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(54) Title: PROXIMITY AWARENESS SYSTEM FOR MOTOR VEHICLES

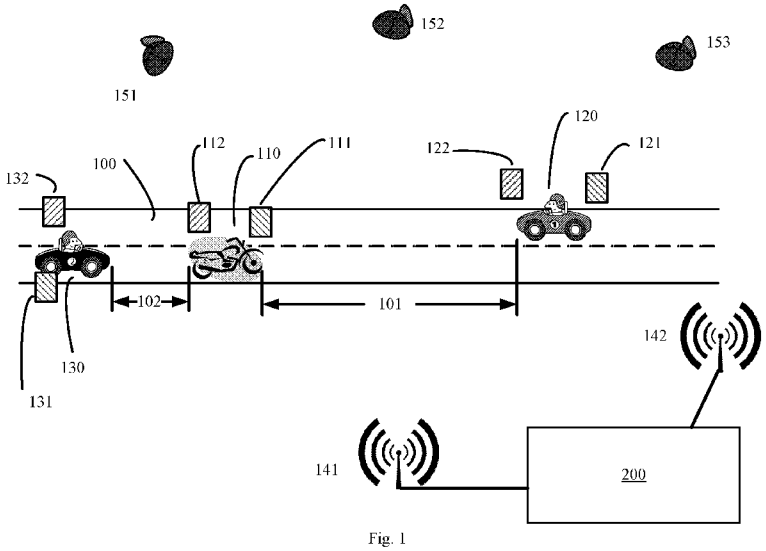

Fig. 1

(57) Abstract: Various embodiments provide enhanced warnings of potential future adverse events (e.g., automobile crashes) by tracking the location and motion of multiple vehicles, and providing alerts or warnings to the drivers of such vehicles in the event that a risk of an adverse event is identified.

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AMENDED CLAIMS
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1. A method of enhancing road safety for vehicles traveling on a network of roads, the method comprising:

receiving, at an interaction detector, a plurality of monitoring vectors from a plurality of vehicles travelling on the network of roads, the interaction detector being remote from the plurality of vehicles;

determining, from the plurality of monitoring vectors, whether there is an interaction between two of the plurality of vehicles on the network of roads, the interaction determined when the two vehicles are within a predetermined distance of one another such that the two of vehicles have a risk of collision, the interaction being determined without use of prior knowledge of a pre-planned route of either of the two vehicles on the network of roads; and

alerting an occupant of at least one of the two vehicles if an interaction on the network of roads is determined only if the at least one of the two vehicles is not within a geofence.

2. The method of claim 1, wherein determining, from the plurality of monitoring vectors, whether there is an interaction between the two vehicles further comprises first determining whether there is a potential interaction between the two vehicles.

3. The method of claim 2 wherein:

the monitoring vector from a first vehicle of the two vehicles comprises at least a location of the first vehicle, and

determining whether there is a potential interaction between the two vehicles comprises:

establishing a plurality of points proximate to the first vehicle; and

determining whether any of the plurality of points is within a risk radius of another of the two vehicles.

4. The method of claim 1, further comprising causing the one of the plurality of vehicles to take evasive action to avoid another of the plurality of vehicles.

5. The method of claim 1, wherein receiving a monitoring vector from a vehicle comprises receiving monitoring vectors generated by a location-monitoring device in said vehicle.

6. The method of claim 1 wherein the two of plurality of vehicles include a first vehicle and a second vehicle, and determining whether there is an interaction between the two vehicles comprises determining whether the first vehicle is within a risk radius of the second vehicle.

7. The method of claim 6 wherein the second vehicle is at the center of an area defined by the risk radius.

8. The method of claim 6 wherein the second vehicle is offset from, and not at the center of, a circle defined by the risk radius.

9. The method of claim 6 wherein the risk radius is defined from a projected future location of the second vehicle.

10. The method of claim 1 wherein determining whether the plurality of vehicles have a risk of collision comprises determining whether the two vehicles are on the same road such that a collision is possible.

11. A system for enhancing safety on a network of roads, comprising:

an interaction detector having a communications interface for receiving a plurality of monitoring vectors from a first vehicle and a second vehicle travelling on the network of roads;

an interaction risk module configured to determine, from the plurality of monitoring vectors, whether there is an interaction between the first vehicle and second vehicle, the interaction determined without use of prior knowledge of a pre-planned route of either of the two vehicles on the network of roads, by determining whether the first vehicle and second vehicle are within a predetermined distance of one another such that the first vehicle and second vehicle might have a risk of collision with one another on the network of roads; and

a message generator configured to generate a message to at least the first vehicle in response to a determination, by interaction risk module, of an interaction, and to send the message to the first vehicle via the communications interface only if the first vehicle is not within a geofence.

12. The system of claim 11, wherein the second vehicle is a motorcycle.

13. The system of claim 11, wherein the interaction risk module is further configured to determine whether there is an interaction between the first vehicle and second vehicle on the network of roads by first determining whether there is a potential interaction between the first vehicle and second vehicle on the network of roads, based on a point spread generated around the location one of the second vehicle.

14. The system of claim 11, wherein the message generator is further configured to generate a message to the first vehicle only if such a message has not been generated to said first vehicle within a predetermined time of a determination, by interaction risk module, of an interaction.

15. The system of claim 11, wherein the interaction risk module is further configured to determine that there is an interaction between the first vehicle and a second vehiclesuch that the first vehicle and second vehicle have a risk of collision with one another, only if monitoring vectors from first vehicle and second vehicle are contemporaneous.

16. The system of claim 11, wherein the interaction risk module is programmed to determine whether there is an interaction between the first vehicle and a second vehicle based on a projected future location of at least one of the first vehicle and a second vehicle.

17. The system of claim 11, wherein the first vehicle is an autonomous vehicle, and the message includes instructions to remotely control the first vehicle to avoid a potential collision between the first vehicle and the second vehicle.

Statement under Article 19(1)

Original claims 1 and 13 (claim 13 is now renumbered as claim 11) have been amended to include the limitation of original claim 18, and original claims 11, 12 and 18 have been cancelled. Claims 13-17, 19 and 20 have been renumbered as claims 11-17, as reflected in the attached listing of claims on replacement pages 24-27.