AUTONOMOUS VEHICLE USING
VANET TECHNOLOGY

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Abstract—**Vehicular ad-hoc network is basically used to improve road safety and driving comfort. The objective of this paper is, to provide vehicle-to-vehicle communication system and also providing an autonomous car which will detect its path , focussing on collision avoidance.**

Every vehicle on the road, can transfer message to other vehicles , to the base station within its range or with the help of other vehicles. The IR Sensors are used to detect obstacles on the road and the car detect its path according to the situation.

Hence, in this proposed work , it will focus on building an autonomous car that will use VANET technology or exchanging information.

Keywords—**VANET , V2V communication, Infrared sensor,**

IC max232, microcontroller AT89C51, motor 10rpm 12DC

I. INTODUCTION

Autonomous vehicle equipped with VANET technology is recently developed idea which is gaining a lot of importance these days. The intention is to provide self navigated vehicle that does not require driver to navigate .also with the help of VANET technology information can be exchanged between the vehicles in range (V2V communication).

Autonomous vehicle is a vehicle that can detect its own path. A lot of companies are investing large amount to build such type of vehicle with . The vehicle will be able to avoid obstacle in the path and navigate on its own reducing the dependence on driver .This feature is very useful and it can be used for investigation purposes where it can be dangerous for humans to go. A collision avoidance system involves at least the following 3 main parts

1. object detection

2. decision making

3. actuation

Another application of autonomous vehicle is collision avoidance .As the vehicle is having IR sensors so it will beforehand detect the vehicle which is about to collide and accordingly sensing the collision it will change its path.

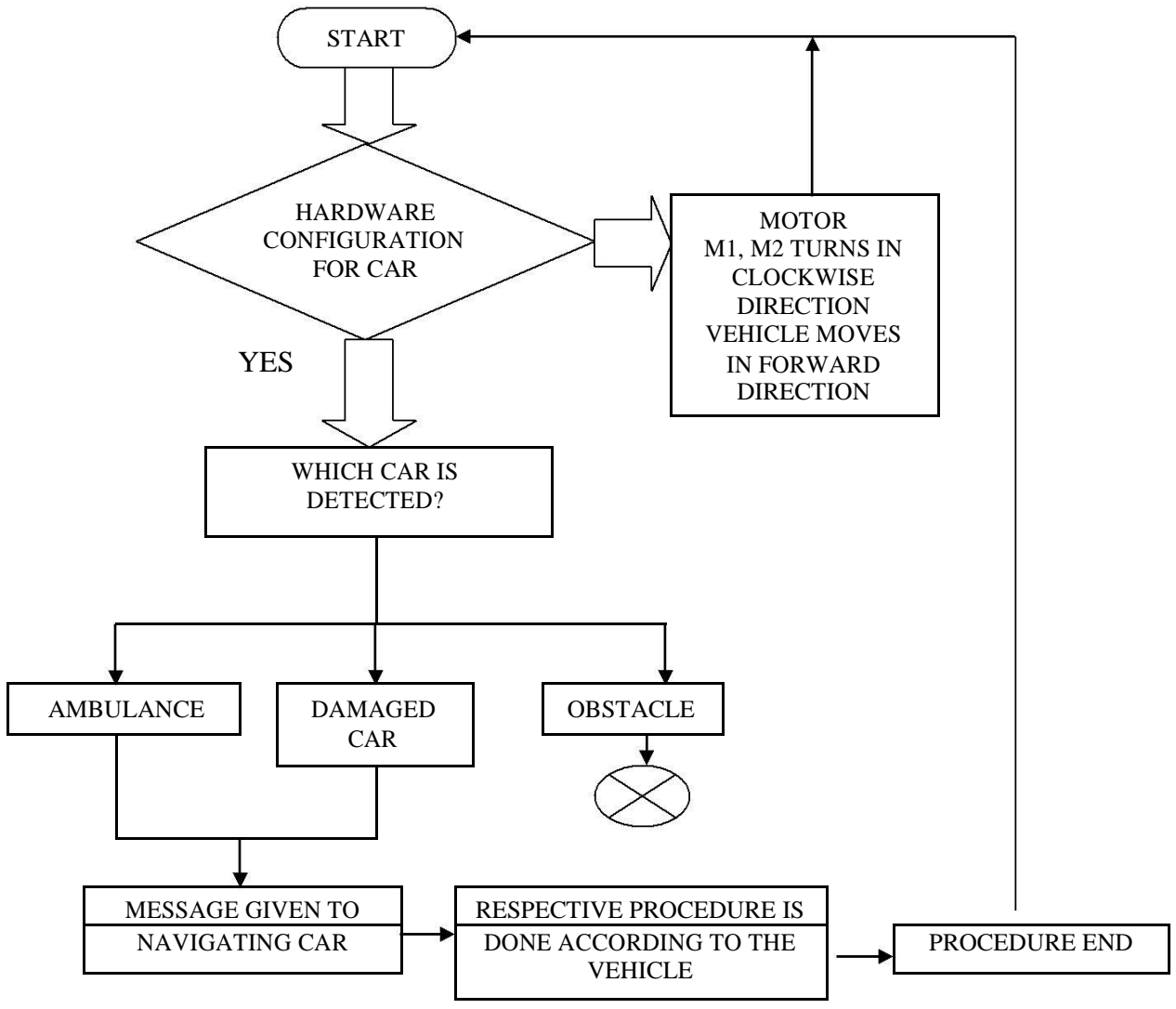In addition to self piloted vehicle our project also uses VANET .

In addition to self piloted vehicle our project also uses VANET technology .v2v communication and v2I comm. in VANET .vehicles will be able to connect with each other using a wireless network .each vehicle will have an board unit with which it will transmit messages and data packets to required destination using v2v comm.

Suppose if a vehicle breaks down in an unknown location and base station in far away. Then it becomes difficult for them to call for help .By using v2v comm. this vehicle can transmit message to the vehicle passing by. This vehicle in turn can send the message to the base station from where the necessary help can be given.

Another feature that we are showing in our project by using the concept of autonomous and VANET technology it is to clear the path whenever the ambulance is behind the navigating vehicle .Let us assume ,a situation which is often seen on our roadways that clearing the path for the ambulance behind .when the navigating vehicle detects an ambulance behind it, it will clear the path for ambulance to go first.

Thus, the objective of this paper, is to develop an autonomous vehicle that will use VANET technology to establish communication within the vehicles. Self guided vehicle that will avoid collision by detecting its own path.

II. METHODOLOGY

CHECK WHICH WAY TO MOVE

MOTOR
M1-STOP
M2-CLOCKWISE TURN
MOVE IN LEFT DIRECTION

MOTOR
M2-STOP
M1-CLOCKWISE TURN
MOVE IN RIGHT DIRECTION

START

HARDWARE CONFIGURATION FOR CAR

YES

MOTOR
M1, M2 TURNS IN CLOCKWISE DIRECTION
VEHICLE MOVES IN FORWARD DIRECTION

WHICH CAR IS DETECTED?

AMBULANCE

DAMAGED CAR

OBSTACLE

MESSAGE GIVEN TO NAVIGATING CAR

RESPECTIVE PROCEDURE IS DONE ACCORDING TO THE VEHICLE

PROCEDURE END

Flow chart represents that how the data transmit and when the decision time comes. How system will react when the vehicle is detected .The actions will be taken in which sequence.

When our vehicle is started , the hardware configured i.e .IR sensors will detect that whether there is any vehicle/obstacle on its path. If the vehicle/obstacle is detected ,then by using IC max 232 it will decide that which type of vehicle is it (ambulance ,damage car, or any obstacle)

Then according to the vehicle, the respective message will transmitted to the navigating car. and the further procedure is done according to the vehicle.

When the obstacle is detected, then microcontroller will check which way to move .When the obstacle is on the left side, motor m2 is stop and m1 turns in clockwise direction and the vehicle moves in right side. when the obstacle is on right side, motor m1 is stop and m2 turns in clockwise direction and vehicle moves in left side.

When no vehicle is detected by the sensor ,both the motor m1 and m2 turns in clockwise direction ,and the vehicle is forward direction

After performing all these tasks, the IR sensors will again start to detect the vehicle and the process continues .

The project uses AT CS51 microcontroller belongs to ATMEL'S family .In 40 pin AT89C51 ,there are ports 4 designated as P0,P1,P2,P3. These ports are bidirectional. Port 3 has multiplexed pins for special functions like serial communication, hardware interrupts, timer input. It can be programmed to operate at different baud rate.

The sensors use in the project are IR Sensor. A sensor converts physical parameter (temperature, speed etc.)into a signal which can be measured by electronic devices that are frequently used to detect and respond to electrical signal. IR Sensor detect Infrared wavelength between 0.7 to 1000 microns. The basic concept of IR obstacle detection is to transmit the IR signal in a direction and a signal received at IR receiver when the IR radiation bounces back from the surface of object. IR LED transmit IR signal onto the object and the reflected signal is received by IR receiver.

The MAX232 is used to convert the TTL / CMOS logic level to RS232 logic level during serial communication of microcontroller with PC. The controller operates at TTL logic level(0-5V) whereas serial communication in PC works on RS232 standard (-25 V-+25V) . The intermediate link is provided through MAX232. The IC MAX232 is a dual driver/reciever. The information is exchanged between the vehicle using zigbee. Zigbee is based on IEEE 802.15.4 standard zigbee devices can transmit data over long distances by passing data through mesh network of intermediate devices to reach more distance once. It is typically used in low data rate application. Zigbee has a define rate of 250kb/s, best suited for intermittent data transmission from a sensor or input device . Zigbee is a low cost low power wireless mesh network standard targeted at wide development long battery life devices in wireless control and monitoring applications .Zigbee operates in industrial, scientific and medical radio bands 2.4 GHz in most jurisdictions worldwide. The motor used over here has 10 rpm operates at 12V,DC.Thus we can say that the IR sensors will detect the vehicle / object nearby. The information is conveyed to the microcontroller if there is an obstacle or not and accordingly sensing the obstacle decision will be taken by the microcontroller which will drive the DC motor in turn driving the wheels in proper direction. Thus the vehicle will take navigate on its own .It will be able to avoid obstacles on the road. Another application proposed in our work is communication between the vehicles using V2V communication. IR sensors will detect the vehicle ,if ambulance is detected it will transmit the message using zigbee. The vehicle will give clearance to the ambulance .If there is a breakdown of the vehicle on the way then this vehicle can send the message to passing by vehicle using zigbee ,the moving vehicle can send the message to the base station from where the emergency help can given.

III. CONCLUSION

This project shows an autonomous vehicle that will detect its own path. Also we have used VANET technology that will facilitate information exchange between vehicles .Thus the vehicle will be able to avoid collision , give clearance to ambulance and facilitate information exchange. Thus it will improve road safety and reduce dependance on drivers . This autonomous car will be take decisions on its own.

IV. REFERENCES

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