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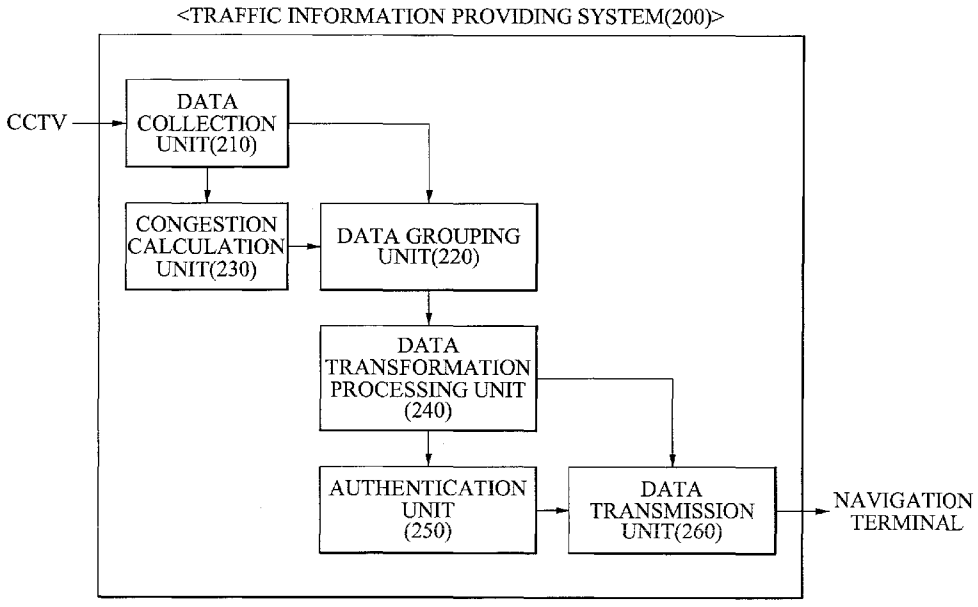
(54) **Title:** SYSTEM AND METHOD FOR PROVIDING TRAFFIC INFORMATION



(57) **Abstract:** The present invention relates to a traffic information providing system and method which selects and groups image data required for a user to efficiently provide the user with image data collected from a plurality of Closed-Circuit Televisions (CCTVs) using a unidirectional broadcast channel without using a separate return channel and to efficiently transmit the image data.

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SYSTEM AND METHOD FOR PROVIDING TRAFFIC INFORMATION

Technical Field

The present invention relates to a traffic information providing system and method which selects and groups image data necessary for a user to efficiently transmit and provide the user with image data collected from a plurality of Closed-Circuit Televisions (CCTVs) using a unidirectional broadcast channel without using a separate return channel.

Background Art

These days, a radio or television (TV) trafficcast provides real-time traffic information of major roads to drivers listening or watching a traffic report. However, traffic information of a road where a driver is driving or traffic information necessary for a user may not be provided or a driver may miss a traffic report due to an airtime.

Also, a navigation system installed in a vehicle displays a current location of a vehicle from map data stored in the navigation system, and provides a route. However, a navigation system may not provide a degree of traffic congestion, information about accidents, and the like, of a road where a user is driving or desires to know.

To overcome such a disadvantage, text-based additional traffic information service such as a Road Traffic Message (RTM), Congestion and Travel Time Information (CTT), and the like, is provided using a Transport Protocol Expert Group (TPEG) protocol. TPEG is a protocol to provide traffic and travel information via a digital broadcasting media.

However, it is expected that other traffic information services using TPEG may not provide a precise amount of actual traffic volume to a user. Also, since user's recognition about a vehicle speed and delay time varies, when a CCTV video traffic information including a still frame is provided as additional information, the user's understanding about a current traffic condition may be improved.

However, when CCTV video traffic information is transmitted to a user in real time through a broadcasting channel, a number of disadvantages may be caused. For example, inefficiency of a data channel due to a great amount of data transmission and degradation of data processing performance of a terminal due to transmission to users

that do not request a service may be caused. Also, actual 'real-time' video information may not be provided when a user watches a CCTV of an area required by the user.

In a Korean Patent Registration No. 10-0695007, "system and method for transmitting mobile image traffic information based DMB using wireless telecommunication network, and method for receiving mobile image traffic information using wireless telecommunication network in a TTI receiving Terminal", a user may request video traffic information (for example, CCTV video traffic information) via a wireless communication network (return channel) based on location information included in a TPEG traffic condition information message. Accordingly, the above-described disadvantages may be overcome and mobile image traffic information may be provided.

According to the present invention, a technology, which may efficiently transmit CCTV video traffic information using only a unidirectional broadcast channel without using a separate return channel such as a wireless communication network and overcome the above-described disadvantages when transmitting CCTV video traffic information in real time, is provided.

Disclosure of Invention

Technical Goals

The present invention provides a traffic information providing system and method which may efficiently transmit Closed-Circuit Television (CCTV) video traffic information using only a unidirectional broadcast channel without using a separate return channel such as a wireless communication network, and to overcome disadvantages such as inefficiency of data channel use and degradation of data processing performance when transmitting CCTV video traffic information in real time.

The present invention also provides a traffic information providing system and method which selects and groups image data necessary for a user, and thereby may efficiently provide the user with image data collected from a plurality of CCTVs using a unidirectional broadcast channel without using a separate return channel.

The present invention also provides a traffic information providing system and method which groups image data collected from a plurality of CCTVs, transmits the grouped image data to a user, and thereby may enable the user to simultaneously check

CCTV video traffic information of a plurality of spots through a plurality of divided screens.

The present invention also provides a traffic information providing system and method which calculates a degree of traffic congestion using traffic information data received from a traffic information collection device, selects and provides a user with spots where a degree of traffic congestion greater than a predetermined value occurs, and thereby may improve transmission efficiency of CCTV video traffic information.

Technical solutions

According to an aspect of the present invention, there is provided a traffic information providing system, including: a data collection unit collecting image data generated by a plurality of Closed-circuit televisions (CCTVs); a data grouping unit grouping the collected image data; a data transformation processing unit transforming the grouped image data to correspond to Transport Protocol Expert Group (TPEG) data and generating TPEG image data; and a data transmission unit transmitting the generated TPEG image data to a user using a single channel.

According to another aspect of the present invention, there is provided a traffic information providing method, including: collecting image data generated by a plurality of CCTVs; grouping the collected image data; transforming the grouped image data to correspond to TPEG data and generating TPEG image data; and transmitting the generated TPEG image data to a user using a single channel.

Brief Description of Drawings

FIG. 1 is a diagram illustrating a relationship among a traffic information providing system, Closed-circuit television (CCTV), and user according to an embodiment of the present invention;

FIG. 2 is a diagram illustrating a configuration of a traffic information providing system according to an embodiment of the present invention;

FIG. 3 is a diagram illustrating examples of a database storing image data and traffic information data collected in a traffic information providing system according to an embodiment of the present invention;

FIG. 4 is a diagram illustrating examples of grouping image data in a traffic

information providing system according to an embodiment of the present invention; and

FIG. 5 is a flowchart illustrating a traffic information providing method according to an embodiment of the present invention.

Best Mode for Carrying Out the Invention

Hereinafter, embodiments of the present invention are described in detail by referring to the figures.

FIG. 1 is a diagram illustrating a relationship among a traffic information providing system 100, Closed-circuit television (CCTV), and user according to an embodiment of the present invention.

The traffic information providing system 100 may group image data collected from a plurality of CCTVs 110 and transmit to a user terminal 120 Transport Protocol Expert Group (TPEG) image data using a single channel, that is, a unidirectional broadcast channel. The TPEG image data is transformed to correspond to TPEG data.

Also, the traffic information providing system 100 may collect image data such as CCTV traffic video, a still frame, or a still image including a current traffic condition from the plurality of CCTVs 110. The plurality of CCTVs 110 is installed in a plurality of spots, for example, a bridge on a Han river such as a Seongsan bridge and Youngdong bridge, a highway such as Northern highway and Western highway, Freedom avenue, Olympic street, Ring road, and the like.

Also, the traffic information providing system 100 may select image data more relevant for a user from the collected image data, and group the image data to enable the image data to be replayed as a single video file. Also, the traffic information providing system 100 may transform the grouped image data to correspond to TPEG data, and transmit the transformed image data to the user terminal 120 (or, navigation terminal installed in a user's vehicle) using a single channel (for example, Digital multimedia Broadcasting (DMB) transmission channel).

Accordingly, the traffic information providing system 100 may efficiently transmit CCTV video traffic information using a current unidirectional broadcast channel without a separate return channel such as a wireless communication network.

In this instance, the traffic information providing system 100 transmits the TPEG image data to the user for a regular time period at regular intervals (for example,

for 30 seconds every ten minutes), and thereby may overcome inefficiency of channel use due to a great amount of TPEG image data transmission and degradation of data receiving performance of the user terminal 120. Also, the traffic information providing system 100 may provide real-time CCTV video traffic information to the user.

FIG. 2 is a diagram illustrating a configuration of a traffic information providing system 200 according to an embodiment of the present invention.

The traffic information providing system 200 may include a data collection unit 210, data grouping unit 220, congestion calculation unit 230, data transformation processing unit 240, authentication unit 250, and data transmission unit 260.

The data collection unit 210 collects image data generated by a plurality of CCTVs.

That is, the data collection unit 210 may collect and store the image data generated by the plurality of CCTVs. Specifically, the image data is data associated with image information about a current traffic condition such as a still image, a still frame, or CCTV traffic video taped by CCTVs installed in a plurality of locations of each road.

Also, the data collection unit 210 may collect traffic information data from a plurality of traffic information collection devices. The plurality of traffic information collection devices may generate overall information associated with traffic, separately from the image data of CCTVs. The plurality of traffic information collection devices may be managed by an organization that completely manages and analyzes traffic information, such as a total traffic information center, government affairs of expressways, and the like.

The data collection unit 210 may collect the traffic information data such as traffic volume from the plurality of traffic information collection devices installed on the roads such as an image detector, loop detector, and Audio Video Interleave (AVI) encoder.

Also, the data collection unit 210 may additionally collect traffic information data such as an installation location of a CCTV, a road of the installation location, road length, speed limit of the road, average driving speed of vehicles in the road, whether the road is restricted, and the like.

As an example, the data collection unit 210 may collect image data including

traffic condition information of a spot in Mapo-gu Mangwon-dong northbound lane on a Seongsan bridge (A) from a CCTV installed in Mapo-gu Mangwon-dong on the Seongsan bridge (A). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'A-1' which is a location identifier of the CCTV, 'Mapo-gu Mangwon-dong northbound lane' which is the installed location of CCTV, 'Seongsan bridge (A)' which is a road of the installed location, '1.4 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '45 km/h' which is an average driving speed, '80' which is a current traffic volume, and 'normal' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Youngdeungpo-gu Yanghwa-dong northbound lane on the Seongsan bridge (A) from a CCTV installed in Youngdeungpo-gu Yanghwa-dong on the Seongsan bridge (A). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'A-2' which is a location identifier of the CCTV, 'Youngdeungpo-gu Yanghwa-dong northbound lane' which is the installed location of CCTV, 'Seongsan bridge (A)' which is a road of the installed location, '1.4 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '50 km/h' which is an average driving speed, '90' which is a current traffic volume, and 'normal' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Seongdong-gu Seongsoo-dong on Youngdong bridge (B) from a CCTV installed in Seongdong-gu Seongsoo-dong on the Youngdong bridge (B). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'B-1' which is a location identifier of the CCTV, 'Seongdong-gu Seongsoo-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is a road of the installed location, '1.6 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '30 km/h' which is an average driving speed, '50' which is a current traffic volume, and 'control' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B) from a CCTV installed in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'B-2' which is a location identifier of the CCTV, 'Gangnam-gu Cheongdam-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is a road of the installed location, '1.6 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '35 km/h' which is an average driving speed, '60' which is a current traffic volume, and 'control' corresponding to whether the road is restricted.

The data grouping unit 220 groups the collected image data.

That is, the data grouping unit 220 may select image data, which is more relevant for a user, from the collected image data in various ways, and group the selected image data to enable the grouped data to be replayed as a single video file. Accordingly, the image data collected from the plurality of CCTVs may be efficiently transmitted using a unidirectional broadcast channel (DMB).

As an example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location. The data grouping unit 220 may first identify a current location of the user, and second identify a CCTV where a location identifier associated with the first-identified current location is provided. Also, the data grouping unit 220 may group image data generated in the second-identified CCTV.

For example, when the user is driving on 'Seongsan bridge (A)', the data grouping unit 220 tracks a location of a navigation terminal installed in a user's vehicle after obtaining consent with respect to a location track from the user through the authentication unit 250. Also, the data grouping unit 220 may first identify a current location of the user, 'Seongsan bridge (A)', and second identify CCTVs where location identifiers 'A-1' and 'A-2' are provided. The location identifiers 'A-1' and 'A-2' are associated with the current location of the user, 'Seongsan bridge (A)'. Also, the data grouping unit 220 may group image data generated in the second-identified CCTVs into top/bottom or left/right, and generate a single file.

As another example, when a location identifier may be provided to each of the

plurality of CCTVs based on each installed location. The data grouping unit 220 may identify a CCTV installed for each road using the location identifiers, and group image data generated in the identified CCTVs.

For example, the data grouping unit 220 may identify CCTVs where location identifiers 'A-1' and 'A-2' are provided from among CCTVs installed in the 'Seongsan bridge (A)'. The location identifiers 'A-1' and 'A-2' are associated with the 'Seongsan bridge (A)'. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and generate a single file. Also, the data grouping unit 220 may identify CCTVs where location identifiers 'B-1' and 'B-2' are provided. The location identifiers 'B-1' and 'B-2' are associated with the 'Youngdong bridge (B)'. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and generate a single file.

As another example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit 220 may identify a CCTV provided with a location identifier associated with a restriction point based on a weather status or various events, and group image data generated in the identified CCTV.

For example, when the 'Youngdong bridge (B)' is restricted because of a flood warning due to typhoon, flood, and the like, the data grouping unit 220 may identify CCTVs where location identifiers 'B-1' and 'B-2' are provided. The location identifiers 'B-1' and 'B-2' are associated with the 'Youngdong bridge (B)' which is a restriction point based on a weather status. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and generate a single file.

As another example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit 220 may identify a CCTV provided with a location identifier associated with a regularly congested area or a spot where a traffic volume greater than a predetermined value is measured, and group image data generated in the identified CCTV.

The data grouping unit 220 may identify a CCTV where a location identifier associated with the regularly congested area, for example, 'Gupabal-Nocbeon section,

Ehwa-Shinchon rotary-Hongik section, Seongsan-Hapjeong-Sangsoo section, Gunja-Shindap section, Shinsa-Gangnam section, Samsung-Gangnam section, Olympic street, and Youngdong bridge (B)', is provided. Also, the data grouping unit 220 may group image data generated in the identified CCTV into top/bottom or left/right, and generate a single file.

Accordingly, the data grouping unit 220 may improve efficiency of transmission channel when transmitting through a single channel by grouping the image data collected from the plurality of CCTVs. Also, the data grouping unit 220 may enable the user to simultaneously check the CCTV video traffic information of a plurality of spots through the plurality of divided screens.

The data grouping unit 220 may use the congestion calculation unit 230. The congestion calculation unit 230 determines a degree of traffic congestion using the collected traffic information data when selecting image data, which is more relevant for the user, from the collected image data and grouping the selected image data to enable the grouped image data to be replayed as a single file.

That is, the data grouping unit 220 may select and group image data collected from a CCTV, installed in a highly congested spot or adjacent spot, using the degree of traffic congestion calculated by the congestion calculation unit 230. Accordingly, the user may be provided with more useful information.

For example, the congestion calculation unit 230 may calculate average time length of congestion for each road using the collected traffic information data, and calculate the degree of traffic congestion based on the calculated average time length of congestion for each road.

The congestion time refers to a delay time in comparison with a prescribed driving speed. For example, the congestion time may be obtained by deducting an estimated trip time when driving at a speed limit from an actual trip time when driving at an average driving speed.

Accordingly, a congestion time of 'Seongdong-gu Seongsoo-dong' may be longer than a congestion time of 'Youngdeungpo-gu Yanghwa-dong northbound lane'. In 'Youngdeungpo-gu Yanghwa-dong northbound lane' on the 'Seongsan bridge (A)', the speed limit is 60 km, the average driving speed is 50 km, and a CCTV corresponding to a location identifier is 'A-2'. In 'Seongdong-gu Seongsoo-dong' on

the 'Youngdong bridge (B)', the speed limit is 60 km, the average driving speed is 30 km, and a CCTV corresponding to a location identifier is 'B-1'. The data grouping unit 220 may identify a CCTV provided with a location identifier associated with a spot where a degree of traffic congestion greater than a predetermined value is calculated. Also, the data grouping unit 220 may group image data generated in the identified CCTV.

As another example, the congestion calculation unit 230 may calculate a number of objects displayed on a single screen in image data generated in a CCTV using the collected traffic information data, and calculate the degree of traffic congestion based on the calculated number of objects. That is, the congestion calculation unit 230 may calculate the number of objects (object density) displayed on a predetermined screen when the traffic information data is visualized on the screen, and calculate the degree of traffic congestion based on the calculated number of objects (object density).

For example, a degree of traffic congestion when the number of objects on the single screen is 16 may be approximately one and one third times greater than a degree of traffic congestion when the number of objects on the single screen is 12, in the image data generated in the CCTV. The data grouping unit 220 may identify the CCTV provided with the location identifier associated with the spot where the degree of traffic congestion greater than the predetermined value is calculated. Also, the data grouping unit 220 may group the image data generated in the identified CCTV.

Also, the congestion calculation unit 230 may calculate the degree of traffic congestion using the traffic information data such as whether an accident exists, distance between two vehicles, and the like. The data grouping unit 220 may group the image data of a spot where a higher degree of traffic congestion is calculated, using the calculated degree of traffic congestion.

According to an embodiment of the present invention, the degree of traffic congestion is calculated using the traffic information data received from the traffic information collection device, and spots with a degree of traffic congestion greater than the predetermined value are selected and provided to the user. Thus, the transmission efficiency with respect to CCTV video traffic information may be improved.

The data transformation processing unit 240 transforms the grouped image data

to correspond to TPEG data.

The data transformation processing unit 240 may transform and divide the grouped image data into a predetermined size at regular intervals, and generate the TPEG image data.

For example, the data transformation processing unit 240 transforms 30 seconds of the grouped image data every ten minutes to correspond to TPEG data and generate TPEG image data. Accordingly, inefficiency of channel use due to a great amount of TPEG image data transmission and degradation of data receiving performance of a user terminal may be overcome. Also, real-time CCTV video traffic information may be provided to the user.

The authentication unit 250 authenticates the user. That is, the authentication unit 250 may enable the TPEG image data to be transmitted to the authenticated user through a unidirectional broadcast channel (DMB) according to a result of the authentication. Also, the authentication unit 250 may obtain an authentication about a location track of the user terminal.

The data transmission unit 260 transmits the generated TPEG image data to the user using a single channel.

That is, the data transmission unit 260 may transmit the generated TPEG image data to the user terminal using the unidirectional broadcast channel such as a DMB, without using a separate return channel such as a wireless Internet.

The TPEG image data automatically transmitted, that is, downloaded, through the data transmission unit 260 is replayed in the user terminal without separately paying a fee like wireless Internet. Accordingly, the user may check real-time CCTV video traffic information more easily.

According to an embodiment of the present invention, the traffic information providing system 200 may transform streaming-type CCTV video traffic information into download-type data, and enable the user to watch desired CCTV image using a limited broadcasting channel. The traffic information providing system 200 may transform and process CCTV video with an appropriate size to be transmitted at regular intervals to overcome disadvantages such as a limit of broadcasting channel and CCTV video which may not be provided in real time.

Accordingly, when broadcast is set to be received without paying a fee for

wireless Internet, the traffic information providing system 200 may provide highly reliable traffic information such as the CCTV video traffic information to the user in real time more easily. Also, the traffic information providing system 200 is suitable for fee-based service of broadcast contents, and provide to only customer of a particular brand. Thus, the traffic information providing system 200 may be differentiated from other systems.

According to an embodiment of the present invention, when CCTV video traffic information of a spot desired by the user is selected, the user terminal may be a terminal (for example, a navigation terminal) that may decode and replay the TPEG image data received through the unidirectional broadcast channel.

FIG. 3 is a diagram illustrating examples of database storing image data and traffic information data collected in a traffic information providing system according to an embodiment of the present invention.

According to an embodiment of the present invention, the traffic information providing system may collect image data, generated in a plurality of CCTVs, and traffic information data from a plurality of traffic information collection devices.

In FIG. 3 (Ⅰ), image data 310 and traffic information data, received from a CCTV installed in Mapo-gu Mangwon-dong on the Seongsan bridge (A), is illustrated as an example. The image data 310 includes traffic condition information of the spot in the Mapo-gu Mangwon-dong northbound lane on the Seongsan bridge (A). The traffic information data includes 'A-1' which is the location identifier of the CCTV, 'Mapo-gu Mangwon-dong northbound lane' which is the installed location of CCTV, 'Seongsan bridge (A)' which is the road of the installed location, '1.4 km' which is the length of the road where the CCTV is installed, '60 km/h' which is the speed limit of the road, '45 km/h' which is the average driving speed, '80' which is the current traffic volume, and 'normal' corresponding to whether the road isrestricted.

In FIG. 3 (Ⅱ), image data 320 and traffic information data, received from a CCTV installed in Youngdeungpo-gu Yanghwa-dong on the Seongsan bridge (A), is illustrated as an example. The image data 320 includes traffic condition information of the spot in the Youngdeungpo-gu Yanghwa-dong northbound lane on the Seongsan bridge (A). The traffic information data includes 'A-2' which is the location identifier of the CCTV, 'Youngdeungpo-gu Yanghwa-dong northbound lane' which is the installed

location of CCTV, 'Seongsan bridge (A)' which is the road of the installed location, '1.4 km' which is the length of the road where the CCTV is installed, '60 km/h' which is the speed limit of the road, '50 km/h' which is the average driving speed, '90' which is the current traffic volume, and 'normal' corresponding to whether the road is restricted.

In FIG. 3 (Ⅲ), image data 330 and traffic information data, received from a CCTV installed in Seongdong-gu Seongsoo-dong on the Youngdong bridge (B), is illustrated as an example. The image data 330 includes traffic condition information of the spot in Seongdong-gu Seongsoo-dong on the Youngdong bridge (B). The traffic information data includes 'B-1' which is a location identifier of the CCTV, 'Seongdong-gu Seongsoo-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is the road of the installed location, '1.6 km' which is the length of the road where the CCTV is installed, '60 km/h' which is the speed limit of the road, '30 km/h' which is the average driving speed, '50' which is the current traffic volume, and 'control' corresponding to whether the road is restricted.

In FIG. 3 (Ⅳ), image data 340 and traffic information data, received from a CCTV installed in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B), is illustrated as an example. The image data 340 includes traffic condition information of the spot in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B). The traffic information data includes 'B-2' which is a location identifier of the CCTV, 'Gangnam-gu Cheongdam-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is the road of the installed location, '1.6 km' which is the length of the road where the CCTV is installed, '60 km/h' which is the speed limit of the road, '35 km/h' which is the average driving speed, '60' which is the current traffic volume, and 'control' corresponding to whether the road is restricted.

FIG. 4 is a diagram illustrating examples of grouping image data in a traffic information providing system according to an embodiment of the present invention.

In FIG. 4 (Ⅰ), when a user is driving on 'Seongsan bridge (A)', a location of a navigation terminal installed in a user's vehicle is tracked after obtaining consent with respect to a location track from the user. Also, a current location of the user, 'Seongsan bridge (A)' is first identified, and CCTVs where location identifiers 'A-1' and 'A-2' are provided are second identified. The location identifiers 'A-1' and 'A-2' are associated with the current location of the user, 'Seongsan bridge (A)'. Also,

image data 410 and 420 generated in the second-identified CCTVs is grouped into top/bottom or left/right, and generate a single file.

In FIG. 4 (Ⅱ), when a 'Youngdong bridge (B)' is restricted because of a flood warning due to typhoon, flood, and the like, CCTVs where location identifiers 'B-1' and 'B-2' are provided are identified. The location identifiers 'B-1' and 'B-2' are associated with the 'Youngdong bridge (B)' which is a restriction point based on a weather status. Also, image data 430 and 440 generated in the identified CCTVs is grouped into top/bottom or left/right, and generate a single file.

In FIG. 4 (Ⅲ), CCTVs where location identifiers 'A-1', 'A-2', 'B-1', and 'B-2' are provided are identified from among CCTVs installed in the 'Seongsan bridge (A)' and 'Youngdong bridge (B)'. The location identifiers'A-1', 'A-2', 'B-1', and 'B-2' are associated with the 'Seongsan bridge (A)' and 'Youngdong bridge (B)' . Also, image data 410, 420, 430, and 440 generated in the identified CCTVs is grouped into top/bottom or left/right, and generate a single file.

According to an embodiment of the present invention, image data collected from a plurality of CCTVs and is grouped and transmitted to a user, and thus the user may simultaneously check CCTV video traffic information of a plurality of spots through a plurality of divided screens.

FIG. 5 is a flowchart illustrating a traffic information providing method according to an embodiment of the present invention.

The traffic information providing method may be embodied by a traffic information providing system according to an embodiment of the present invention. Also, the traffic information providing method is described with reference to FIG. 5 as well as FIG. 2 for better understanding.

In operation S510, the traffic information providing system collects image data generated by a plurality of CCTVs.

A data collection unit 210 may collect and store the image data generated by the plurality of CCTVs. Specifically, the image data is data associated with image information about a current traffic condition such as a still image, still frame, or CCTV traffic video taped by CCTVs installed in a plurality of locations of each road.

Also, the data collection unit 210 may collect traffic information data from a plurality of traffic information collection devices.

The data collection unit 210 may collect the traffic information data such as traffic volume from the plurality of traffic information collection devices installed on the roads such as an image detector, loop detector, and AVI.

Also, the data collection unit 210 may additionally collect traffic information data such as an installed location of CCTV, road of the installed location, road length, speed limit of the road, average driving speed of vehicles in the road, whether the road is restricted, and the like.

As an example, the data collection unit 210 may collect image data including traffic condition information of a spot in Mapo-gu Mangwon-dong northbound lane on a Seongsan bridge (A) from a CCTV installed in Mapo-gu Mangwon-dong on the Seongsan bridge (A). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'A-1' which is a location identifier of the CCTV, 'Mapo-gu Mangwon-dong northbound lane' which is the installed location of CCTV, 'Seongsan bridge (A)' which is a road of the installed location, '1.4 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '45 km/h' which is an average driving speed, '80' which is a current traffic volume, and 'normal' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Youngdeungpo-gu Yanghwa-dong northbound lane on the Seongsan bridge (A) from a CCTV installed in Youngdeungpo-gu Yanghwa-dong on the Seongsan bridge (A). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'A-2' which is a location identifier of the CCTV, 'Youngdeungpo-gu Yanghwa-dong northbound lane' which is the installed location of CCTV, 'Seongsan bridge (A)' which is a road of the installed location, '1.4 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '50 km/h' which is an average driving speed, '90' which is a current traffic volume, and 'normal' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Seongdong-gu Seongsoo-dong on a Youngdong bridge (B) from a CCTV installed in Seongdong-gu Seongsoo-dong on the

Youngdong bridge (B). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'B-1' which is a location identifier of the CCTV, 'Seongdong-gu Seongsoo-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is a road of the installed location, '1.6 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '30 km/h' which is an average driving speed, '50' which is a current traffic volume, and 'restricted' corresponding to whether the road is restricted.

As another example, the data collection unit 210 may collect image data including traffic condition information of a spot in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B) from a CCTV installed in Gangnam-gu Cheongdam-dong on the Youngdong bridge (B). Also, the data collection unit 210 may collect and store traffic information data as well as the collected image data. The traffic information data includes 'B-2' which is a location identifier of the CCTV, 'Gangnam-gu Cheongdam-dong' which is the installed location of CCTV, 'Youngdong bridge (B)' which is a road of the installed location, '1.6 km' which is a length of the road where the CCTV is installed, '60 km/h' which is a speed limit of the road, '35 km/h' which is an average driving speed, '60' which is a current traffic volume, and 'control' corresponding to whether the road is restricted.

In operation S520, the traffic information providing system groups the collected image data.

A data grouping unit 220 may select image data, which is more relevant for a user, from the collected image data in various ways, and group the selected image data to enable the grouped data to be replayed as a single video file. Accordingly, the image data collected from the plurality of CCTVs may be efficiently transmitted using a unidirectional broadcast channel (DMB).

As an example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location. The data grouping unit 220 may first identify a current location of the user, and second identify a CCTV where a location identifier associated with the first-identified current location is provided. Also, the data grouping unit 220 may group image data generated in the second-identified CCTV.

For example, when the user is driving on 'Seongsan bridge (A)', the data

grouping unit 220 tracks a location of a navigation terminal installed in a user's vehicle after obtaining consent with respect to a location track from the user through an authentication unit 250. Also, the data grouping unit 220 may first identify a current location of the user, 'Seongsan bridge (A)', and second identify CCTVs where location identifiers 'A-1' and 'A-2' are provided. The location identifiers 'A-1' and 'A-2' are associated with the current location of the user, 'Seongsan bridge (A)'. Also, the data grouping unit 220 may group image data generated in the second-identified CCTVs into top/bottom or left/right, and generate a single file.

As another example, when a location identifier may be provided to each of the plurality of CCTVs based on each installed location. The data grouping unit 220 may identify a CCTV installed for each road using the location identifier, and group image data generated in the identified CCTV.

For example, the data grouping unit 220 may identify CCTVs where location identifiers 'A-1' and 'A-2' are provided. The location identifiers 'A-1' and 'A-2' are associated with the 'Seongsan bridge (A)'. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and generate a single file. Also, the data grouping unit 220 may identify CCTVs where location identifiers 'B-1' and 'B-2' are provided. The location identifiers 'B-1' and 'B-2' are associated with the 'Youngdong bridge (B)'. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and generate a single file.

As another example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit 220 may identify a CCTV provided with a location identifier associated with a restriction point based on a weather status or various events, and group image data generated in the identified CCTV.

For example, when the 'Youngdong bridge (B)' is restricted because of a flood warning due to typhoon, flood, and the like, the data grouping unit 220 may identify CCTVs where location identifiers 'B-1' and 'B-2' are provided. The location identifiers 'B-1' and 'B-2' are associated with the 'Youngdong bridge (B)' which is a restriction point based on a weather status. Also, the data grouping unit 220 may group image data generated in the identified CCTVs into top/bottom or left/right, and

generate a single file.

As another example, a location identifier may be provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit 220 may identify a CCTV provided with a location identifier associated with a regularly congested area or a spot where a traffic volume greater than a predetermined value is measured, and group image data generated in the identified CCTV.

The data grouping unit 220 may identify a CCTV where a location identifier associated with the regularly congested area, for example, 'Gupabal-Nocbeon section, Ehwa-Shinchon rotary-Hongik section, Seongsan-Hapjeong-Sangsoo section, Gunja-Shindap section, Shinsa-Gangnam section, Samsung-Gangnam section, Olympic street, and Youngdong bridge (B)', is provided. Also, the data grouping unit 220 may group image data generated in the identified CCTV into top/bottom or left/right, and generate a single file.

Accordingly, the data grouping unit 220 may improve efficiency of transmission channel when transmitting through a single channel by grouping the image data collected from the plurality of CCTVs. Also, the data grouping unit 220 may enable the user to simultaneously check the CCTV video traffic information of a plurality of spots through the plurality of divided screens.

The data grouping unit 220 may use a congestion calculation unit 230. The congestion calculation unit 230 determines a degree of traffic congestion using the collected traffic information data when selecting image data, which is more relevant for the user, from the collected image data and grouping the selected image data to enable the grouped image data to be replayed as a single file.

That is, the data grouping unit 220 may select and group image data collected from a CCTV, installed in a spot with a high degree of traffic congestion, using the degree of traffic congestion calculated by the congestion calculation unit 230. Accordingly, the user may be provided with more useful information.

For example, the congestion calculation unit 230 may calculate average time length of congestion for each road using the collected traffic information data, and calculate the degree of traffic congestion based on the calculated average time length of congestion for each road.

The congestion time refers to a delay time in comparison with a prescribed

driving speed. For example, the congestion time may be obtained by deducting a trip time when driving at a speed limit from a trip time when driving at an average driving speed.

Accordingly, a congestion time of 'Seongdong-gu Seongsoo-dong' may be longer than a congestion time of 'Youngdeungpo-gu Yanghwa-dong northbound lane'. In 'Youngdeungpo-gu Yanghwa-dong northbound lane' on the 'Seongsan bridge (A)', the speed limit is 60 km, the average driving speed is 50 km, and a CCTV corresponding to a location identifier is 'A-2'. In 'Seongdong-gu Seongsoo-dong' on the 'Youngdong bridge (B)', the speed limit is 60 km, the average driving speed is 30 km, and a CCTV corresponding to a location identifier is 'B-1'. The data grouping unit 220 may identify a CCTV provided with a location identifier associated with a spot where a degree of traffic congestion greater than a predetermined value is calculated. Also, the data grouping unit 220 may group image data generated in the identified CCTV.

As another example, the congestion calculation unit 230 may calculate a number of objects displayed on a single screen in image data generated in a CCTV using the collected traffic information data, and calculate the degree of traffic congestion based on the calculated number of objects.

For example, a degree of traffic congestion when the number of objects on the single screen is 16 may be approximately one and one third times greater than a degree of traffic congestion when the number of objects on the single screen is 12, in the image data generated in the CCTV. The data grouping unit 220 may identify the CCTV provided with the location identifier associated with the spot where the degree of traffic congestion greater than the predetermined value is calculated. Also, the data grouping unit 220 may group the image data generated in the identified CCTV.

Also, the congestion calculation unit 230 may calculate the degree of traffic congestion using the traffic information data such as whether an accident exists, distance between two vehicles, and the like. The data grouping unit 220 may group the image data at a spot with a higher degree of traffic congestion using the calculated degree of traffic congestion.

According to an embodiment of the present invention, the degree of traffic congestion is calculated using the traffic information data received from the traffic

information collection device, and spots with a degree of traffic congestion greater than the predetermined value are selected and provided to the user. Thus, the transmission efficiency with respect to CCTV video traffic information may be improved.

In operation S530, the traffic information providing system transforms the grouped image data and generates TPEG image data.

A data transformation processing unit 240 may transform and divide the grouped image data into a predetermined size at regular intervals, and generate the TPEG image data.

For example, the data transformation processing unit 240 transforms the grouped image data for thirty seconds every ten minutes to correspond to TPEG data and generate TPEG image data. Accordingly, inefficiency of channel use due to a great amount of TPEG image data transmission and degradation of data receiving performance of a user terminal may be overcome. Also, real-time CCTV video traffic information may be provided to the user.

In operation S540, the traffic information providing system transmits the generated TPEG image data to the user using a single channel.

An authentication unit 250 may enable the TPEG image data to be transmitted to an authenticated user through a unidirectional broadcast channel (DMB) according to a result of the authentication.

A data transmission unit 260 may transmit the generated TPEG image data to the user terminal using the unidirectional broadcast channel such as a DMB, without using a separate return channel such as a wireless Internet.

The TPEG image data automatically transmitted, that is, downloaded, through the data transmission unit 260 is replayed in the user terminal without separately paying a fee like wireless Internet. Accordingly, the user may check real-time CCTV video traffic information more easily.

The above-described embodiment of the present invention may be recorded in computer-readable media including program instructions to implement various operations embodied by a computer. The media may also include, alone or in combination with the program instructions, data files, data structures, and the like. The media and program instructions may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well-known and available

to those having skill in the computer software arts. Examples of computer-readable media include magnetic media such as hard disks, floppy disks, and magnetic tape; optical media such as CD ROM disks and DVD; magneto-optical media such as floptical disks; and hardware devices that are specially configured to store and perform program instructions, such as read-only memory (ROM), random access memory (RAM), flash memory, and the like. Examples of program instructions include both machine code, such as produced by a compiler, and files containing higher level code that may be executed by the computer using an interpreter. The described hardware devices may be configured to act as one or more software modules in order to perform the operations of the above-described embodiments of the present invention.

According to an embodiment of the present invention, a traffic information providing system and method may efficiently transmit CCTV video traffic information using only a unidirectional broadcast channel without using a separate return channel such as a wireless communication network.

Also, according to an embodiment of the present invention, a traffic information providing system and method selects and groups image data relevant for a user, and thereby may efficiently provide the user with image data collected from a plurality of CCTVs using a unidirectional broadcast channel without using a separate return channel.

Also, according to an embodiment of the present invention, a traffic information providing system and method groups image data collected from a plurality of CCTVs, transmits the grouped image data to a user, and thereby may enable the user to simultaneously check CCTV video traffic information of a plurality of spots through a plurality of divided screens.

Also, according to an embodiment of the present invention, a traffic information providing system and method calculates a degree of traffic congestion using traffic information data received from a traffic information collection device, selects and provides a user with spots where a degree of traffic congestion greater than a predetermined value occurs, and thereby may improve transmission efficiency of CCTV video traffic information.

Although a few embodiments of the present invention have been shown and described, the present invention is not limited to the described embodiments. Instead,

it would be appreciated by those skilled in the art that changes may be made to these embodiments without departing from the principles and spirit of the invention, the scope of which is defined by the claims and their equivalents.

CLAIMS

1. A traffic information providing system, comprising:

a data collection unit collecting image data generated by a plurality of Closed-circuit televisions (CCTVs);

a data grouping unit grouping the collected image data;

a data transformation processing unit transforming the grouped image data to correspond to Transport Protocol Expert Group (TPEG) data and generating TPEG image data; and

a data transmission unit transmitting the generated TPEG image data to a user using a single channel.

2. The traffic information providing system of claim 1, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit identifies at least one CCTV provided with a location identifier associated with a current location of the user, and groups image data generated in the at least one identified CCTV.

3. The traffic information providing system of claim 1, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit identifies at least one CCTV provided with a location identifier associated with a road where the user is driving, and groups image data generated in the at least one identified CCTV.

4. The traffic information providing system of claim 1, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit identifies at least one CCTV provided with a location identifier associated with a restriction point based on a weather status, and groups image data generated in the at least one identified CCTV.

5. The traffic information providing system of claim 1, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit identifies at least one CCTV provided with a location

identifier associated with a regularly congested area, and groups image data generated in the at least one identified CCTV.

6. The traffic information providing system of claim 1, further comprising:

a congestion calculation unit calculating a degree of traffic congestion using traffic information data received from a traffic information collection device.

7. The traffic information providing system of claim 6, wherein the congestion calculation unit calculates average time length of congestion for each road using the received traffic information data, and calculates the degree of traffic congestion based on the calculated average time length of congestion for each road.

8. The traffic information providing system of claim 6, wherein the congestion calculation unit calculates a number of objects displayed on a predetermined screen when the received traffic information data is visualized on the screen, and calculates the degree of traffic congestion based on the calculated number of objects.

9. The traffic information providing system of any one of claim 7 or claim 8, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and the data grouping unit identifies at least one CCTV provided with a location identifier associated with a point where the calculated degree of traffic congestion satisfies a predetermined value, and groups image data generated in the at least one identified CCTV.

10. The traffic information providing system of claim 1, wherein the data transformation processing unit divides the grouped image data into a predetermined unit and time and generates the TPEG image data.

11. The traffic information providing system of claim 1, further comprising:

an authentication unit authenticating the user and enabling the TPEG image data to be transmitted to the authenticated user according to a result of the authentication.

12. A traffic information providing method, comprising:

collecting image data generated by a plurality of CCTVs;

grouping the collected image data;

transforming the grouped image data to correspond to TPEG data and generating TPEG image data; and

transmitting the generated TPEG image data to a user using a single channel.

13. The traffic information providing method of claim 12, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and

the grouping comprises:

identifying at least one CCTV provided with a location identifier associated with a current location of the user; and

grouping image data generated in the at least one identified CCTV.

14. The traffic information providing method of claim 12, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and

the grouping comprises:

identifying at least one CCTV provided with a location identifier associated with a road where the user is driving; and

grouping image data generated in the at least one identified CCTV.

15. The traffic information providing method of claim 12, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and

the grouping comprises:

identifying at least one CCTV provided with a location identifier associated with a restriction point based on a weather status; and

grouping image data generated in the at least one identified CCTV.

16. The traffic information providing method of claim 12, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and

the grouping comprises:

identifying at least one CCTV provided with a location identifier associated with a regularly congested area; and

grouping image data generated in the at least one identified CCTV.

17. The traffic information providing method of claim 12, further comprising:

calculating a degree of traffic congestion using traffic information data received from a traffic information collection device.

18. The traffic information providing method of claim 17, wherein the calculating comprises:

calculating average time length of congestion for each road using the received traffic information data; and

calculating the degree of traffic congestion based on the calculated average time length of congestion for each road.

19. The traffic information providing method of claim 17, wherein the calculating comprises:

calculating a number of objects displayed on a predetermined screen when the received traffic information data is visualized on the screen; and

calculating the degree of traffic congestion based on the calculated number of objects.

20. The traffic information providing method of any one of claim 18 or claim 19, wherein a location identifier is provided to each of the plurality of CCTVs based on each installed location, and

the grouping comprises:

identifying at least one CCTV provided with a location identifier associated with a point where the calculated degree of traffic congestion satisfies a predetermined

value; and

grouping image data generated in the at least one identified CCTV.

21. A computer-readable recording medium storing a program for implementing the method according to any one of claims 12 through 19.

FIG. 1

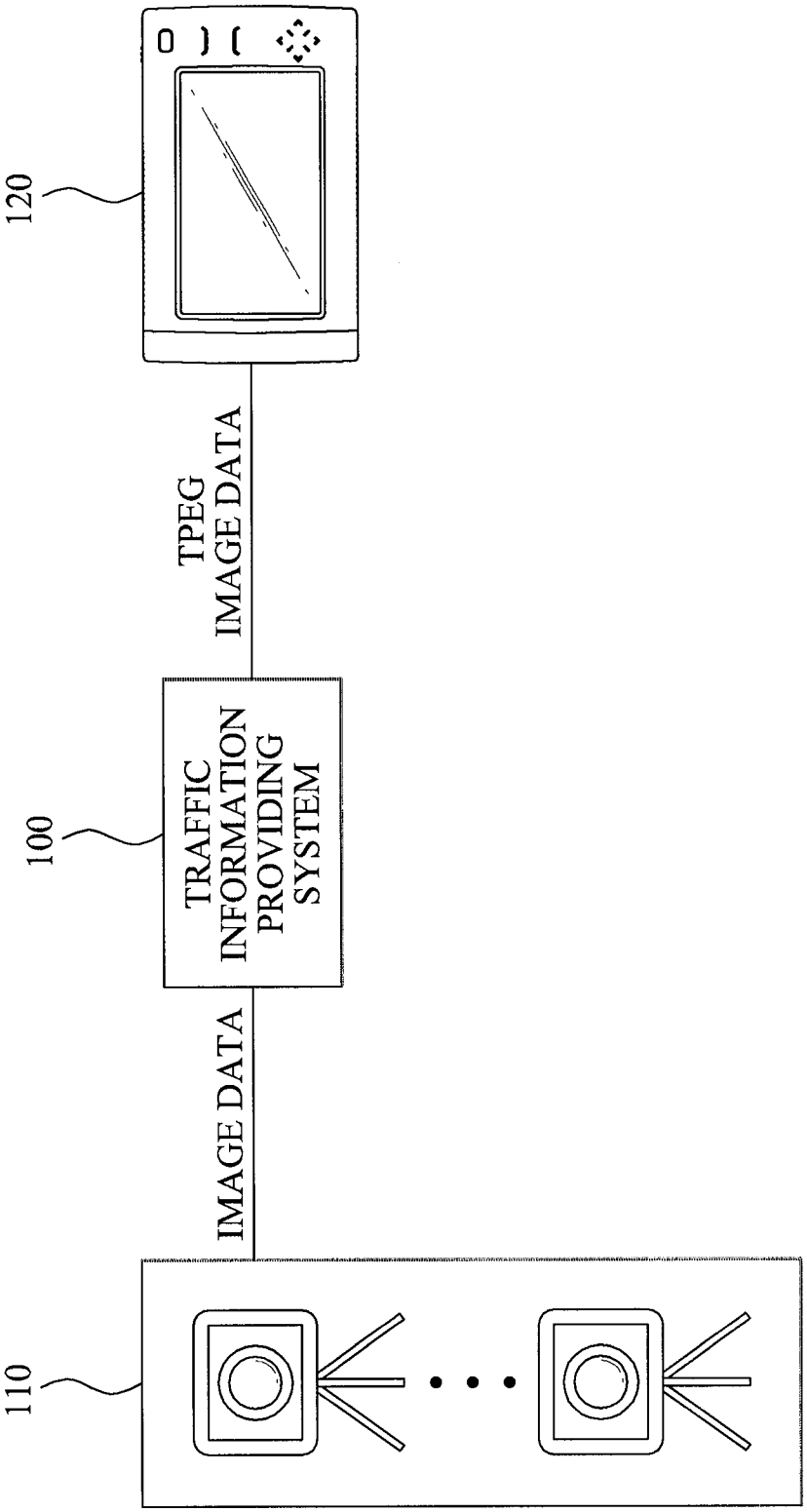

120
TPEG
IMAGE DATA
100
TRAFFIC
INFORMATION
PROVIDING
SYSTEM
IMAGE DATA
110

FIG. 2

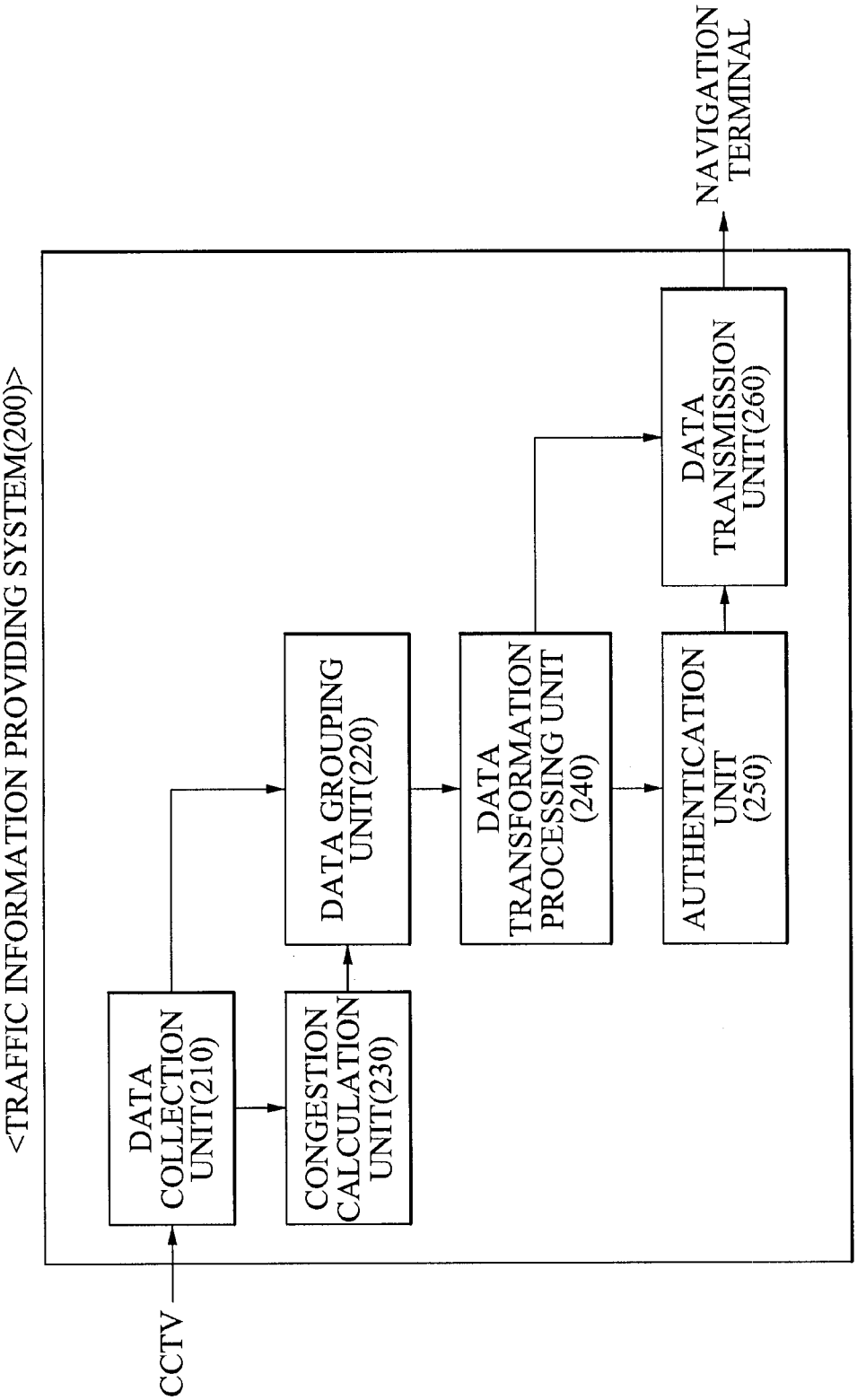
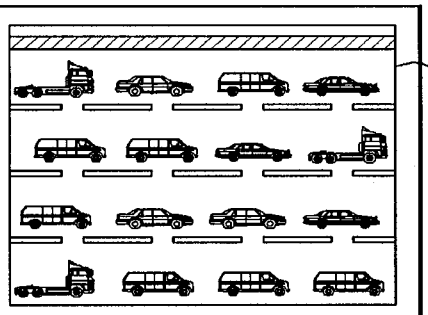
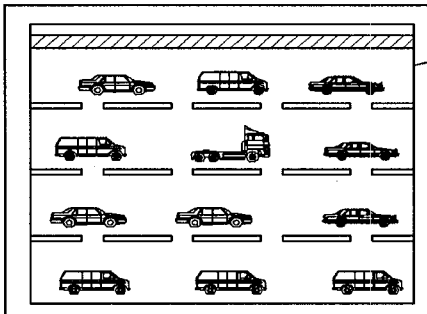

<TRAFFIC INFORMATION PROVIDING SYSTEM(200)>
CCTV
DATA COLLECTION UNIT(210)
CONGESTION CALCULATION UNIT(230)
DATA GROUPING UNIT(220)
DATA TRANSFORMATION PROCESSING UNIT (240)
AUTHENTICATION UNIT (250)
DATA TRANSMISSION UNIT(260)
NAVIGATION TERMINAL

FIG. 3



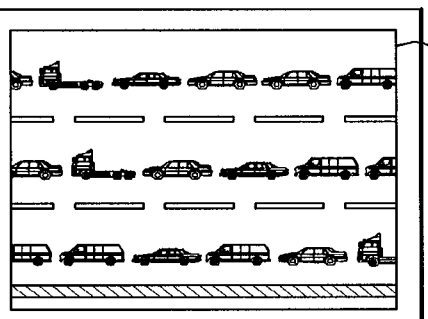
LOCATION IDENTIFIER	A-1
INSTALLED LOCATION	MAPO MANGWON NORTHBOUND LANE
ROAD	SEONGSAN BRIDGE (A)
ROAD LENGTH	1.4km
SPEED LIMIT	60 km/h
AVERAGE DRIVING SPEED	45 km/h
CURRENT TRAFFIC VOLUME	80
CONTROL	NORMAL

(I)



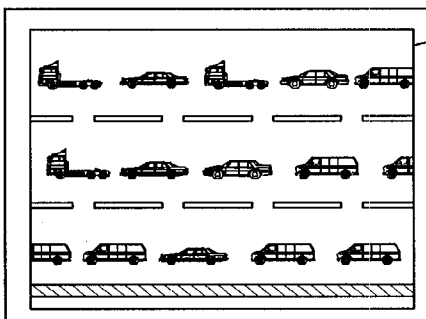
LOCATION IDENTIFIER	A-2
INSTALLED LOCATION	YOUNGDEUNGPO YANGHWA NORTHBOUND LANE
ROAD	SEONGSAN BRIDGE (A)
ROAD LENGTH	1.4km
SPEED LIMIT	60 km/h
AVERAGE DRIVING SPEED	50 km/h
CURRENT TRAFFIC VOLUME	90
CONTROL	NORMAL

(II)



LOCATION IDENTIFIER	B-1
INSTALLED LOCATION	SEONGDONG SEONGSOO
ROAD	YOUNGDONG BRIDGE (B)
ROAD LENGTH	1.6km
SPEED LIMIT	60 km/h
AVERAGE DRIVING SPEED	30 km/h
CURRENT TRAFFIC VOLUME	50
CONTROL	CONTROL

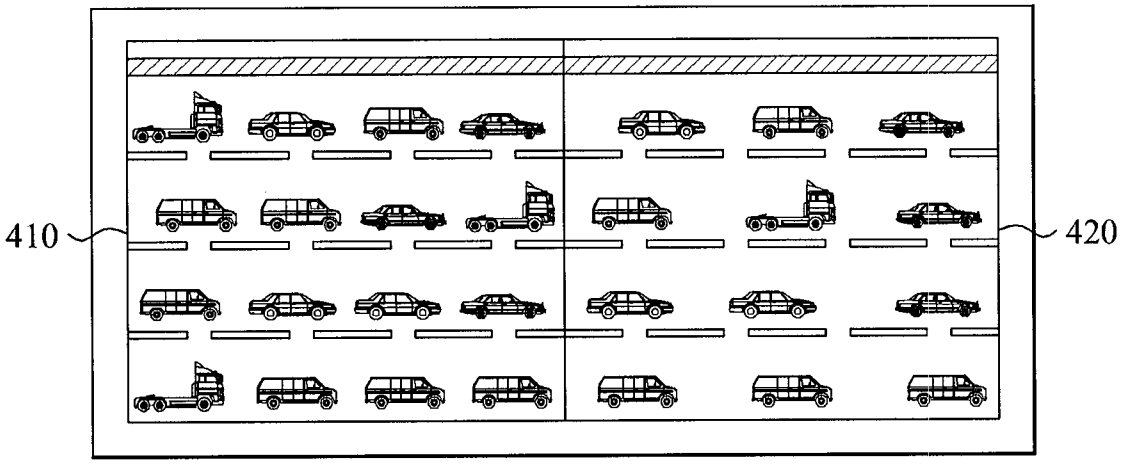
(III)



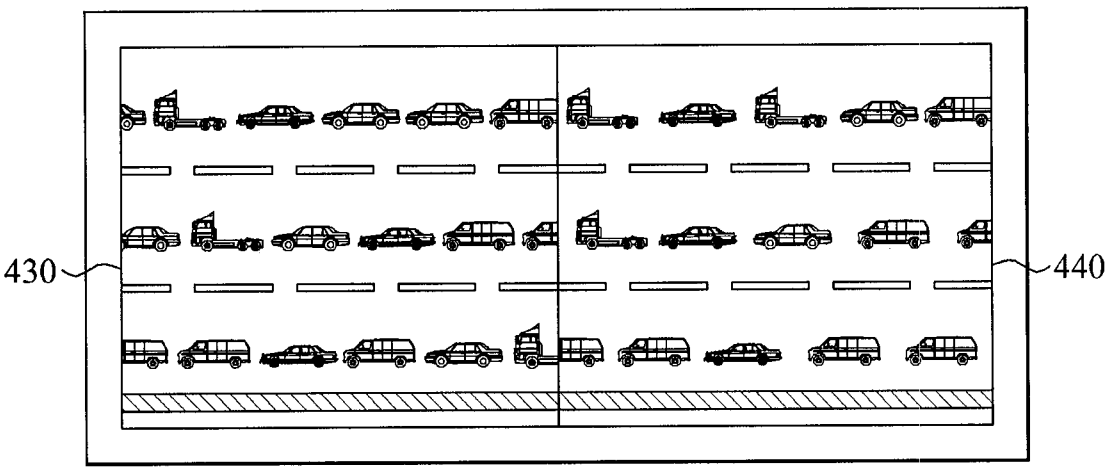
LOCATION IDENTIFIER	B-2
INSTALLED LOCATION	GANGNAM CHEONGDAM
ROAD	YOUNGDONG BRIDGE (B)
ROAD LENGTH	1.6km
SPEED LIMIT	60 km/h
AVERAGE DRIVING SPEED	35 km/h
CURRENT TRAFFIC VOLUME	60
CONTROL	CONTROL

(IV)

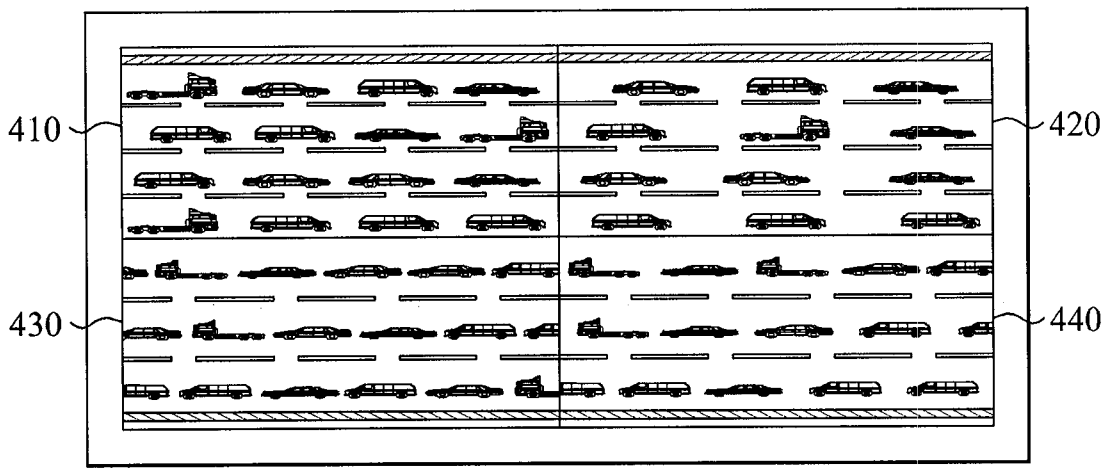
FIG. 4



(I)

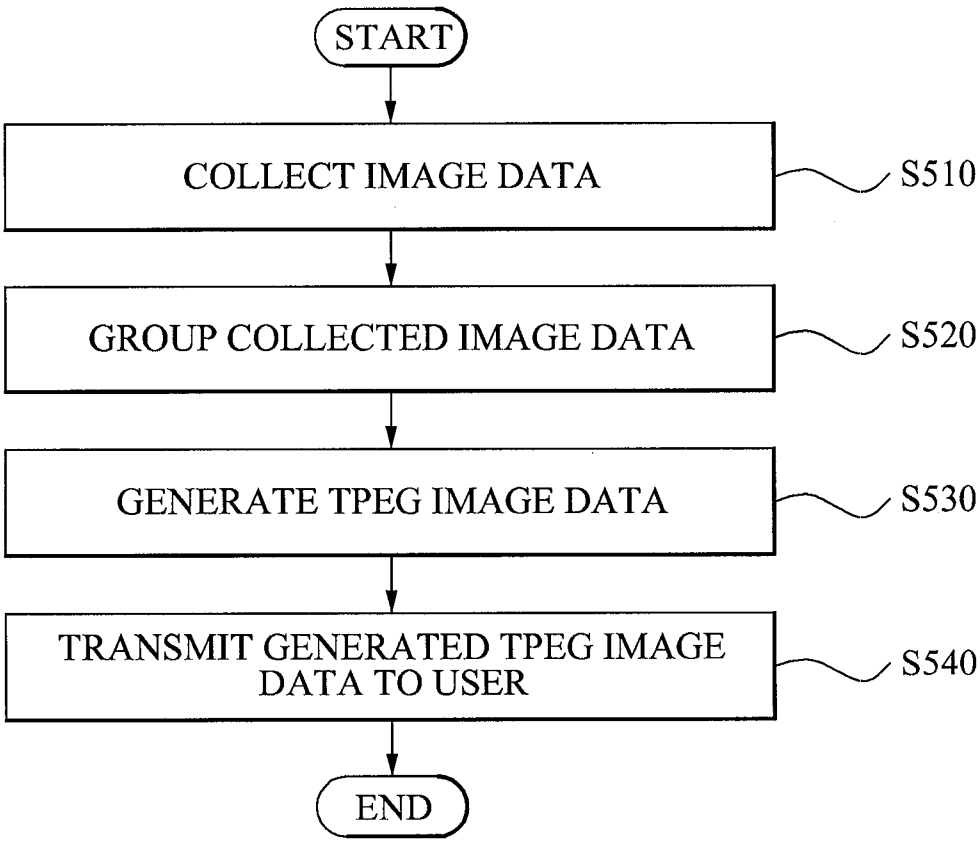


(II)



(III)

FIG. 5


START
COLLECT IMAGE DATA
S510
GROUP COLLECTED IMAGE DATA
S520
GENERATE TPEG IMAGE DATA
S530
TRANSMIT GENERATED TPEG IMAGE DATA TO USER
S540
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2007/006500

A. CLASSIFICATION OF SUBJECT MATTER

G08G 1/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 G06F G06Q G08G H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and Applications for Utility models since 1975.
Japanese Utility models and Applications for Utility models since 1975.

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO Internal)
"Keywords: CCTV, image data, collect, TPEG, transmit and traffic information"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR1020010044730 A (JUNG, IM KYUN) 05 JUNE 2001 See the abstract, claim 1 and figures 1-2	1-21
A	KR1020060076574 A(SAMSUNG ELECTRONICS CO., LTD.) 04 JULY 2006 See the abstract, claim 1 and figures 2-7	1-21
A	KR1020020016993 A (MOBILETALK CO., LTD.) 07 MARCH 2002 See the abstract, claims 1-7 and figures 1, 5, 6	1-21
A	KR1020000064200 A (LEE, JAE HAK) 06 NOVEMBER 2000 See the abstract, claim 1 and figures 1-3	1-21
A	KR1020010026249 A (INFO TECH KOREA CO., LTD.) 06 APRIL 2001 See the abstract, claim 1 and figure 3	1-21

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 FEBRUARY 2008 (28.02.2008)	**29 FEBRUARY 2008 (29.02.2008)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE, HYEON HONG

Telephone No. 82-42-481-8527

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2007/006500

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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KR1020060076574 A	04.07.2006	NONE	
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		AU200177806A5	13.03.2002
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		JP2004508624A	18.03.2004
		US20040009766A1	15.01.2004
		WO02/19294A1	07.03.2002
KR1020000064200 A	06.11.2000	AU200182655A1	13.03.2002
		AU200182655A5	13.03.2002
		WO02/19239A1	07.03.2002
KR1020010026249 A	06.04.2001	NONE	