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(54) **APPARATUS FOR MEANS OF TRANSPORT FOR REPORTING SAFETY OBSERVATION**

(57) An apparatus (100) for a means of transport for reporting a safety observation, which apparatus comprises a video recording system (105) for shooting and saving a video. Furthermore, the apparatus comprises a microphone (110) for receiving speech and a storage (133) for saving the speech received by a microphone as an audio recording. The apparatus additionally comprises an op-

erating unit (120) for starting the reporting. In addition, the apparatus comprises a report creation unit (130) which is arranged connectable to said video recording system (105), microphone (110), storage (133) and operating unit (120), and which report creation unit (130) is configured to create a report which comprises a video and an audio recording related to the safety observation.

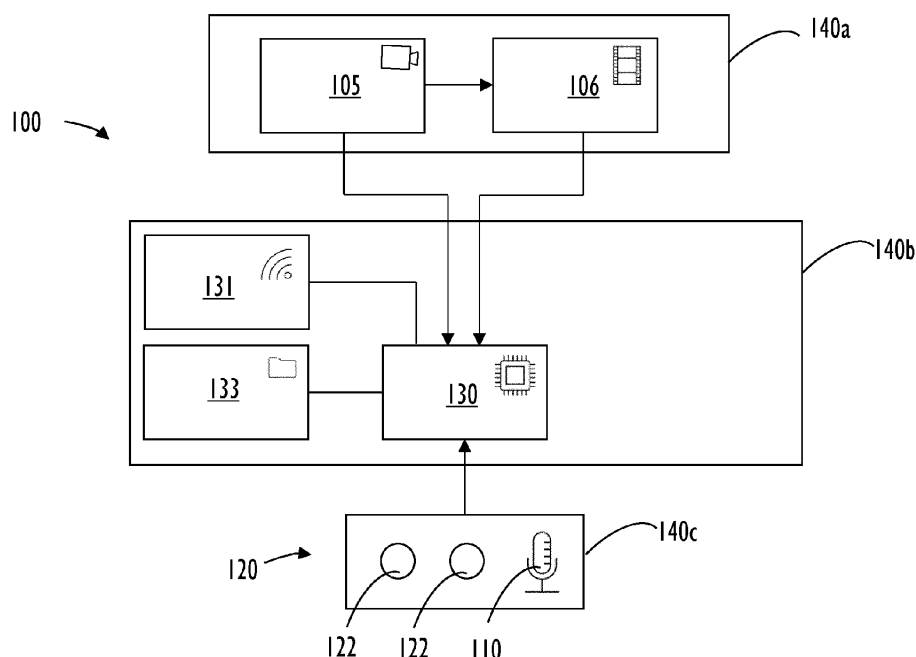


FIG. 1

Description

Background of the invention

[0001] The invention relates to an apparatus intended for a means of transport for reporting a safety observation.

[0002] Safety observations may be made from various accident and near miss situations in the traffic. The safety observations may be compiled into reports which may be used for improving safety. A problem of reporting safety observations is that the safety observations are not always necessarily reported because the solution utilised for reporting is considered very laborious to use.

Brief description of the invention

[0003] The object of the invention is to provide a novel type of an apparatus which may create a report of a safety observation in a means of transport.

[0004] The solution according to the invention is characterised by what is stated in the independent claim.

[0005] In the solution according to the invention, the apparatus includes a video recording system for shooting and saving a video, a microphone for receiving speech, a storage for saving the speech as an audio recording, an operating unit for starting reporting, and a report creation unit. The report creation unit is configured to create a report which comprises the video and the audio recording related to the safety observation.

[0006] An advantage of the solution according to the invention is that it is possible to implement the reporting of the safety observation in real-time without several separate measures by the user, which may promote the reporting of the safety observation. The user may be e.g. a driver of a means of public transport in a tram where the apparatus according to the solution is located.

[0007] Some embodiments of the invention are presented in the dependent claims.

Brief description of the drawings

[0008] The invention will now be described in more detail in connection with preferred embodiments and with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of an apparatus, and
Figure 2 is a schematic view of another apparatus.

[0009] For reasons of clarity, some embodiments of the invention are illustrated in the figures in a simplified form. Similar parts are indicated in the figures by the same reference numbers.

Detailed description of the invention

[0010] Figure 1 is schematic view of an apparatus 100 for reporting safety observations. Figure 2 is schematic

view of another apparatus 100 for reporting safety observations. The apparatus 100 is arranged to be located e.g. to a motor vehicle, such as e.g. a passenger car or a lorry. The apparatus 100 is particularly arranged to be located to a means of public transport, such as e.g. a tram or a train. For example, a driver of a means of public transport may come across a situation, of which, they should make a safety observation, such as e.g. a description of an occurred dangerous situation, a near miss situation etc., but stopping the vehicle would cause a delay in the timetables set for the means of public transport. Then, the creation of a report on the safety observation might be postponed to a time when the driver's shift has already ended. A result of this may be that the safety observation will not be reported at all or its description will remain very insufficient. An advantage of the apparatus 100 according to the solution is that the report on the safety observation may be created and sent possibly already during the drive easily and safely.

[0011] The apparatus 100 of the figures comprises a video recording system 105 for shooting and saving a video. The video recording system 105 comprises a video recorder configured to shoot and save the video. Depending on the purpose of use, the video recorder may be directed e.g. such that the video recorder shoots at least partially the driver's view of the traffic. The video recorder may be located e.g. inside the cab or on the roof of the vehicle for capturing a wider angle of view. The video recorder shoots a video, of which, at least a part may be attached to the report created from the safety observation. For forming a power connection, the video recording system 105 comprises a power source which is not shown in the figures for clarity.

[0012] The apparatus 100 of the figures further comprises an operating unit 120 which is configured to start the reporting of a specific duration or of a settable duration. The operating unit 120 comprises a button 122 for starting the reporting. In the figures, the apparatus 100 comprises two buttons 122 for enhancing ease-of-use, wherein the minimal number of buttons 122 may facilitate the use of the apparatus. There may be a different number of buttons 122 or the start of the reporting may be implemented in other ways than by means of the button 122. When using two buttons 122, the reports may be shared for different use situations e.g. such that one button 122 is for near miss situations and the other button 122 is for emergency situations. The buttons 122 may be distinguished from each other e.g. by colours for enhancing ease-of-use. The buttons 122 may also be large of their size in order for them to be easily seen and easily pressed. The apparatus 100 may create a report of a specific duration, whereby the report is created for a specific time forward from the starting moment. The specific time may be e.g. 30 seconds. Alternatively, the apparatus 100 may create a report of a settable duration, whereby the duration of the report is changeable.

[0013] The apparatus 100 further comprises a microphone 110 for receiving speech. The microphone 110

receives the speech by converting sound vibration created by the speech into a digital format. The operating unit 120 of the apparatus 100 of the figures comprises the microphone 110 but the microphone 110 may alternatively be separate from the operating unit 120. The microphone 110 is configured to receive speech, i.e. audio, for the duration of the reporting. The above-mentioned button 122 thus starts the reporting, whereby the microphone 110 receives audio for a specific duration of reporting or for a settable duration of reporting. The apparatus 100 comprises a storage 133, to which a later described report creating unit 130 is configured to save the speech received by the microphone 110 as an audio recording. Hence, the user may speak out and describe the safety observation, which is formed as an audio recording. The microphone 110 stops the reception of speech after the reporting has ended.

[0014] The apparatus 100 of the figures additionally comprises a report creation unit 130. The report creation unit 130 comprises a computer unit or a microcontroller for its functions. The report creation unit 130 also comprises a power source for supplying power for the functions of the apparatus. The power source is arranged connectable to a system producing electric power in the means of transport such that the apparatus 100 gets the power it requires from the power-producing system in the means of transport. The report creation unit 130 is in connection with said storage 133, to which, programs and other files related to reporting may be stored in addition to the audio recordings. The report creation unit 130 is in connection with said video recording system 105. The report creation unit 130 is in connection with the video recording system 105 e.g. wirelessly, by means of cables or in some other equivalent way. The apparatus 100 may comprise a base station 131 in connection with the report creation unit 130, wherein the base station 131 may form an Internet connection or a connection to the video recording system 105 or some other system. The report creation unit 130 is also in connection with the above-mentioned operating unit 120 and its buttons 122. Additionally, the report creation unit is in connection with the above-mentioned microphone 110 either directly or e.g. by means of the operating unit 120.

[0015] The devices attached to the report creation unit 130 get the power they require from the power source via the report creation unit. Alternatively, the attached devices may have their own power source depending on e.g. the amount of power the device requires.

[0016] The report creation unit 130 of the apparatus 100 of the figures is further controlled by software. The software is stored to said storage 133. By means of the software, video and audio are processed and saved. By means of the software, the report creation unit 130 is configured to create a report, to which is attached a video from the video recording system 105 or via it and to which is attached an audio recording which includes the speech recorded by the microphone 110. Said video and audio recording may be attached to an email attachment by

means of said software. Said software may produce one file of the audio recording and the video. The audio recording and the video are then in the same video file synchronised in relation to each other such that the audio recording is timed on the video appropriately. The audio recording and the video being in the same file possibly facilitates the report processor's work.

[0017] The report creation unit 130 may comprise a system clock which measures time accurately. For the sake of clarity, the system clock is not shown in the figures. The software is configured to synchronise the time measured by the system clock to the coordinated universal time (UTC) by means of an Internet connection formed by e.g. the base station 131. The software is configured to convert the accurately measured time to a specific point in time, that is, date and time. The accurate point of time may be attached by means of the software to the apparatus's functions, audio recordings, videos and location data which will be described later in more detail. Based on the accurate point of time, the date and time related to each audio recording and video may be determined. The audio recording and said video may be synchronised in relation to each other e.g. by means of said accurate point of time.

[0018] The software may also be configured to attach an accurate point of time, i.e. date and time, to the video file in the report, as part of the viewable video e.g. on the top corner of the video. The accurate point of time in the video may be shown e.g. in the format DD.MM.YYYY HH:MM:SS, where DD denotes day, MM denotes month, YYYY denotes year, HH denotes hour, MM denotes minute, and SS denotes second. For clarity, it should be mentioned that the accurate point of time continuously changes all the time corresponding to the point of time of the reporting.

[0019] Said video from the video recording system 105 may be a video recorded at the time of reporting, which the report creation unit 130 has received directly from the video recording system 105. In the embodiment of the figures, the apparatus 100 further comprises a buffering unit 106 in connection with said video recording system 105 and report creation unit 130. The buffering unit 106 is configured to buffer a video of a specific duration from a time period before starting the reporting at least until the start of the reporting. The buffering unit 106 comprises a storage of specific size, where the buffering unit 106 saves video from the video recording system 105. When the buffering unit 106 has saved the video for a specific duration, the buffering unit 106 starts a new cycle saving the video on top of the already saved video starting forward from the oldest point of time in the video. Therefore, the buffering unit 106 continuously contains a specific duration of the newest video.

[0020] Furthermore when a command is given from the operating unit 120 to start the reporting, the buffering unit 106 already contains a specific duration of video saved before the starting of the reporting until the starting of the reporting. The buffering unit 106 also continues

saving during the reporting. Then, the video includes in the same file a specific duration of video before the start of the reporting until the start of the reporting and a video from the duration of the reporting. After the reporting has ended, the report creation unit 130 is configured to receive the video for processing. The report creation unit 130 processes the video to be of a specific duration and adds the above-mentioned audio recording as a part of the video. The video of the specific duration may comprise e.g. 30 seconds of video before the start of the reporting until the start of the reporting and 30 seconds of video forward from the start of the reporting.

[0021] In an alternative embodiment, the report creation unit 130 saves the video saved during the reporting from the video recording system 105 and attaches from the buffering unit 106 the specific duration of the video before the start of the reporting until the start of the reporting as a part of the video saved from the video recording system 105.

[0022] The report creation unit 130 of the apparatus 100 of the figures is configured to create and send a report, in which, the report format may be an email message. The software of the report creation unit 130 attaches the video file to the email message. By means of the Internet connection formed by the base station 131, the report creation unit 130 may send the report, i.e. the email message, forward to be processed. The report format may be alternatively saved and/or sent to some other system, such as e.g. a document management system.

[0023] The apparatus 100 of Figure 2 comprises an accelerometer 132 connected to the report creation unit 130. The accelerometer 132 is configured to measure the acceleration of the means of transport. Acceleration refers to a change in speed in relation to time. Thus, acceleration may also be negative of its size, whereby it may also be called deceleration. The accelerometer 132 measures the acceleration of the apparatus 100, which has a connection with the acceleration of a means of transport when the apparatus 100 is installed in the means of transport. For example, an impact, a sudden braking, a bump caused by a defect on the track when driving a tram, or some other factor causing changes in speed in relation to time may show in the measurement of the accelerometer 132. The accelerometer 132 may be determined with a settable limit value, after reaching which, the report creation unit 130 automatically starts the reporting of a specific duration. An advantage is then that the driver does not need to press the button 122 of the operating unit 120 in an emergency situation, but the driver may focus on performing necessary measures during sudden braking and, depending on the situation, to describe the situation by speech which the microphone 110 receives after the apparatus 100 has started the reporting and which the report creation unit 130 saves to the storage 133 for processing the report.

[0024] The apparatus 100 according to the embodiment of Figure 2 further comprises a horn-use detector 134 which is configured to detect the use of a horn of a

specific duration. The horn-use detector 134 may be e.g. a pressure switch or an audio sensor arranged installable into connection with the horn of the means of transport. The horn-use detector 134 is arranged connectable to the report creation unit 130 e.g. by means of cabling or a wireless connection in order for the detector 134 be installable into connection with the horn of the means of transport in accordance with the purpose. Said report creation unit 130 is configured to start the reporting of a specific duration or the reporting of a settable duration when the horn-use detector 134 detects the use of the horn of at least the specific duration. An advantage is then that the driver does not need to press the button 122 of the operating unit 120 in an emergency situation, but the driver may focus on performing necessary measures during the use of the horn and/or after it and possibly on describing the situation by speech which the microphone 110 receives after the apparatus 100 has started the reporting and which the report creation unit 130 saves in the storage 133 for processing the report.

[0025] The apparatus 100 according to the embodiment of Figure 2 further comprises a location determination unit 136 which is configured to save the location data of the apparatus from a specific point in time of the reporting moment. The location determination unit 136 is in connection with the report creation unit 130. By means of software, said report creation unit 130 is configured to attach the location data related to the safety observation to the report. The location data may be e.g. a single point in a map, wherein the point in the map is the location of the apparatus at the time of the start of the reporting, the end of the reporting or some other specified moment. Alternatively, the location data may be e.g. a line, i.e. a route, on the map formed by the location determination unit 136. The location determination unit 136 comprises a GPS system or some other equivalent system, by means of which, the location data and the accurate point in time possibly attached to it may be formed on a map base. The location data and said accurate point of time may be added e.g. as a separate attachment to the report formed as an email. If the location data is considered as a line, the different points in the line may be considered as single points, to each of which point, an accurate point of time is related. The points in the lines being considered are thus the locations of the apparatus in said points in different points of time.

[0026] Receivers of the report may process the location data e.g. by means of a separate system where location data are collected on one map base in said system. The location data may also be shown on the map base in a desired period of time, which may facilitate the processing of the reports. An advantage in the location data is that e.g. defects on the track may be easily located by means of the location data.

[0027] The apparatus 100 is divided into one or more enclosures. In the embodiment of the figures, the apparatus 100 comprises an enclosure 140a for the video recording system 105 and the buffering unit 106, an enco-

sure 140b for at least the report creation unit 130, the storage 133 and the base station 131, and possibly additionally for the accelerometer 132, the horn-use detector 134 and the location determination unit 136, and an enclosure 140c for the buttons 122 and the microphone 110. It is also possible to divide the devices to one or more enclosures in some other way. For example, the buffering unit 106 may in another embodiment be in the enclosure 140b. The apparatus 100 is divided into different enclosures in order to be able to locate the video recorder at a desired view angle and the operating unit within the user's reach and to be able to find a suitable location for the rest of the apparatus in the means of transport.

[0028] It was mentioned above that the apparatus 100 comprises the video recording system 105. In an embodiment, the report creation unit 130 of the apparatus 100 is also arranged connectable to other video recording systems. This other video recording system may be e.g. a system readily installed in the means of public transport from which the report creation unit 130 receives a video for creating the report.

[0029] In an embodiment, the apparatus 100 additionally comprises a reserve power source which may be e.g. a battery. For the sake of simplicity, the figures show no reserve power source. The reserve power source is connected to the power source of the report creation unit 130 and/or the video recording system 105 for forming power for the functions of the apparatus. The power source comprises a device for charging the reserve power source and a device for dividing the power received from the reserve power source for the functions of the apparatus. The reserve power source may be necessary in e.g. situation where the power source is not temporarily in a power connection with e.g. a means of transport.

[0030] It was mentioned above that the apparatus comprises the storage 133. In more detail, the storage may be e.g. a memory card, a memory stick or a hard disk. The storage 133 may be disconnected from the apparatus. A memory card may be used e.g. in accident investigation, wherein an accident has happened during the drive of the means of transport but no report has been sent from the incident. Then, data found on the memory card, such as e.g. video, audio, location data, and points of time related to them may be used in the accident investigation.

[0031] Those skilled in the art will find it obvious that, as technology advances, the basic idea of the invention may be implemented in many different ways. The invention and its embodiments are thus not restricted to the above-described examples but may vary within the scope of the claims.

Claims

1. Apparatus (100) for a means of transport for reporting a safety observation, **characterised in that** the

apparatus (100) comprises:

a video recording system (105) for shooting and saving a video,
a microphone (110) for receiving speech and a storage (133) for saving the speech received by the microphone as an audio recording,
an operating unit (120) for starting the reporting,
a report creation unit (130) which is arranged connectable to said video recording system (105), microphone (110), storage (133) and operating unit (120), and which report creation unit (130) is configured to create a report which comprises a video and an audio recording related to the safety observation.

2. An apparatus (100) according to claim 1, **characterised in that** the apparatus (100) comprises:

a buffering unit (106) which is configured to buffer a video of a specific duration from a time period before starting the reporting at least until the start of the reporting from the video recording system (105), and that
the report creation unit (130) is configured to create a report where the video related to the safety observation comprises a video of a specified duration forward from the start of the reporting and a video of a specified duration from a period before the start of the reporting until the start of the reporting.

3. An apparatus (100) according to claim 1 or 2, **characterised in that** the report creation unit (130) is configured to create a report on the safety observation, which comprises a video and an audio recording in the same file.

4. An apparatus (100) according to any one of claims 1-3, **characterised in that** the apparatus (100) further comprises

an accelerometer (132) which is in connection with the report creation unit 130, and that
said report creation unit (130) is configured to start the reporting of a specific duration or the reporting of a settable duration when acceleration measured by the accelerometer (132) reaches a settable limit value.

5. An apparatus (100) according to any one of claims 1-4, **characterised in that** the apparatus (100) further comprises

a horn-use detector (134) which is configured to detect the use of a horn, and that
said report creation unit (130) is configured to start the reporting of a specific duration or the

reporting of a settable duration when the horn-use detector (134) detects the use of the horn of at least the specific duration.

6. An apparatus (100) according to any one of claims 1-5, **characterised in that** the apparatus (100) further comprises

a location determination unit (136) which is in connection with the report creation unit (130) and which location determination unit (136) is configured to save the location data of the apparatus (100) from a specific point in time of the reporting moment, and that said report creation unit (130) is configured to attach the location data of the apparatus (100) to the report.

7. An apparatus (100) according to any one of claims 1-6, **characterised in that** the apparatus (100) comprises

a base station (131) for forming an Internet connection, which base station (131) is in connection with the report creation unit (130), and that the report creation unit (130) is configured to send the report via the Internet connection.

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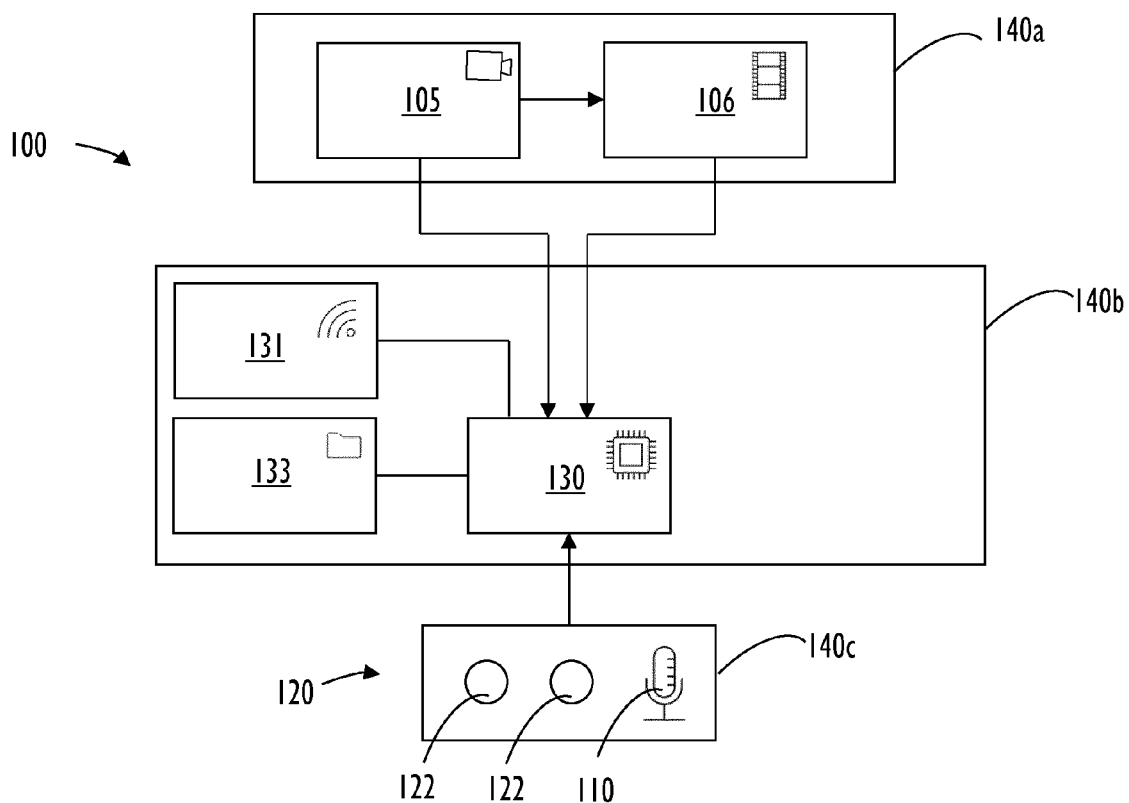


FIG. 1

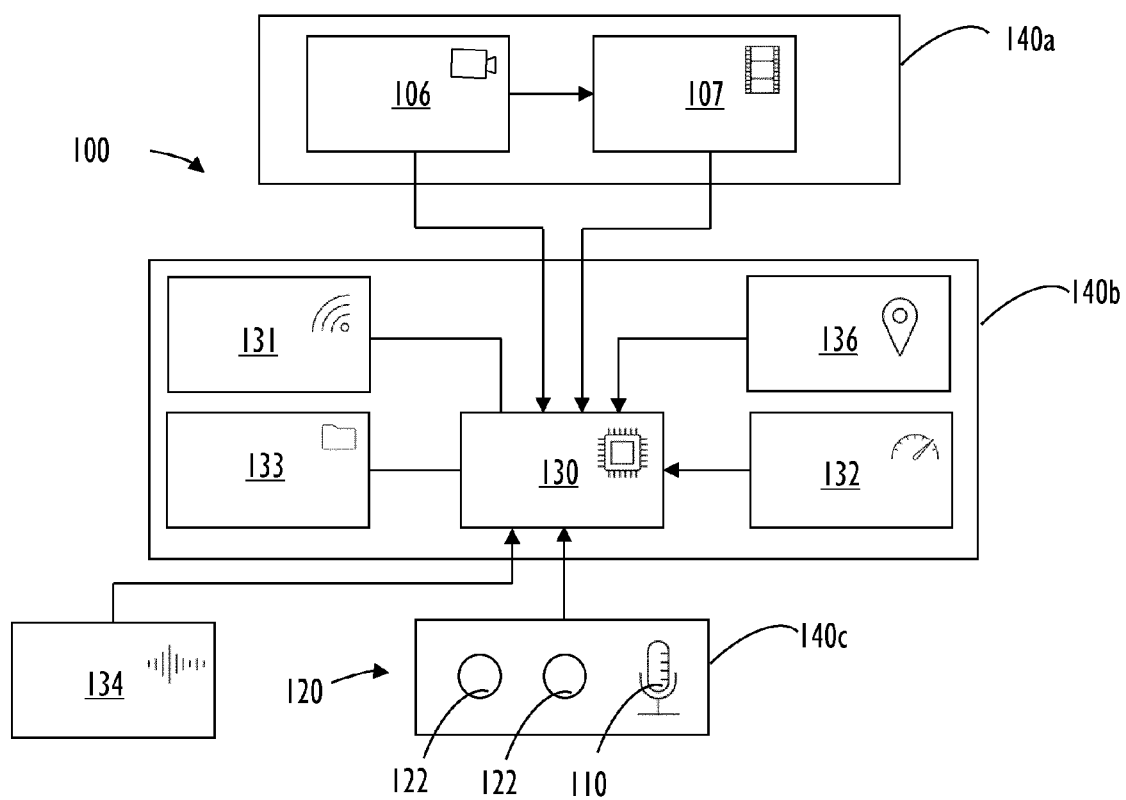


FIG. 2



EUROPEAN SEARCH REPORT

Application Number

EP 23 16 9738

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2022/048432 A1 (SWITALSKI GILLIAN [GB] ET AL) 17 February 2022 (2022-02-17)	1-4, 6, 7	INV. G07C5/08
Y	* abstract *	5	
	* paragraph [0006] - paragraph [0017] *		
	* paragraph [0043] - paragraph [0054] *		
	* paragraph [0072] - paragraph [0075] *		
	* paragraph [0090] *		
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A	* abstract *	1	TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		26 September 2023	Miltgen, Eric
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		T : theory or principle underlying the invention	
Y : particularly relevant if combined with another document of the same category		E : earlier patent document, but published on, or after the filing date	
A : technological background		D : document cited in the application	
O : non-written disclosure		L : document cited for other reasons	
P : intermediate document			
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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