VEHICLE TO VEHICLE COMMUNICATION BASED INTERNAL 3-D HORN1

Abstract:

V2V based 3-D horn is a technology in which array of relatively small horn speakers are placed inside the car rather than outside. But it will not be excited by the driver of that car but will be excited by some other driver of some other car.

Outside car will send a request to our car for exciting the horn using V2V communication. Since all the horns will be inside the car, so horns will be heard by the car drivers only and not by everyone else, which will reduce noise pollution to a very low value.

An array of multiple speakers will be present inside the car. The array of horn speakers inside the car is for the driver to know the location of the outside car which is exciting the horn. It will give him the feel of the location of the outside car. Location includes 2 parameters, distance + angle. To give the feel of the distance of the outside car, intensity of the sound in the array of horns will be varied accordingly. To give the feel of the angle of the outside car, only that portion of the horn array will be excited which can depict the location of the outside car. Thus the 3-D horn will give the feel for the surrounding car location even if driver is inside the car with all windows closed.

To accomplish the above task of knowing the distance and angle, a GPS is used. Also for vehicle to vehicle communication, Xigbee is used which has a range of about 50 meters.

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There is a need to differentiate between a human and a car so that if the driver presses horn button for the human then the outside horn system should get activated so that horn should be heard by the human and not only by the nearby cars. To differentiate between human and car, a combination of GPS and radar is used.(detail equation).

Also in case GPS fails to read the coordinates, due to some whether condition or other network problems, then also the outside horn system will get activated.

Sequence of operation: Taking a scenario of 2 cars (CAR 1 AND CAR 2) with this technology installed in both of them and a human, below is the flowchart which shows the sequence of operation.

CAR 1 presses its horn button.

GPS coordinates are read for car 1.

Xigbee1 send signal 1(request for coordinate of car2)

Car2 receives signal

Car2 sends its coordinates

Receive coordinates of car 2

Radar1 measures car distance of car2

Both distance are compared. If they are equal, then no human is present between them, if unequal then a human or some other object is present between them. In that case, outside horn will be excited.

If no human is present then:

Xigbee1 send signal2 (request for horn + coordinates of car1).

CAR 2 receives signal.

Extracts the received coordinates of the car1.

Read its own coordinates

Compare both the coordinates to know the location of the car 1

Excite the corresponding horn with corresponding intensity.

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COST OF HARDWARE AND RESPONSE TIME:

HARDWARE: Each vehicle should be equipped with-:

GPS

XIGBEE transmitter and receiver

RADAR

SPEAKER (min 12)

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