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(54) Title: A VEHICLE TO VEHICLE COMMUNUCATION SYSTEM AND A METHOD THEREOF

(57) Abstract: A vehicle to vehicle communication system (100) and a method (200) for managing vehicle to vehicle communication are provided. The method comprises providing a mobile application in a computing device present with a user, providing permissions to the mobile application, detecting fluctuation in motion a vehicle using a gyroscope, activating crash detection if major fluctuations are detected and measuring decrease in speed of the vehicle if the minor detection is detected.

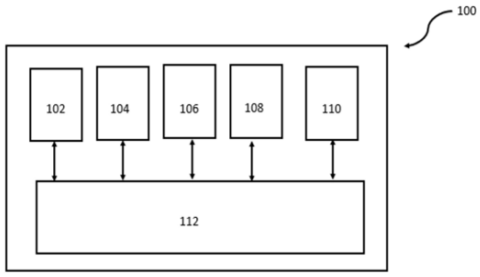

FIGURE 1

FORM 2

THE PATENTS ACT, 1970

(39 of 1970)

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THE PATENTS RULES, 2003

COMPLETE SPECIFICATION

(See Section 10; rule 13)

Title of the Invention

A VEHICLE TO VEHICLE COMMUNUCATION SYSTEM AND A METHOD THEREOF

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APPLICANTS:

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The following specification particularly describes the invention and the manner in which it is performed.

TECHNICAL FIELD

The present disclosure relates generally to vehicle to vehicle communication and more specifically relates to vehicle safety using the vehicle to vehicle communication.

BACKGROUND

[0001] Approximately 1.3 million people die each year as a result of road crashes. Now the possible reasons for the crashes are quite obvious, i.e., over-speeding, lack of clear vision, potholes, bad road condition etc. Now sometimes a person is driving in a right way but due to someone else negligence or foolishness leads to crashes. Now since the humans live in an ecosystem, i.e., for example, if we communicate, there are several ways to do so like, communication through languages, gestures: - eye, touch, sarcasms etc. and just like communication, the other processes among humans are in an ecosystem, i.e., everything is inter-connected to each other by one or more ways.

[0002] But when we talk about automobiles, road crashes occur due to human negligence. If we somehow give those senses or powers that humans have (perseverance, thinking, predictability, reacting, plan of action and the list goes on) to the vehicles, then we can say all the existing and upcoming automobiles would be in a virtual ecosystem linked with the reality, i.e., while navigation we can get a 360° view of vehicles around and the essential information associated with them.

[0003] There are some techniques which disclose vehicle safety using vehicle to vehicle communication. For example, reference can be made to US8630795B2 which discloses notifying vehicles of the speed limit on roads the vehicles are travelling on. Further, reference can be made to US9317983B2 which discloses automatic communication of vehicle damage and health of users in detected vehicle incidents. However, none of the techniques known in the art discloses

techniques for speed limit detection, crash detection, accident probability, traffic detection etc. using vehicle to vehicle communication.

OBJECTS OF THE INVENTION

[0004] The principal object of the present invention is to provide techniques for providing vehicle safety using vehicle to vehicle communication.

[0005] Another object of the present invention is to provide techniques for providing accurate vision to a vehicle while communicating with other vehicles.

[0006] Another object of the present invention is to provide techniques for providing potholes detection, road condition, speed limit detection, traffic detection, accident detection using vehicle to vehicle communication.

SUMMARY OF THE INVENTION

[0007] In one embodiment, a method (200) for managing vehicle to vehicle communication are provided. The method comprises providing a mobile application in a computing device present with a user, providing permissions to the mobile application, detecting fluctuation in motion a vehicle using a gyroscope, activating crash detection if major fluctuations are detected and measuring decrease in speed of the vehicle if the minor detection is detected.

BRIEF DESCRIPTION OF DRAWINGS

[0008] Figure 1 illustrates a block diagram of vehicle to vehicle communication system, in accordance with one embodiment of the present invention.

[0009] Figure 2 illustrates a flowchart of a method for managing vehicle to vehicle communication, in accordance with one embodiment of the present

invention.

[0010] Figure 3 illustrates a flowchart of a method for managing vehicle to vehicle communication, in accordance with another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0011] While the present invention is described herein by way of example using embodiments and illustrative drawings, those skilled in the art will recognize that the invention is not limited to the embodiments of drawing or drawings described and are not intended to represent the scale of the various components. Further, some components that may form a part of the invention may not be illustrated in certain figures, for ease of illustration, and such omissions do not limit the embodiments outlined in any way. It should be understood that the drawings and the detailed description thereto are not intended to limit the invention to the particular form disclosed, but on the contrary, the invention is to cover all modifications, equivalents, and alternatives falling within the scope of the present invention as defined by the appended claim.

[0012] As used throughout this description, the word "may" is used in a permissive sense (i.e. meaning having the potential to), rather than the mandatory sense, (i.e. meaning must). Further, the words "a" or "an" mean "at least one" and the word "plurality" means "one or more" unless otherwise mentioned. Furthermore, the terminology and phraseology used herein are solely used for descriptive purposes and should not be construed as limiting in scope. Language such as "including," "comprising," "having," "containing," or "involving," and variations thereof, is intended to be broad and encompass the subject matter listed thereafter, equivalents, and additional subject matter not recited, and is not intended to exclude other additives, components, integers, or steps. Likewise, the term "comprising" is considered synonymous with the terms "including" or "containing" for applicable legal purposes. Any discussion of documents, acts, materials, devices, articles, and the like are included in the specification solely for

the purpose of providing a context for the present invention. It is not suggested or represented that any or all these matters form part of the prior art base or were common general knowledge in the field relevant to the present invention.

[0013] In this disclosure, whenever a composition or an element or a group of elements is preceded with the transitional phrase "comprising", it is understood that we also contemplate the same composition, element, or group of elements with transitional phrases "consisting of", "consisting", "selected from the group of consisting of, "including", or "is" preceding the recitation of the composition, element or group of elements and vice versa.

[0014] The present invention is described hereinafter by various embodiments with reference to the accompanying drawing, wherein reference numerals used in the accompanying drawing correspond to the like elements throughout the description. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiment set forth herein. Rather, the embodiment is provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those skilled in the art. In the following detailed description, numeric values and ranges are provided for various aspects of the implementations described. These values and ranges are to be treated as examples only and are not intended to limit the scope of the claims. In addition, several materials are identified as suitable for various facets of the implementations. These materials are to be treated as exemplary and are not intended to limit the scope of the invention.

[0015] Referring to **FIG. 1**, a block diagram of a vehicle to vehicle communication system 100 in accordance with one embodiment of the present invention. The vehicle communication system 100 comprises a location detection unit 102, a gyroscope sensor 104, an image capturing unit 106, a communication network 108, a memory unit 110 and a processor 112.

[0016] Referring to **FIG. 2** now, a flowchart of a method 200 for managing vehicle to vehicle communication is disclosed. The figure 2 will be explained in

conjunction with the FIG. 1. At step 202, the method begins where a user installs a mobile application in a computing device present with the user and some of the permissions like tracking, accessing contacts, SMS, sharing live location etc. are provided by the user.

[0017] If the user navigates to a destination using the mobile application, the user will know the vehicles around with their basic information like: - speed, direction, probability of overtaking etc., without knowing where they are actually heading too (the destination of nearby vehicles will not be known by user using our service). Live location/co-ordinates of all the vehicles in a given range for an individual would be shown on the map with the help of GPS and cellular networks.

[0018] The image capturing unit 106 may be installed on a vehicle. For example, the image capturing unit 106 may be present at a front portion of the vehicle. The image capturing unit 106 clicks the image of the vehicles present in front of the vehicle onto which the image capturing unit 106 is present. The image capturing unit 106 analysis the image and analysis the speed, direction and probability of overtaking of all the vehicles present in front of the vehicles onto which the image capturing unit 106 is present.

[0019] Major potholes on the road can be detected through a flight instrument, i.e., attitude indicator, which uses gyroscope and with the help of machine learning, we can detect the potholes. In one embodiment, the gyroscope may be present in the computing device present with the vehicle. At step 204, fluctuation in the motion of the car is analyzed using the gyroscope 104. An artificial intelligence and machine learning models stored in the memory unit 110 can be used to in addition to the gyroscope 104.

[0020] At step 206, if the major fluctuation is detected, crash detection system is switched ON and the user is asked whether the user wants to cancel the SOS services. The user is provided with a waiting time of 5 seconds for the user to provide an input. If no input is provided by the user, nearby police stations and

emergency units are informed. However, if the input is provided by the user, the system 100 continues monitoring fluctuations in the gyroscope. In other words, if the measured value of the gyroscope is greater than a threshold, the fluctuation is considered to be a major fluctuation and if the measured value of the gyroscope is less than the threshold, the fluctuation is considered to be minor fluctuations.

[0021] If minor fluctuation is detected, decrease in speed is measured using change in gyroscope and AI/ML models. The AI/ML models can store potholes images and learn from the stored images. Hence, the next time the pothole is detected based on the fluctuation in the gyroscope, the system 100 can automatically detect whether there was a pothole present. With the pothole detection, road conditions can be judged on the basis of uniformity/smoothness with the help of readings that is given by attitude indicator and with the process of live tracking, we can train the model to understand the road patterns using gyroscope.

[0022] With the concept of V2I (vehicle to infrastructure) and graph theory, the database of traffic lights can also be linked to the app and faster routes can be calculated. Cellular networks will help to update the live tracking. With the help of AI and Machine learning, probability of accidents/crashes, overtaking, lane changing can be calculated and can be recommended to users when or when not to overtake or change the lanes.

[0023] Referring to **FIG. 3** now, a flowchart of a method 300 for managing vehicle to vehicle communication in accordance with another embodiment of the present invention. At step 302, the method comprises providing a mobile application. The mobile application can be provided in a mobile phone available with the user of a vehicle. At step 304, the method comprises providing permissions to the mobile applications. The permissions include application control, location (GPS) permission, gyroscope permission, cellular permission, notification permission.

[0024] At step 306, the method comprises sending request to a server, by the

mobile application, with the coordinates. With this request, sensitivity of the gyroscope is measured up to its maximum level. The application uses this gyroscope for collecting data from any sudden changes in the motion of the car. This data is then analyzed for crash detection. For this, the artificial intelligence and machine learning models are stored in the memory of the server. With the help of the analyzed data and database, accident probability is analyzed and this data is stored in the database.

[0025] Also, with the request for coordinates to the server, SOS services button is activated. With this activation, a 5 seconds timer starts for the user to provide input. If an input from the user is received (N from the user), the operation of the activation is canceled. However, if the input from the user is not received (Y from the user), the information is sent to the nearby hospitals and police stations for indicating emergency situation.

[0026] At step 308, the method comprises retrieving data, by the server, from the database containing the GPS coordinates of other vehicles and checks for nearby cars. Since the GPS coordinates of all the vehicles present on the road are stored on the server, these GPS coordinates are retrieved. At step 310, the method comprises filtering, by the server, the GPS data to identify the vehicles within a specified radius. At step 312, the method comprises returning the filtered data to the mobile application.

[0027] At step 314, the method comprises marking the coordinates data and placing them as markers. With this, the user can interact with the data, to get information like speed and distance. At step 316, the method comprises periodically updating the markers as positions of the vehicles change.

[0028] The vehicles can communicate among each other in a specified range (200 - 300 foot). Communication can be in alerts, warnings, automated voice, etc. At the time of unclear and unsure vision due to night time, fog, smog, road closures and other environmental hazards, this service will provide you with the precise and accurate vision. The potential hazard from potholes (minor or major) will be

detected and informed to the other vehicles behind.

[0029] With the thought of live road analysis, we can measure the uniformity of roads. Navigation would be much easier, safe and accurate. While navigating the app would also alert user regarding the speed limit mandated by the governments or traffic police on the particular road or highway. Live traffic detection would be one of the major.

[0030] At the time of panic or accident, nearby ambulance and cops will arrive for rescue as soon as possible. Accidents can also be detected. Exchange of information like: - speed, direction, incoming potholes, etc. would take place between vehicles and road infrastructure.

[0031] The various actions, acts, blocks, steps, or the like in the flow diagram may be performed in the order presented, in a different order or simultaneously. Further, in some embodiments, some of the actions, acts, blocks, steps, or the like may be omitted, added, modified, skipped, or the like without departing from the scope of the invention.

[0032] Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention.

I/We Claim:

1. A method for managing vehicle to vehicle communication, comprising:

providing a mobile application in a computing device present with a user;

providing permissions to the mobile application;

detecting fluctuation in motion a vehicle using a gyroscope;

activating crash detection if major fluctuations are detected;

measuring decrease in speed of the vehicle if the minor detection is detected.

2. The method as claimed in claim 1, wherein if the major fluctuation is detected, the method further comprises asking the user if the user wants to cancel the SOS services.

3. The method as claimed in claim 1, further comprising providing a waiting time for the user to provide input.

4. The method as claimed in claim 3, further comprising informing the nearby police stations and emergency units if no input is provided by the user within the waiting time.

5. The method as claimed in claim 1, wherein if the fluctuation in the gyroscope is above the threshold, the fluctuation is considered to be major fluctuation.

6. The method as claimed in claim 1, wherein if the fluctuation in the gyroscope is below the threshold, the fluctuation is considered to be minor fluctuation.

7. The method as claimed in claim 1, further comprising detecting sudden changes in the motion of the vehicle and detecting accident probability using the detected change in the motion.

8. The method as claimed in claim 1, retrieving data containing the GPS coordinates of the other vehicles.

9. The method as claimed in claim 8, filtering the retrieved data to identify the vehicles within a specified radius.

10. A vehicle to vehicle communication system for performing the method as claimed in claim 1.

Dated this 02nd September, 2023

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ABSTRACT

A VEHICLE TO VEHICLE COMMUNUCATION SYSTEM AND A METHOD THEREOF

A vehicle to vehicle communication system (100) and a method (200) for managing vehicle to vehicle communication are provided. The method comprises providing a mobile application in a computing device present with a user, providing permissions to the mobile application, detecting fluctuation in motion a vehicle using a gyroscope, activating crash detection if major fluctuations are detected and measuring decrease in speed of the vehicle if the minor detection is detected.

[Figure 1]

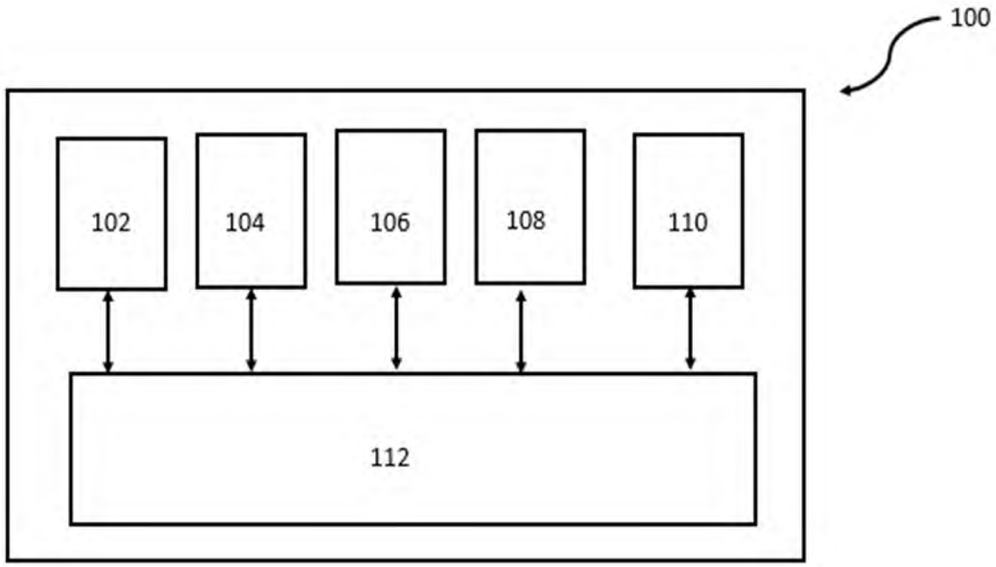

FIGURE 1

Dated this **04th September, 2023**

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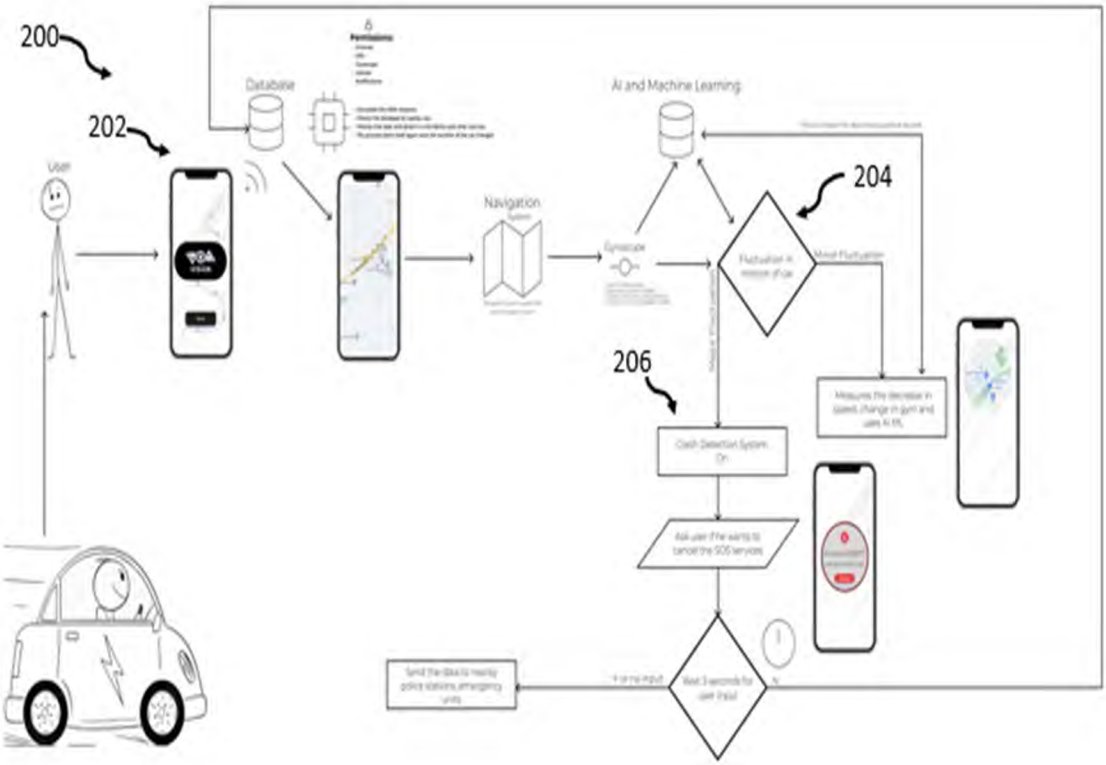

FIGURE 2

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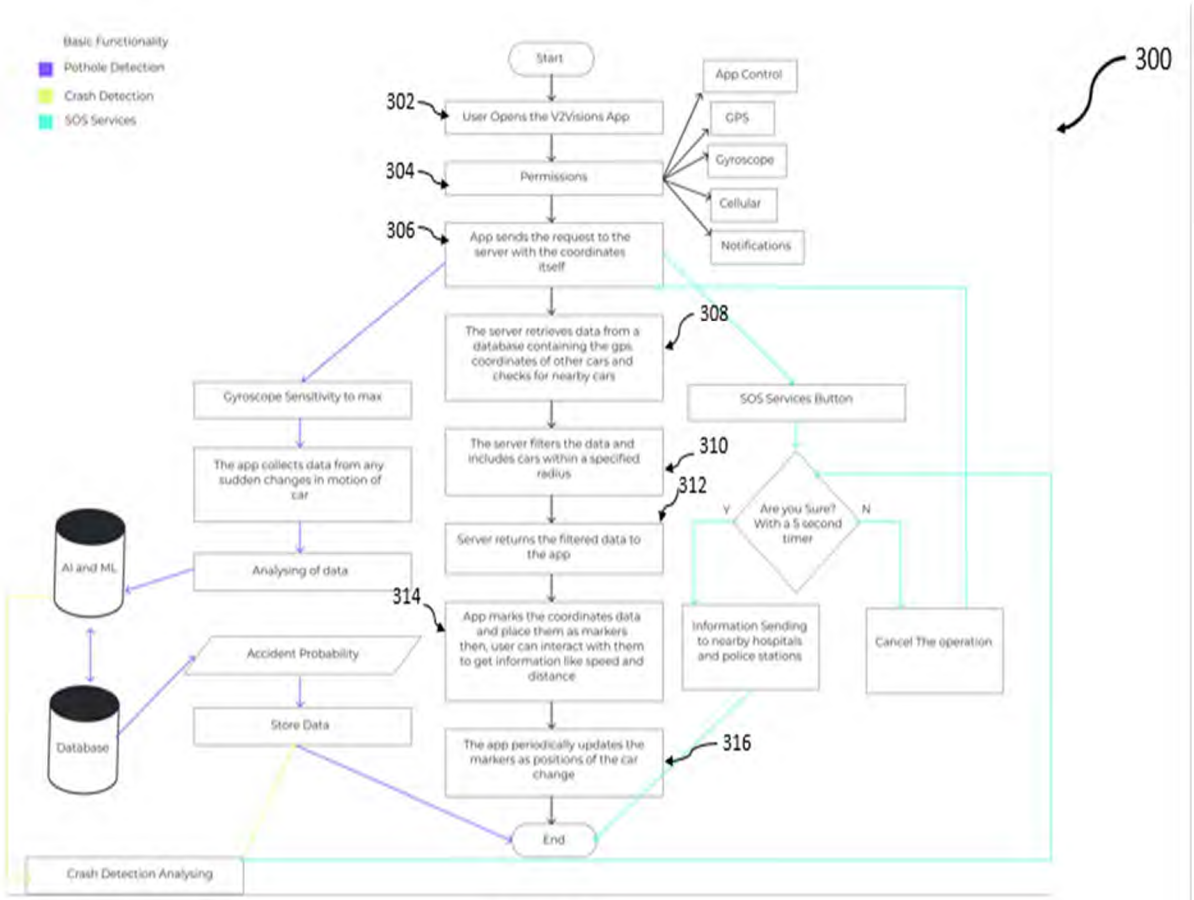

FIGURE 3

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