT I/F
DISPLAY DEVICE
SPEAKER
INPUT DEVICE
MICROPHONE
CAMERA
3
SECOND INFORMATION PROCESSING DEVICE
PROCESSOR
MAIN MEMORY
AUXILIARY STORAGE DEVICE
COMMUNICATION I/F
INPUT I/F
DISPLAY DEVICE
SPEAKER
INPUT DEVICE
MICROPHONE
CAMERA
1
SERVER
PROCESSOR
FIRST ACQUIRING UNIT
SECOND ACQUIRING UNIT
FIRST OUTPUT UNIT
SECOND OUTPUT UNIT
MAIN MEMORY
AUXILIARY STORAGE DEVICE
COMMUNICATION I/F

FIG. 6A



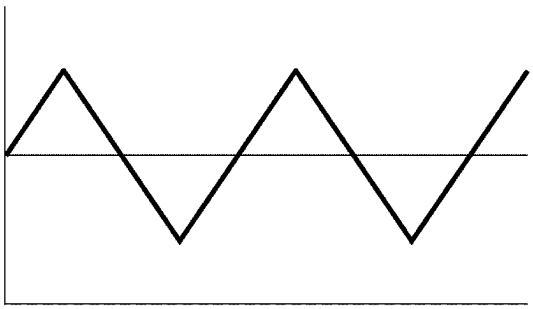
RECTANGULAR WAVE

FIG. 6B



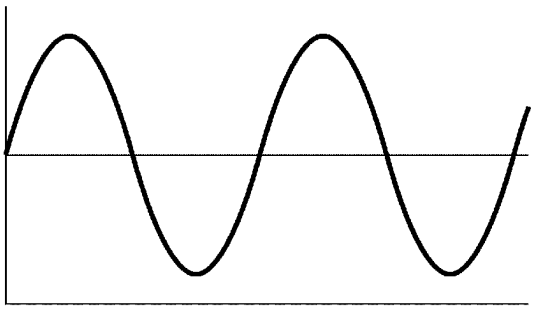
SAW TOOTH WAVE

FIG. 6C



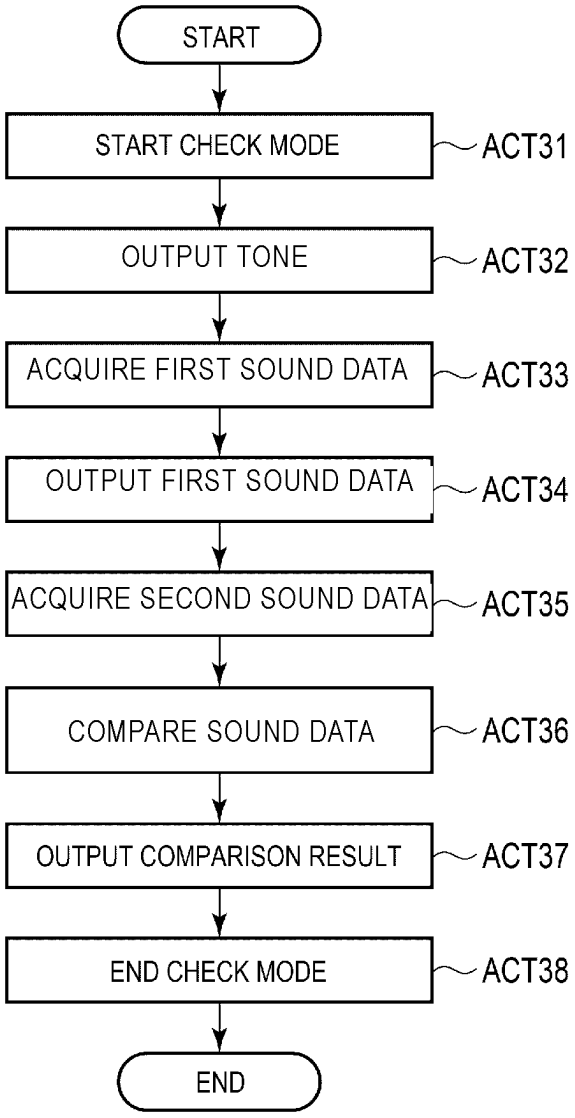
TRIANGULAR WAVE

FIG. 6D



SINE WAVE

FIG. 7


START
START CHECK MODE
ACT31
OUTPUT TONE
ACT32
ACQUIRE FIRST SOUND DATA
ACT33
OUTPUT FIRST SOUND DATA
ACT34
ACQUIRE SECOND SOUND DATA
ACT35
COMPARE SOUND DATA
ACT36
OUTPUT COMPARISON RESULT
ACT37
END CHECK MODE
ACT38
END

INFORMATION PROCESSING DEVICE AND INFORMATION PROCESSING PROGRAM

CROSS-REFERENCE TO RELATED APPLICATION

This application is based upon and claims the benefit of priority from Japanese Patent Application No. 2021-208970, filed Dec. 23, 2021, and Japanese Patent Application No. 2022-093114, filed Jun. 8, 2022, the entire contents of which are incorporated herein by reference.

FIELD

Embodiments described herein relate generally to information processing devices and information processing programs for electronic conferencing systems and the like.

BACKGROUND

An electronic conference system may be referred to as a video conference system or a Web conference system. Such a system may have a plurality of information processing devices connected via a network. In such existing electronic conference systems, several externally connected input devices other than a microphone and/or video camera intended to be used may sometimes be associated with the networked information processing devices.

In such a case, if a user errs in the selection of an input device or a selected input device is out of order, multimedia data such as sound data or image data is sometimes not correctly provided.

In an electronic conference system in which a data check between each information processing device and a server is performed to check whether multimedia data can be correctly transmitted, a user of an information processing device might not be able to check how the multimedia data is actually being output to an information processing device of another party.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram illustrating a Web conference system according to a first embodiment.

FIG. **2** is a flowchart of information processing by a first information processing device according to a first embodiment.

FIG. **3** is a flowchart of information processing by a second information processing device according to a first embodiment.

FIG. **4** is a flowchart of information processing by a server according to a first embodiment.

FIG. **5** is a block diagram illustrating a Web conference system according to a second embodiment.

FIGS. **6**A to **6**D are diagrams illustrating waveforms of sound (tone) data according to a second embodiment.

FIG. **7** is a flowchart of information processing by a first information processing device according to a second embodiment.

DETAILED DESCRIPTION

An object of an embodiment is to provide a smoother electronic conference experience.

In one embodiment, an information processing device for a web conference system or the like includes a speaker to output sound, a microphone to receive sound, and a processor. The processor is configured to control the speaker to output a predetermined tone, acquire first sound data from the microphone while the speaker is being controlled to output the predetermined tone, and send the first sound data to another information processing device. The processor then acquires second sound data received from the other information processing device. The second sound data corresponds to the first sound data as output by the other information processing device. The processor then compares the first sound data and the received second sound data and causes a notification to be output indicating a result of the comparison between the first and second sound data.

First Embodiment

[Configuration Examples]

A first embodiment is explained below with reference to the drawings. FIG. **1** is a block diagram illustrating a Web conference system **100** according to the first embodiment.

The Web conference system **100** includes a server **1**, a first information processing device **2**, and a second information processing device **3**. The server **1**, the first information processing device **2**, and the second information processing device **3** are communicably connected to one another via a network. For example, the network is configured as one or more networks such as the Internet, a mobile communication network, and a LAN (Local Area Network). The networks may be a wireless network or a wired network. The Web conference system **100** in this example is a system including at least two different kinds of equipment networked to one another.

The server **1** is electronic equipment that collects data and processes the collected data. The electronic equipment in this context may be a computer. The server **1** is communicably connected to the first information processing device **2** and the second information processing device **3** via the network. The first information processing device **2** and the second information processing device **3** can be used by different users in different places. The server **1** receives data from the first information processing device **2** and the second information processing device **3** and outputs data to the first information processing device **2** and the second information processing device **3**.

The first information processing device **2** is electronic equipment capable of communicating with other electronic equipment. The first information processing device **2** is, for example, used by a participant in a Web conference. For example, the first information processing device **2** is a PC (Personal Computer), a smartphone, a tablet terminal, or the like. "Participant" may also be referred to as a "user" or "person". The first information processing device **2** is an example of an information processing terminal.

The second information processing device **3** is electronic equipment capable of communicating with other electronic equipment. The second information processing device **3** is, for example, equipment used by a host or another participant in the Web conference. For example, the second information processing device **3** is a PC, a smartphone, a tablet terminal, or the like. "Host" may also be referred to as a "user" or "person". The second information processing device **3** is an example of an information processing terminal.

In the following explanation, reference to an "information processing device" without reference numeral indicates the corresponding description can be applicable to the first information processing device **2** and/or the second information processing device **3**.

A configuration example of the server **1** is explained.

The server **1** includes a processor **11**, a main memory **12**, an auxiliary storage device **13**, and a communication interface **14** (communication I/F).

The processor **11** can be a CPU (Central Processing Unit) but is not limited to this. The processor **11** may be configured as various circuits. In the present example, processor **11** loads, in the main memory **12**, a program stored in advance in the main memory **12** or the auxiliary storage device **13**. The program when executed causes the processor **11** to realize or execute units explained below. The processor **11** executes the program loaded in the main memory **12** to execute various operations.

The main memory **12** includes a nonvolatile memory region and a volatile memory region. The main memory **12** stores an operating system and/or programs in the nonvolatile memory region. The main memory **12** uses the volatile memory region as a work area in which data is rewritten as appropriate by the processor **11**. For example, the main memory **12** includes a ROM (Read Only Memory) as the nonvolatile memory region. For example, the main memory **12** includes a RAM (Random Access Memory) as the volatile memory region. The main memory **12** stores programs.

The auxiliary storage device **13** can be an EEPROM® (Electric Erasable Programmable Read-Only Memory), an HDD (Hard Disc Drive), an SSD (Solid-State Drive), or the like. The auxiliary storage device **13** may store the programs described above, data used by the processor **11** in performing various kinds of processing, and data generated by the processor **11**.

The auxiliary storage device **13** stores information concerning users of the first information processing device **2** and the second information processing device **3** participating in a Web conference provided on the Web conference system **100**. The information concerning the users includes, for example, user identification information (e.g., a user ID), identification information of the information processing devices used by the users (e.g., a device ID), or the like. The user identification information is allocated to each of the individual users. The identification information of the information processing devices is allocated to each of the individual information processing devices. The identification information of the information processing devices may be, for example, IP addresses or the like of the information processing devices.

The communication interface **14** is an interface (or interfaces) that can communicably connect the server **1** to other electronic equipment via the network according to a predetermined communication protocol.

A hardware configuration of the server **1** is not limited to the configuration explained above.

Units realized by the processor **11**.

The processor **11** provides a first acquiring unit **110**, a second acquiring unit **111**, a first output unit **112**, and a second output unit **113**. These units provided by the processor **11** can be also referred to as functions of the processor **11** or a control unit (controller) including the processor **11** and the main memory **12**.

The first acquiring unit **110** acquires, from the first information processing device **2**, via the communication interface **14**, first multimedia data acquired based on an input via an input device of the first information processing device **2**. The first multimedia data includes at least one of sound data and image data acquired via the input device of the first information processing device **2**. The image data may be still image data (e.g., still pictures) or moving image data (e.g., video). The input device can be any device capable of acquiring or providing sound and/or images such as a built-in microphone, an external microphone, a built-in camera, and an external camera.

The second acquiring unit **111** acquires, from the second information processing device **3**, via the communication interface **14**, second multimedia data corresponding to the first multimedia data sent to second information processing device **3**. The second information processing device **3** processes and outputs the first multimedia data as acquired from the server **1**. The second multimedia data is data corresponding to the first multimedia data output from the second information processing device **3**. The second acquiring unit **111** may acquire the second multimedia data from the second information processing device **3**. The second multimedia data may correspond to first multimedia data that has been stored in the second information processing device **3**. Multimedia data transmitted by the first information processing device **2** to the second information processing device **3** via the network is referred to as first multimedia data. Multimedia data returned from the second information processing device **3** to the first information processing device **2** is referred to as second multimedia data. In some examples, the first and second multimedia data may be identical to one another in content.

The first output unit **112** outputs the first multimedia data (acquired by the first acquiring unit **110**) to the second information processing device **3** via the communication interface **14**. In the following explanation, the term "output" may be considered to mean "transmit".

The second output unit **113** outputs the second multimedia data (acquired by the second acquiring unit **111**) to the first information processing device **2** via the communication interface **14**.

The first information processing device **2** is electronic equipment including a processor **21**, a main memory **22**, an auxiliary storage device **23**, a communication interface **24**, an input interface **25**, a display device **26**, a speaker **27**, and an input device **28** connected to one another.

The processor **21** can be the same type of hardware component(s) as the processor **11**. The processor **21** executes a program stored in the main memory **22** or the auxiliary storage device **23** to execute various operations.

The main memory **22** can be the same type of hardware component(s) as the main memory **12**. The main memory **22** stores programs to be executed by the processor **21**.

The auxiliary storage device **23** can be the same type of hardware component(s) as the auxiliary storage device **13**. The auxiliary storage device **23** can store programs to be executed by the processor **21**.

The auxiliary storage device **23** in this example stores information concerning the user of the information processing device **2**, such as user identification information, identification information of the first information processing device **2**, and the like.

The communication interface **24** can be various interfaces that communicably connect the first information processing device **2** to other equipment via the network according to a communication protocol.

The input interface **25** is an interface for connecting the first information processing device **2** to external equipment. In this context, external equipment includes external microphones **251-1** to **251-*mi*** (where mi is an integer equal to or larger than 1) to which sound can be input and external cameras **252-1** to **252-*nj*** (where nj is an integer equal to larger than 1) capable of acquiring imaging data in an imaging range. The input interface **25** is, for example, a USB

(Universal Serial Bus). The external microphones **251-1** to **251-*mi*** and the external cameras **252-1** to **252-*nj*** are examples of input devices.

The display device **26** is capable of displaying various screens under the control of the processor **21**. For example, the display device **26** is a liquid crystal display or an EL (Electroluminescence) display.

The speaker **27** is a device capable of outputting sound under control of the first information processing device **2**. The speaker **27** is an example of the sound output device.

The input device **28** is a device capable of providing data or an instruction to the first information processing device **2**. For example, the input device **28** includes a built-in microphone **281** to which sound can be input and a built-in camera **282** capable of acquiring imaging data in an imaging range. The input device **28** may be or include a keyboard, a touch panel or the like. The microphone **281** is an example of a sound input device.

Units realized by the processor **21**.

The processor **21** provides a first acquiring unit **210**, a second acquiring unit **211**, a mode changing unit **212**, an output unit **213**, and an output control unit **214**. These units provided by the processor **21** can also be referred to as functions of the processor **21** or a control unit or controller including the processor **21** and the main memory **22**.

The first acquiring unit **210** acquires the first multimedia data via a selected input device (an input device selected by the user) of the first information processing device **2**. The selected input device includes at least one of a selected microphone or a selected camera. The selected microphone is selected out of the built-in microphone **281** and the external microphones **251-1** to **251-*mi***. The selected camera is selected out of the built-in camera **282** and the external cameras **252-1** to **252-*nj***. The first multimedia data is at least one of sound data acquired by the selected microphone or image data acquired by the selected camera.

The second acquiring unit **211** acquires, from the server **1**, second multimedia data that corresponds to the first multimedia data. The second multimedia data is at least one of sound data or image data.

The mode changing unit **212** changes an operation mode to a check mode based on an operation of the user of the first information processing device **2**. The check mode is an operation mode for performing an operation check on an input device selected by the user. The operation check includes checking whether the selected input device normally operates. For example, the operation check includes checks of an input level, volume, sound quality, and the like of a microphone or image quality, an angle of view, an imaging range, and the like of a camera. The operation of the user includes selecting an input device or changing a previously selected an input device. The mode changing unit **212** may change from the operation mode to the check mode in response to an instruction by the user. The mode changing unit **212** ends the check mode in response to the user of the first information processing device **2** selecting to use the selected input device. In the following explanation, "in response to" may read "based on".

The output unit **213** outputs, via the server **1**, the first multimedia data (acquired by the first acquiring unit **210**) to the second information processing device **3**.

The output control unit **214** causes an output device to output the second multimedia data as acquired by the second acquiring unit **211**. The output device can be one of the display device **26** or the speaker **27**. The output control unit **214** causes the display device **26** to output, based on the second multimedia data, a selection notification for the user to instruct whether to use the selected input device. The selection notification includes a text message such as "use the selected microphone?", "change the selected microphone?", "use the selected camera?", or "change the selected camera?".

The output control unit **214** may cause the output device to output the first multimedia data and/or the second multimedia data acquired by the first acquiring unit **210**. In this case, the output control unit **214** may cause the output device to simultaneously output the first multimedia data and the second multimedia data or may cause the output device to output the first multimedia data or the second multimedia data with a delay of a predetermined time. The predetermined time is, for example, five seconds or ten seconds. The output control unit **214** may cause the display device **26** to output, based on the first multimedia data and the second multimedia data, a selection notification for the user to instruct whether to use the selected input device.

The second information processing device **3** is electronic equipment including a processor **31**, a main memory **32**, an auxiliary storage device **33**, a communication interface **34**, an input interface **35**, a display device **36**, a speaker **37**, and an input device **38**. The units configuring the second information processing device **3** are connected to one another to be capable of inputting and outputting signals.

The processor **31** can be the same type of hardware component(s) as the processor **11**. The processor **31** executes a program stored in the main memory **32** or the auxiliary storage device **33** to execute various operations. Similar to the processor **21**, the processor **31** provides a first acquiring unit **210**, a second acquiring unit **211**, a mode changing unit **212**, an output unit **213**, and an output control unit **214**, or the functions thereof.

The main memory **32** can be the same type of hardware component(s) as the main memory **12**. The main memory **32** stores programs to be executed by the processor **31**.

The auxiliary storage device **33** can be the same type of hardware component(s) as the auxiliary storage device **13**. The auxiliary storage device **33** stores the programs to be executed by the processor **31**.

The auxiliary storage device **33** stores information concerning the user of the second information processing device **3**. The information concerning the user includes user identification information, identification information of the second information processing device **3**, and the like.

The communication interface **34** can be various interfaces that communicably connect the second information processing device **3** to other equipment via the network according to a communication protocol.

The input interface **35** is an interface for connecting the second information processing device **3** to external equipment. In this context, external equipment includes external microphones **351-1** to **351-*m*** (where m is an integer equal to or larger than 1) to which sound can be input and external cameras **352-1** to **352-*n*** (where n is an integer equal to larger than 1) capable of acquiring imaging data in an imaging range. The input interface **35** is, for example, a USB. The external microphones **351-1** to **351-*m*** and the external cameras **352-1** to **352-*n*** are examples of an input device.

The display device **36** is capable of displaying various screens under control of the processor **31**. For example, the display device **36** is a liquid crystal display or an EL display.

The speaker **37** is a device capable of outputting sound under control of the second information processing device **3**.

The input device **38** is a device capable of receiving data or an instruction to the second information processing device **3**. For example, the input device **38** can be a built-in

microphone **381** to which sound can be input or a built-in camera **382** capable of acquiring imaging data in an imaging range. The input device **38** may be or include a keyboard, a touch panel or the like.

[Operation Example]

A procedure of processing by the Web conference system **100** is explained.

In the following explanation in which processing, functions, or operations of the server **1** are being described, "server **1**" may be read as "processor **11**". Similarly, in explanation in which processing, functions, or operations of the first information processing device **2** is being described, "first information processing device **2**" may be read as "processor **21**". Likewise for the second information processing device **3**, "second information processing device **3**" may be read as "processor **31**".

In the example explained below, the users of the first information processing device **2** and the second information processing device **3** are to participate in a Web conference. The users of the first information processing device **2** and the second information processing device **3** log in to the Web conference and select input devices to be used. The user of the first information processing device **2** selects an input device and performs an operation check for the selected input device. In this case, the second information processing device **3** receives multimedia data input by the user of the first information processing device **2** and in turn outputs the received multimedia data.

The processing procedure explained below is only one example, various processing may be changed or altered in other examples.

FIG. **2** is a flowchart illustrating information processing by the first information processing device **2** according to the first embodiment.

The processor **21** detects selection of an input device based on an operation of the user of the first information processing device **2** (ACT **1**). In ACT **1**, the processor **21** detects the input device selected by the user.

The mode changing unit **212** changes the operation mode to the check mode based on the operation of the user of the first information processing device **2** (ACT **2**). In ACT **2**, the mode changing unit **212** starts the check mode in response to the selected input device being detected by the processor **21**. The mode changing unit **212** outputs a check mode start instruction for starting the check mode to the server **1**. The changing the operation mode to the check mode includes starting the check mode. The mode changing unit **212** may change the operation mode to the check mode in response to a direct instruction for changing the operation mode to the check mode input by the user. In this case, the server **1** outputs the check mode start instruction to the second information processing device **3** in response to receiving the check mode start instruction.

The first acquiring unit **210** acquires first multimedia data from the input device selected by the user of the first information processing device **2** (ACT **3**). In ACT **3**, the first acquiring unit **210** acquires the first multimedia data.

The output unit **213** outputs, via the server **1**, the first multimedia data that has been acquired by the first acquiring unit **210** to the second information processing device **3** (ACT **4**). In ACT **4**, the output unit **213** outputs the first multimedia data to the server **1**.

The server **1** outputs the first multimedia data received from output unit **213** to the second information processing device **3**. The second information processing device **3** thus acquires the first multimedia data. The second information processing device **3** outputs second multimedia data corresponding to the first multimedia data via a selected output device. The second information processing device **3** also transmits the second multimedia data to the server **1**.

In the check mode, the second acquiring unit **211** acquires the second multimedia data from the second information processing device **3** via the server **1** (ACT **5**). In ACT **5**, the second acquiring unit **211** acquires the second multimedia data from the server **1**. The second acquiring unit **211** may save the second multimedia data in the auxiliary storage device **23**.

The output control unit **214** causes the output device to output the second multimedia data that has been acquired by the second acquiring unit **211** (ACT **6**). In an example, the output control unit **214** causes the output device to output just the second multimedia data acquired by the second acquiring unit **211**. In another example, the output control unit **214** causes the output device to output both the first multimedia data and the second multimedia data. The output control unit **214** causes the output device to output the first multimedia data (acquired by the first acquiring unit **210** and/or the second multimedia data (acquired by the second acquiring unit **211**). The output control unit **214** may cause the output device to simultaneously output the first multimedia data and the second multimedia data. If the first multimedia data includes sound data, the output control unit **214** may cause the output device to output the second multimedia data at a delay of a predetermined length of time.

The output control unit **214** causes the output device to output, based on the second multimedia data, a selection notification prompting the user to instruct whether to use the input device previously selected by the user (ACT **7**). In an example, the output control unit **214** causes the display device **26** to output the selection notification based on the second multimedia data acquired by the second acquiring unit **211**. In another example, the output control unit **214** causes the display device **26** to output the selection notification based on both the first multimedia data and the second multimedia data. In some examples, the output control unit **214** may cause the speaker **27** to output the selection notification as sound or voice data.

The processor **21** determines, based on the input operation (selection) of the user, whether the selected input device has been changed (ACT **8**). In ACT **8**, the processor **21** acquires the selection instruction made by the user.

If the selected input device is changed (YES in ACT **8**), the processing returns from ACT **8** to ACT **3**. In ACT **3**, the first acquiring unit **210** acquires the first multimedia data received from the newly selected input device.

If the selected input device is not changed (NO in ACT **8**), the processing proceeds from ACT **8** to ACT **9**.

The mode changing unit **212** then ends the check mode (ACT **9**). In ACT **9**, for example, the mode changing unit **212** changes the operation mode from the check mode to a normal mode. The normal mode is an operation mode for executing a Web conference. The mode changing unit **212** also outputs a check mode end instruction to the second information processing device **3** via the server **1**.

In some examples, ACT **7** may be omitted. That is, the output control unit **214** may not cause the output device to output the selection notification. In this case, the processor **21** in ACT **8** could just detect if a new/different input device is selected by the user to determine whether the previously selected input device has been changed. The other processing might be substantially unchanged.

FIG. **3** is a flowchart illustrating information processing by the second information processing device **3** according to the first embodiment.

The processing explained below is executed based on the operation mode of the first information processing device **2** being changed to the check mode.

The processor **31** starts a check mode (ACT **11**). In ACT **11**, the processor **31** acquires a check mode start instruction from the first information processing device **2** via the server **1**. That is, processor **31** acquires the check mode start instruction from the server **1** rather than directly from the first information processing device **2**.

The processor **31** acquires, via the server **1**, the first multimedia data output from the first information processing device **2** (ACT **12**). The processor **31** may save the first multimedia data in the auxiliary storage device **33** at this point.

The processor **31** generates the second multimedia data from the acquired first multimedia data and outputs the generated second multimedia data to an output device (ACT **13**). The output device can be one or both of the display device **36** or the speaker **37**. In ACT **13**, the second multimedia data is obtained by processing the first multimedia data for supply to the output device.

The processor **31** next outputs the second multimedia data to the first information processing device **2** via the server **1** (ACT **14**). The server **1** then outputs the second multimedia data to the first information processing device **2**.

The processor **31** ends the check mode in response to a check mode end instruction from the first information processing device **2** (ACT **15**). In ACT **15**, for example, the processor **31** acquires the check mode end instruction via the server **1**.

FIG. **4** is a flowchart illustrating information processing by the server **1** according to the first embodiment.

The processing explained below is executed based on the operation mode of the first information processing device **2** being changed to the check mode.

The processor **11** starts the check mode (ACT **21**). In ACT **21**, for example, the processor **11** acquires a check mode start instruction from the first information processing device **2**. The processor **11** in turn outputs the check mode start instruction to the second information processing device **3**.

The first acquiring unit **110** acquires first multimedia data from a selected input device in the first information processing device **2** (ACT **22**).

The first output unit **112** outputs the first multimedia data (acquired by the first acquiring unit **110**) to the second information processing device **3** (ACT **23**).

The second acquiring unit **111** acquires second multimedia data corresponding to the first multimedia data from the second information processing device **3** (ACT **24**).

The second output unit **113** outputs the second multimedia data (acquired by the second acquiring unit **111**) to the first information processing device **2** (ACT **25**).

The processor **11** ends the check mode (ACT **26**). In ACT **26**, for example, the processor **11** acquires a check mode end instruction from the first information processing device **2**. The processor **11** changes from the check mode to the normal mode in response to the check mode end instruction.

[Effects]

The first information processing device **2** used in the Web conference system **100** according to the first embodiment can acquire the first multimedia data via an input device, output the first multimedia data to another information processing device, acquire the second multimedia data corresponding to the first multimedia data from the other information processing device, and cause an output device to output the second multimedia data.

For example, the first information processing device **2** can output to an output device of the first information processing device **2**, multimedia data output from another information processing device in response to receiving of the multimedia data from the first information processing device **2**. Consequently, the user of the first information processing device **2** can check how the first multimedia data is being output by the other information processing device. For example, the first multimedia data could be deteriorated by the influence of the network connection in the transmission of data from the first information processing device **2** to the second information processing device **3**. In this way, the first information processing device **2** can realize a smoother electronic conference by permitting the user of the first information processing device to confirm transmitted data is being output appropriately at the destination.

The first information processing device **2** according to the first embodiment can cause the output device to output, based on the second multimedia data, a selection notification prompting the user to select which input device to use. Further, the first information processing device **2** can cause the output device to output the first multimedia data and the second multimedia data and cause the output device to output, based on the first multimedia data and the second multimedia data, a selection notification prompting the user to instruct which the input device is to be used. Consequently, the user of the first information processing device **2** can select which input device to use based on the returned second multimedia data. The user of the first information processing device **2** can select an input device based on the comparison between the first multimedia data (transmitted data) and the second multimedia data (returned data). Accordingly, the first information processing device **2** can prompt the user to select an appropriate input device based on the second multimedia data from the transmission destination (other user's device) and realize a smoother electronic conference.

The first information processing device **2** according to the first embodiment can change the operation mode to the check mode based on operation of the user and acquire the second multimedia data in the check mode. In some examples, the first information processing device **2** can end the check mode in response a user selection of an input device being selected by the user. In some examples, the first information processing device **2** acquires the second multimedia data only when the operation mode is changed to the check mode (from a normal mode or the like). Accordingly, the first information processing device **2** can realize a smoother electronic conference while reducing a processing load since the additional check processing occurs only outside the normal mode.

[Modifications]

The first information processing device **2** and the second information processing device **3** described above include a plurality of microphones and a plurality of cameras but are not limited to this. The first information processing device **2** and the second information processing device **3** may include just one microphone or just one camera.

The information processing device according to the first embodiment explained above can be configured as follows:

[1] An information processing device for use in a Web conference system, the information processing device including:

a first acquiring unit configured to acquire first multimedia data based on an input via an input device;

an output unit configured to output the first multimedia data acquired by the first acquiring unit to another information processing device different from the information processing device;

a second acquiring unit configured to acquire, from the other information processing device, second multimedia data corresponding to the first multimedia data; and

an output control unit configured to cause the output unit to output the second multimedia data acquired by the second acquiring unit.

[2] The information processing device described in [1], wherein the output control unit causes the output unit to output a selection notification for a user to instruct whether to use the input device after the second multimedia data is received/acquired.

[3] The information processing device described in [1], wherein

the output control unit causes the output unit to output both the first multimedia data and the second multimedia data, and

the output control unit causes the output unit to output a selection notification for a user to instruct whether to use the input device.

[4] The information processing device described in [2] or [3], further including a mode changing unit configured to change an operation mode to a check mode, wherein

the second acquiring unit acquires the second multimedia data only in the check mode.

[5] The information processing device described in [4], wherein the mode changing unit ends the check mode after the input device is selected by the user.

[6] An information processing program for causing a computer to execute:

a first acquiring function for acquiring first multimedia data based on an input via an input device of an information processing device used in a Web conference system;

an output function for outputting the first multimedia data acquired by the first acquiring function to another information processing device different from the information processing device;

a second acquiring function for acquiring, from the other information processing device, second multimedia data corresponding to the first multimedia data; and

an output control function for causing the output function to output the second multimedia data acquired by the second acquiring function.

Second Embodiment

In description of the second embodiment, differences from the first embodiment are primarily explained. In the accompanying drawings, aspects that are substantially the same as those of the first embodiment have the same reference symbols. Explanation of such repeated components may be omitted.

[Configuration Examples]

FIG. **5** is a block diagram illustrating a Web conference system according to the second embodiment.

The Web conference system **101** includes a server **1**, a first information processing device **2**, and a second information processing device **3**. The server **1**, the first information processing device **2**, and the second information processing device **3** are communicably connected to one another via a network. Additional information processing devices may be connected to the network and incorporated in the Web conference system **101** in some examples

The configuration of the server **1** can be the same as in the first embodiment.

The first information processing device **2** in this second embodiment includes a processor **21**, a main memory **22**, an auxiliary storage device **23**, a communication interface **24**, an input interface **25**, a display device **26**, a speaker **27**, and an input device **28** as in the first embodiment.

In general, the processor **21**, the main memory **22**, the auxiliary storage device **23**, the communication interface **24**, the input interface **25**, the display device **26**, the speaker **27**, and the input device **28** can have the same configuration in the first embodiment.

The auxiliary storage device **23** in the second embodiment can be used to save sound data (e.g., data corresponding to a tone signal) having a specific frequency. In this context, the specific frequency can be a frequency inaudible (or substantially so) to an expected or standard user (e.g., outside the audible range of human hearing). However, in some examples, the specific frequency may be within a range in which younger user might typically be able to distinguish though older users mostly can not. The sound data having a specific frequency can be, for example, a waveform such as a rectangular wave, a saw tooth wave, a triangular wave, or a sinewave such as illustrated in FIGS. **6**A to **6**D, respectively. In an example, the specific frequency of the sound data is outside the human audible region. The human audible region is considered to be about 20 Hz to 20 kHz. In some examples, the specific frequency may be within the human audible region but near the upper limit or the lower limit. The specific frequency may be at or lower than a processable sampling rate of the first information processing device **2**. For example, the sampling rate may be 48 kHz. In a particular example, the sound data with the specific frequency is a sine wave or a rectangular wave at a frequency of 20 kHz. In some examples, different frequencies or waveform types may be mixed or otherwise incorporated in the sound data (tone signal).

The processor **21** in the second embodiment provides a tone-output control unit **220**, a first acquiring unit **221**, a second acquiring unit **222**, a mode changing unit **223**, an output unit **224**, a comparing unit **225**, and a display control unit **226**. These units (and corresponding functions thereof) provided by the processor **21** can also be referred to as functions of the processor **21**. These units/functions can also be considered to be provided by a control unit (or controller) including the processor **21** and the main memory **22**.

The tone-output control unit **220** controls an output of predetermined tone or sound via the speaker **27**. The tone-output control unit **220** acquires the sound data to be output from the auxiliary storage device **23**. The tone-output control unit **220** causes the speaker **27** to output a predetermined tone based on the stored sound data having the specific frequency.

The first acquiring unit **221** acquires first sound data including the predetermined tone via a microphone that has been selected by the user of the first information processing device **2**. The microphone can be the built-in microphone **281** or one of the external microphones **251-1** to **251-*mi***. The first sound data is the sound data received by the selected microphone. The sound received by this microphone includes predetermined tone that is output by the speaker **27**. The sound received by the microphone can also include the voice of user of the first information processing device **2**. The sound data corresponding to the predetermined tone is, for example, obtained by A/D-converting the predetermined tone when output via the speaker **27**. The sound data corresponding to the predetermined tone will have a par-

ticular frequency, even if other sounds (e.g., user speech/voice sounds) are also present in the microphone input. The first acquiring unit **221** may save the first sound data in the auxiliary storage device **23**.

The second acquiring unit **222** acquires, via the server **1**, second sound data from the second information processing device **3**. The second sound data corresponds to the first sound data as output by the second information processing device **3**. The second acquiring unit **222** may save the second sound data in the auxiliary storage device **23**.

The mode changing unit **223** changes the operation mode to the check mode based on an operation of the user of the first information processing device **2**. The mode changing unit **223** may change the operation mode to the check mode in response to a specific instruction to change the operation mode to the check mode from the user. The mode changing unit **223** ends the check mode in response to an input device being selected for use by the user of the first information processing device **2**.

The output unit **224** outputs, via the server **1**, the first sound data acquired by the first acquiring unit **221** to the second information processing device **3**.

The comparing unit **225** compares the first sound data and the second sound data. The comparing unit **225** acquires, for example, the first sound data from the auxiliary storage device **23**. The comparing unit **225** may also acquire the second sound data from the auxiliary storage device **23** rather than from the server **1** or otherwise. The comparing unit **225** determines whether the second sound data sufficiently coincides (matches) with the first sound data. The comparing unit **225** may detect, for example, whether the second sound data includes the specific frequency tone that has been included in the first sound data. When the second sound data includes the data corresponding to specific frequency tone, the comparing unit **225** decides that the second sound data coincides with the first sound data. If the second sound data does not include the specific frequency tone, the comparing unit **225** decides that the second sound data does not coincide with the first sound data.

In another example, the comparing unit **225** may determine a match based on a ratio of the temporal length of the data having the specific frequency (tone length) included in the second sound data to the temporal length of the predetermined tone included in the first sound data (also referred to as a "tone length ratio"). A case may occur that the specific frequency tone temporarily or intermittently drops out of the second sound data because of a transient situation of the second information processing device **3** or the network. In this case, if the tone length ratio is 100%, the comparing unit **225** may determine that the second sound data coincides with the first sound data. However, if the tone length ratio is not 100%, the comparing unit **225** may determine that the second sound data does not coincide with the first sound data.

In still another example, the comparing unit **225** may determine in a stepwise or incremental manner, the degree of coincidence between the second sound data and the first sound data based on the tone length ratio. Thus, for example, if the tone length ratio is 90% or higher, the comparing unit **225** might determine the coincidence degree as "excellent" but if the tone length ratio is between 50% and 90%, the comparing unit **225** may determine the coincidence degree as "good". If the tone length ratio is lower than 50%, the comparing unit **225** may determine the coincidence degree as "bad". Stages of the coincidence degree are not limited to three stages of "excellent", "good", and "bad" and may be any number of stages. The comparing unit **225** may, for example, determine the coincidence degree as a numerical value such as "100%" or "50%".

The display control unit **226** displays a comparison result provided by the comparing unit **225** on the display device **26**. The display control device **226** may display, on the display device **26**, a notification indicating that the second sound data coincides with the first sound data or a notification indicating that the second sound data does not coincide with the first sound data. A notification indicating that the second sound data coincides or not with the first sound data may be referred to as a coincidence notification. A notification indicating that the second sound data does not coincide with the first sound data may be referred to as a noncoincidence notification. The display control unit **226** may display, on the display device **26**, a notification indicating a coincidence degree for the second sound data and the first sound data. A notification indicating the coincidence degree may be referred to as a coincidence degree notification. When the second sound data does not coincide with the first sound data, the display control unit **226** may display, on the display device **26**, a notification indicating that the second sound data does not coincide with the first sound data. The display control unit **226** may display such a notification on the display device **26** if the second sound data does not coincide with the first sound data or if the coincidence degree is low. The display control unit **226** may display coincidence notifications and noncoincidence notifications in different display forms, formats, or the like such that different types of notifications may be readily distinguishable. The display control unit **226** may display coincidence degree notifications in a different display forms or formats according to the value of the coincidence degree. Possible display form and format types include text decoration such as a character color, a size, a font type, text emphasis (e.g., outlining, underlining, bold, italics, etc.), display brightness, a display background color, display background brightness, display background pattern, a message frame color, text flashing, and the like. The display control unit **226** may display coincidence notifications, noncoincidence notifications, and coincidence degree notifications as a popup notification. The display of notifications may be adjusted based on setting by the user.

The second information processing device **3** is substantially the same as in the first embodiment.

[Operation Example]

A procedure of processing by the Web conference system **101** is explained.

In the following explanation in which processing, functions, or operations of the server **1** are being described, "server **1**" may be read as "processor **11**". Similarly, in explanation in which processing, functions, or operations of the first information processing device **2** is being described, "first information processing device **2**" may be read as "processor **21**". Likewise for the second information processing device **3**, "second information processing device **3**" may be read as "processor **31**".

In the example explained below, the users of the first information processing device **2** and the second information processing device **3** are to participate in a Web conference. After users of the first information processing device **2** and the second information processing device **3** log in to the Web conference, they select input devices (e.g., microphones, cameras, etc.) to be used in the Web conference.

In the present example, the user of the first information processing device **2** selects the microphone **281** as the input device and then performs an operation check on the microphone **281**. In this case, the second information processing

device **3** receives, via the server **1**, sound data input to the microphone **281** of the first information processing device **3**. The second information processing device **3** then outputs sound from its speaker device or the like corresponding to the sound data received via the server **1** from the first information processing device **2**.

FIG. **7** is a flowchart illustrating information processing by the first information processing device **2** according to the second embodiment.

The mode changing unit **223** changes the operation mode to the check mode based on an operation of the user of the first information processing device **2** (ACT **31**). The operation is, for example, selecting the microphone **281**. The operation may be a specific instruction from the user for shifting to the check mode. In ACT **31**, for example, the mode changing unit **223** starts the check mode in response to a selection of the microphone **281** being detected by the processor **21**. The mode changing unit **223** outputs a check mode start instruction for starting the check mode to the server **1**. The server **1** then outputs the check mode start instruction to the second information processing device **3** in response to receiving the check mode start instruction from the first information processing device **2**.

The tone-output control unit **220** controls an output of a predetermined tone from the speaker **27** (ACT **32**). In ACT **32**, for example, the tone-output control unit **220** acquires sound data having a specific frequency from the auxiliary storage device **23**. The sound data may have a preset frequency or a frequency set by the user. The tone-output control unit **220** may acquire sound data having a mix of frequencies from the auxiliary storage device **23**. The tone-output control unit **220** D/A-converts the acquired sound data and causes the speaker **27** to output the predetermined tone.

The first acquiring unit **221** acquires, via the microphone **281**, first sound data including the predetermined tone (ACT **33**). In ACT **33**, for example, the first acquiring unit **221** A/D-converts sound input to the microphone **281**. If the predetermined tone output from the speaker **27** is received by the microphone **281**, the first acquiring unit **221** A/D-converts the predetermined tone as input to the microphone **281**. The first acquiring unit **221** thus acquires, as the first sound data, sound data including the predetermined tone. If the voice of the user or other sound is input to the microphone **281**, the first acquiring unit **221** also A/D-converts these sounds. The first acquiring unit **221** saves the first sound data in the auxiliary storage device **23**.

The output unit **224** outputs, via the server **1**, the acquired first sound data to the second information processing device **3** (ACT **34**).

The server **1** then outputs the first sound data to the second information processing device **3**. The second information processing device **3** thus acquires the first sound data. The second information processing device **3** performs control to output sound corresponding to the first sound data from the speaker **37**. The second sound data is the data prepared by the second information processing device **3** for output by the speaker **37** based on the receiving of the first sound data from the server **1**. The second information processing device **3** outputs the prepared second sound data to the server **1**. The server **1** then outputs this second sound data to the first information processing device **2**.

The second acquiring unit **222** acquires, via the server **1**, the second sound data from the second information processing device **3** (ACT **35**). The second acquiring unit **222** may save the second sound data in the auxiliary storage device **23**.

The comparing unit **225** then compares the first sound data and the second voice data (ACT **36**). In ACT **36**, for example, the comparing unit **225** acquires both the first sound data and the second voice data from the auxiliary storage device **23**. The comparing unit **225** then determines whether the second sound data coincides with the first sound data. The comparing unit **225** may determine a coincidence degree based on a tone length ratio or other comparative measure for coincidence between the first and second sound data.

The display control unit **226** displays a comparison result from the comparing unit **225** on the display device **26** (ACT **37**). In ACT **37**, for example, the display control unit **226** displays a notification indicating the comparison result on the display device **26**. The notification indicating the comparison result can be, for example, a coincidence notification, a noncoincidence notification, or a coincidence degree notification. The display control unit **226** may change notification display forms and formats according to the comparison result.

The mode changing unit **223** ends the check mode in response to the microphone **281** being selected for use by the user of the first information processing device **2** (ACT **38**). The mode changing unit **223** changes the operation mode from the check mode to the normal mode. The mode changing unit **223** outputs a check mode end instruction to the second information processing device **3** via the server **1**.

In some examples, the mode changing unit **223** may change the operation mode to the check mode without specific instruction from the user of the first information processing device **2**. For example, the mode changing unit **223** may periodically repeat the check mode. Such a check repeat interval may be set by the user or preset. In this case, the processor **21** repeats the processing in ACT **32** to ACT **37** at intervals. The mode changing unit **223** may also change the operation mode from the check mode to the normal mode in response to an instruction (e.g., an override instruction) from the user of the first information processing device **2**. The mode changing unit **223** may also end the check mode based on an elapse of time (a timing out period) as set by the user or otherwise. The mode changing unit **223** may also immediately end the check mode once it is determined the first sound data and the second sound data sufficiently coincide over a predetermined period.

Information processing by the second information processing device **3** is the same as in the first embodiment, however, in the second embodiment, "multimedia data" as related to the described processing in ACT **11** to ACT **15** for the first embodiment can be considered to be sound data alone.

Information processing by the server **1** is the same in the first embodiment, however, in the second embodiment "multimedia data" as related to the described processing in ACT **21** to ACT **26** for the first embodiment can be considered to be sound data alone.

[Effects]

The first information processing device **2** used in the Web conference system **101** according to the second embodiment can cause the output of a predetermined tone via a local speaker. The first information processing device **2** can acquire, via a local microphone, first sound data including the predetermined tone. The first information processing device **2** can then output the acquired first sound data to another information processing device. The first information processing device **2** can then acquire second sound data (corresponding to the first sound data as output by the other information processing device) from the other information

processing device. The first information processing device **2** can compare the first sound data to the acquired second sound data. The first information processing device **2** can then display a comparison result on a local display device. Accordingly, the first information processing device **2** can check whether sound data output by the first information processing device matches the sound data output at the other information processing device (e.g., second information processing device **3**). Consequently, the user of the first information processing device **2** can check whether the first sound data is being correctly output by another information processing device. For example, the first sound data could be deteriorated by the influence of the network in transmission from the first information processing device **2** to the second information processing device **3**, and the user of the first information processing device **2** can check whether sound appropriately reaches the other party (device) by comparison of the first and second sound data. Since the first information processing device **2** can cause the output of the predetermined tone via the local speaker **27** (or the like) without actually requiring the user of the first information processing device **2** to speak, it can be checked whether sound can reach the other party at the start of a conference. In this way, the first information processing device **2** can realize a smoother electronic conference experience.

The first information processing device **2** according to the second embodiment can output a tone or the like of a specific frequency. Consequently, since the first information processing device **2** sets the frequency of the tone in the sound data, the first information processing device **2** can more easily compare the first sound data and the second sound data.

The tone or the like output by the local speaker of the first information processing device **2** may have a frequency equal to or lower than the sampling rate of the microphone data of the first information processing device **2**. If a sampling rate, which is a period for capturing sound data, is too much lower than a frequency of the sound data being output, the sound data cannot be accurately captured. However, if the sampling rate is higher than the frequency of the sound data, the sound data can be accurately captured. Accordingly, by using sound data (a tone) having a frequency at or lower than a sampling rate, the first information processing device **2** can more accurately capture the sound data.

The first information processing device **2** according to the second embodiment can output sound at a frequency outside a human audible region. Consequently, the first information processing device **2** can compare the first voice data and the second voice data using a sound (tone) that is inaudible to the user of the first information processing device **2** and other participants in the Web conference. Accordingly, sound checks can be performed without hindering an ongoing Web conference. In this way, the first information processing device **2** can provide a smoother electronic conference experience for participants.

[Modifications]

The first information processing device **2** and the second information processing device **3** are explained above as including a plurality of microphones and a plurality of cameras but are not limited to this. The first information processing device **2** and the second information processing device **3** may include just one microphone or camera.

Other Embodiments

An information processing device used in an embodiment may be realized by distributed or cloud-based components.

A program for providing described functionality and configuration of a processor or control unit may be transferred to an end user by being stored in an information processing device or may be transferred by subsequent download, installation, or the like to the information processing device. Such a program may be transferred via a network or recorded in a non-transitory, computer-readable recording medium such as a CD-ROM, a memory card, or the like.

While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the disclosure. Indeed, the novel embodiments described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the embodiments described herein may be made without departing from the spirit of the disclosure. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the disclosure.

What is claimed is:

1. An information processing device for a conference system, the device comprising:

a speaker to output sound;

a microphone to receive sound; and

a processor configured to:

control the speaker to output a predetermined tone;

acquire first sound data from the microphone while the speaker is being controlled to output the predetermined tone;

send the first sound data to another information processing device;

acquire second sound data received from the other information processing device, the second sound data corresponding to the first sound data as output by the other information processing device;

compare the first sound data and the received second sound data; and

cause a notification to be output, the notification indicating a result of the comparison between the first and second sound data, wherein

the comparison between the first and second sound data includes a calculation of a tone length ratio based on the length of the predetermined tone in the second sound data to the length of the predetermined tone in the first sound data.

2. The information processing device according to claim **1**, wherein the output of the notification includes causing a display to display the result of the comparison between the first and second sound data.

3. The information processing device according to claim **1**, wherein the predetermined tone includes a sound at a frequency that is outside a human audible range.

4. The information processing device according to claim **1**, wherein the frequency of the predetermined tone is less than a sampling rate of the processor for sound data received by the microphone.

5. The information processing device according to claim **1**, wherein the frequency of the predetermined tone is greater than a sampling rate of the processor for sound data received by the microphone.

6. The information processing device according to claim **1**, further comprising:

a camera to acquire images, wherein

the processor is further configured to cause image data from the camera to be sent the other information processing device.

7. The information processing device according to claim 1, further comprising:

a communication interface for connecting to a server via a network connection, wherein

the other information processing device is also connected to the server.

8. The information processing device according to claim 1, wherein the processor is configured to cause the predetermined tone to be output only when in a check mode.

9. The information processing device according to claim 8, wherein the processor enters the check mode upon receipt of an instruction from a user made via an input device during a conference.

10. The information processing device according to claim 8, wherein the processor enters the check mode at fixed time intervals during a conference.

11. The information processing device according to claim 8, wherein the processor exits the check mode upon a user selecting the microphone to be used during a conference.

12. A web conference system, comprising:

a server connected to a network;

a plurality of information processing devices connected to the server via network, at least one of the plurality of information processing devices being an information processing device according to claim 1.

13. An information processing method for web conference systems, the method comprising:

controlling of a speaker of an information processing device to output a predetermined tone;

acquiring first sound data from a microphone of the information processing device while the speaker is outputting the predetermined tone;

sending the first sound data to another information processing device via a network;

receiving second sound data from the other information processing device, the second sound data corresponding to the first sound data as output by the other information processing device;

comparing the first sound data and the received second sound data; and

outputting a notification indicating a result of the comparison between the first and second sound data, wherein

the comparing of the first and second sound data includes a calculation of a tone length ratio based on the length of the predetermined tone in the second sound data to the length of the predetermined tone in the first sound data.

14. The information processing method according to claim 13, wherein the predetermined tone is at a frequency outside a normal human audible range.

15. The information processing method according to claim 13, wherein the outputting of the notification includes causing a display to display the result of the comparison between the first and second sound data.

16. The information processing method according to claim 13, wherein the predetermined tone is output only when the information processing device is in a check mode.

17. The information processing method according to claim 16, wherein the information processing device enters the check mode upon receipt of an instruction from a user made via an input device during a conference.

18. The information processing method according to claim 16, wherein the information processing device enters the check mode at fixed time intervals during a conference.

19. The information processing method according to claim 16, wherein the information processing device exits the check mode upon a user selecting the microphone to be used during a conference.

20. The information processing method according to claim 13, wherein the predetermined tone is generated by one of a rectangular wave, a saw tooth wave, or a triangular wave.

* * * * *