

AVOIDANCE OF FLAT TYRE AND PATCH HOLES FOR ALL MOTOR VEHICLE BASED ON IOT

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ABSTRACT

When the vehicle is running at high speeds, flat tires are often hazardous. Extent of impact varies depending on how fast air pressure drops in, and how long the vehicle runs on a flat tire. It could even damage the axles. Vehicles that run on flat tire are prohibitively expensive. Some low-end vehicles are providing tire pressure details on the front panel only at the time of starting the car. Moreover, use of pressure sensor is an intrusive mechanism and susceptible to wear and tear. Detecting path holes for vehicles on road is also an essential feature to keep a track in order to avoid critical situations. LiDAR is one type of wave transmission which uses the light in the form of a pulsed laser to measure ranges just the way RADAR does. These waves return echoes from certain features or targets that allow the determination of important properties and attributes of the target. When the pressure in the tyre gets reduced the person need to go mechanic shop in order to solve his problem. So we developed an app nearby mechanic shop. In this app if tyre gets flat message will sent to mobile and also if they are an mechanic shop nearby message will sent to mobile using MQTT. This project is a non-intrusive solution for identifying flat tire at any speed and alerts driver on his mobile, and, uses LiDAR for detecting path holes and alerts to deviate a little for preventing damages to the wheel. The NodeMCU and Android technology are used. The hardware components are NodeMCU, two mini lidars and I2C level converter.

Keywords: LiDAR, RADAR, Tyre, Path Holes, I2C

I. INTRODUCTION

When a vehicle is moving flat tyre and detecting of patch holes is very difficult, so we have designed a model to detect the pressure in the tyre and when the pressure gets reduced we will get a notification at the same time the patch holes ahead in our way can be detected and a notification will be sent to us such that we can divert our way. So for detecting the pressure in the tyre and for detecting the patch holes we have used two mini LIDARs. These LIDARs will detect and give information to the microcontroller then the microcontroller will send a notification message to our mobile through MQTT.

The two LIDARs used of which one is used for detecting the pressure in the tyres such that we can stop the car immediately and the other is used for detecting the patch holes ahead in our way such that we can divert from the way. We also developed an app through which we will get nearby mechanic shops location such that when pressure in tyre gets reduced we can get information of the mechanic shops which will be easier for

us. This model can be used to avoid the consequences of the flat tyre and the damage to the vehicle due to patch holes on the road. The LIDARs used will detect the pressure in the tyre by emitting the laser light.

II. PROPOSED PROJECT

The objective of the project is to avoid the consequences of flat tyre and patch holes on the road. For the implementation of this model we have used two LIDARs of which one is used for detecting the pressure in the tyre and the other is used for detecting the patch holes on the tyre. The microcontroller used here is NodeMCU. For implementing this model we have used a LIDAR to detect the pressure in the tyre. Initially the required pressure value for the tyre is fixed in microcontroller and the LIDAR used will be sensing the pressure in the tyre and when the pressure in the tyre gets reduced then immediately a notification message will be sent to our mobile from the microcontroller through MQTT indicating that pressure in the tyre got reduced such that we can stop the vehicle and get it repaired or replaced. For implementing this model we have used a LIDAR which will detect the patch holes on the road by emitting the laser lights on the road and receiving them back in the form of echoes. Initially the sensors maximum range of travelling on the flat road will be fixed in the microcontroller and the LIDAR will be sensing the range of the road as the range increases then a patch hole is detected then the microcontroller will send a message to the mobile indicating that there is a patch hole ahead through MQTT such that we can divert the way. If the pressure in the tyre gets reduced or if any other repair occurs then an app is developed to get the location of the nearby mechanic shops such that without any risk we can get our vehicle repaired. The proposed block diagram is given below in the figure 2.1

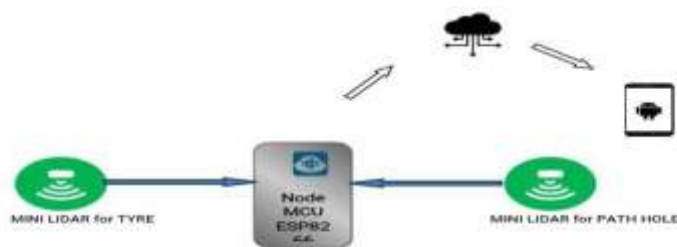


Fig 2.1 Block Diagram of the Proposed Architecture

III. FLOW CHART MODEL

The flow chart model for the proposed system architecture is given below in the figure 3.1

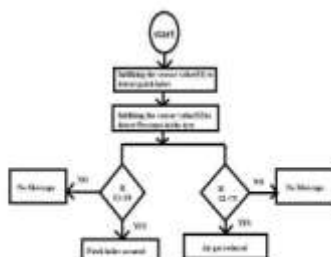


Fig 3.1 Flow Chart Model for the Proposed Architecture

First we need to initialize the sensor values S1 and S2. Sensor(S1) is initialized to detect the patch holes and Sensor(S2) is initialized to detect whether pressure in the tyre gets reduced or not. After initializing the sensor values, We need to check the conditions for both patch holes and flat tyres. If sensor range S1 is greater than the distance(mentioned in flow chart) then a patch holes is detected then the microcontroller will send a message to the mobile indicating that there is a patch hole ahead through MQTT such that we can divert the way. In the same way Sensor S2 will check the condition for flat tyre. If the sensor range S2 is less than the condition mentioned in above flow chart then pressure in the tyre reduced and message will sent to mobile from microcontroller through MQTT.

IV.RESULTS AND DISCUSSION

We successfully designed the project “AVOIDANCE OF FLAT TYRE AND PATCH HOLES FOR ALL MOTOR VEHICLE BASED ON iot”. LIDAR’s will detect the pressure in the tyre and when the pressure gets reduced we will get a notification at the same time the patch holes ahead in our way can be detected and a notification will be sent to us such that we can divert our way. These lidars will detect and give information to the microcontroller then the microcontroller will send a notification message to our mobile through MQTT.

SAMPLE OUTPUT:



V.CONCLUSION

Thus we have successfully designed and implemented the model for AVOIDANCE OF FLAT TYRE FOR ALL MOTOR VEHICLES BASED ON IoT and developed an app for location of nearby mechanic shops.

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