ON-STREET INFRASTRUCTURE FOR NON-INTRUSIVE ARRANGEMENT FOR VEHICULAR NETWORKS

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ABSTRACT:
The main objective of this concept is to provide enhanced services for vehicles in the automobile industry. Intelligent Transportation Systems are grounded on vehicular networks, i.e., efficient data communication networks receiving data from several entities play a vital role in protecting the vehicle. By relying on the global behaviour of drivers, our strategy does not incur in privacy concerns. By knowing the entered zone of the area, automatically speed limit will be set. Here, the GPS is used to know the zone. Finally, the speed limit will be set based on the GPS location. Automatically, this sophisticated system will take in to control by limiting the speed of the cat; if a car driver exceeds that zone limit. Along with that; rash driving and tire pressure monitoring are implemented as an extension of this concept with advanced sensors. An accelerometer is used for rash driving, the piezoelectric sensor is used for tyre pressure monitoring.

KEYWORDS: Raspberrypi3, Vehicular Networks, vehicle-to-infrastructure, Global position system, Accelerometer, Piezo.

INTRODUCTION:
Vehicular Networks (VANETS) [1] [2] are wireless communication networks that support cooperative driving among communicating vehicles on the road. According to Karagiannis et al. [3]" vehicular connectivity techniques can significantly enhance the efficiency of travel, reduce traffic incidents and improve safety, mitigate the impact of congestion". The VANETS involve vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communications. In V2V communication, the vehicles exchange messages without any support infrastructure [4]. However, V2V communication may become inefficient in sparse areas such as highways, rural zones and low peak hours in the city due to the lack of communicating pairs and radio obstacles. On the other hand, several research studies demonstrate that minimum support infrastructure, i.e., the usage of a V2I network, may largely improve the overall efficiency of the vehicular network [5]–[8]. Despite the advantages of an infrastructure vehicular network, the main drawback of a V2I network is the need of installing the Roadside Units (RSUs), which are usually expensive [8,9], turning the decision related to the amount and location of RSUs a challenge to planning authorities. On the other hand, these planning authorities want that a maximum among of vehicles is connected to some RSU during its trip. However, due to the RSU costs, these authorities usually have a restrict number of available RSUs. In this work, a problem to deploy RSUs is tackled in order to maximize the number of distinct vehicles contacting the infrastructure, an interesting metric when we intend to collect and disseminate small and self-contained traffic announcements [10]. It is assumed the vehicle will receive the information if it gets in contact with an RSU at least once. Under this assumption, the goal is to place the RSUs at η of the possible intersections so as to maximize the number of vehicles that enter an RSU coverage area at least once. Intelligent Transportation Systems are grounded on vehicular networks [1], i.e., sophisticated communication networks receiving data from several entities composing the traffic system. In a vehicular network, the communication may happen in an ad hoc basis where vehicles exchange messages without any support infrastructure [2]. However, the ad hoc communication may become inefficient in sparse areas such as highways, rural zones, and low peak hours in the city due to the lack of communicating pairs and radio obstacles. The intense mobility of vehicles also makes routing far complicated as we lack reliable means to

infer the future location of vehicles. Although the communication may take place in an ad hoc basis, several works [3], [4] demonstrate that a minimum support infrastructure may largely improve the overall efficiency of the network.

LITERATURE SURVEY:

According to international Interpol, statistic revealed that 4.2 million vehicles stolen in 2008 from 149 countries. Because of this Insurance companies phase the problems. Later they start finding the solution for this. The existing system contains the alarm system it has some disadvantages like, with high-speed matching algorithms and fast integration, this technology has been widely exploited to safeguard vehicles and identity fraud. In 2012, Karthikeyan et al. used a fingerprint sensor, (Fingerprint module 3030) along with microcontroller AT89c52 to validate the user [12]. Z. Brijet et al. combined the Fingerprint sensor and Arduino. The connection from the ignition switch that supplies voltage is given to the voltage regulator which is connected to Arduino in-order to turn it on and off. Fingerprint sensor activated the relay which in turn controlled the starter relay resulting in the vehicle turning on. If the finger image does not match any of the images stored in the database, then the starting system is disabled [13]. [3]The main aim of this project is to prevent the vehicle from probable theft. To achieve this we are incorporating security by including biometrics, i.e. a fingerprint. In the beginning, the owner of the vehicle must store his/her own fingerprint in the fingerprint module. The GSM modem is used to send and receive messages to and from the owner. The owner's mobile number has to be set fixed during the coding. To start the ignition of the four-wheeler one should enter the authorized fingerprint. If anyone enters an unregistered fingerprint, the owner will immediately receive a message and the local alarm system will be turned on. For theft prevention, we can also trace the four-wheeler by giving a call to the GSM modem which is embedded on the system. Then real-time tracking begins and the GPS location of the vehicle is sent to the owner by SMS. The ignition of the vehicle can also be controlled through notifications to the system. In this proposed project we are using GPS module to find the current latitude and longitude of the present location, the GPS module is UART (Universal Asynchronous Receiver/Transmitter) with a baud rate of 9600 bps. We are using two serial ports. One is used for the GSM modem and another one for the GPS modem. The coding is written in embedded c language and Arduino IDE was used to program it. It is a fitted device on the automobile. The whole monitoring of the entire device is done by the mobile phone which delivers wireless connection amongst the vehicle tracking system device and the customer. The vehicle tracking device also has a dedicated sim card slot in which a GSM SIM card is inserted in to receive and send SMS. The user can send an SMS through his mobile phone to know the location of its vehicle and also the facility to safeguard the vehicle. So for the understanding of the whole operation of this vehicle tracking system is distributed in two parts: 1. Tracking the position of the vehicle. 2. To provide security to the vehicle. The vehicle tracking system consists of a GPS receiver which provides the real-time position of the automobile. This real-time data is deposited in MMC(Main Memory Module) after a set time of intermission by the MCU(Main Control Unit). GSM module is undoubtedly associated with the MCU which is then used to propel and receive the SMS. GSM module takes the information from the MMC and sends this information to the registered user's mobile cell phone. This data consists of longitude, latitude, altitude, the speed over ground, and the course over ground, the real-time and date. By using Google maps we can then locate the exact location of the vehicle. The vehicle tracking system also has another singular feature which tells not only the whereabouts of the vehicle but also securing the automobile. Shaikh et al. [5] describe the arm7 based smart car security system. The principal point of this undertaking is to offer a development security framework in automobile, which comprises of a face detection subsystem, a GPS module, a GSM module and a control stage. The face location subsystem can discover confronts in a vehicle amid the period in which no one ought to be in the auto, and make an alert uproariously or soundlessly. Alternate modules transmit vital data to clients and help to keep eyes on vehicle constantly, actually when the vehicle is lost. This framework model is based on the base of one inserted stage Arm7 which controls all the processes. Jian-ming et al. [6] describe vehicles against robbery framework utilizing GSM and GPS module. The framework is created utilizing fast blended sort single-chip C8051f120 and the stolen vehicle is discovered by the utilization of vibration sensor. The framework stays in contact with auto holder through the GSM module, for the safety and reliability of the car. Kaushik et al. [7] depict an Anti-burglary vehicle security framework which plans to permit access to the vehicle just if the individual's finger impression matches that put away in the framework. The correlation

will happen in Mat lab and the result will be demonstrated on the LCD. On the off chance that through illicit means the vehicle is accessed then vehicle fuel tank will be bolted through Relay circuit so that at whatever point the tank gets unfilled, the unapproved individual will never again have the capacity to refuel the tank. Ibrahim et al. [8] describe a hostile to burglary security framework that uses an installed framework outline with Dual Tone Multi-Frequency (DTMF) and a GSM to screen and shield an automobile. It secures the auto or vehicle against burglary. Upon actuation, it naturally grounds the auto by detaching the ignition scratch supply from the auto battery. In an attempt of theft through the car doors or boot, the system sends a text message to the car owner and at the same time starts up an alarm. Nagaraja et al. [9] describe the outline and improvement of a GSM based vehicle robbery control framework for a car. The created framework makes utilization of an inserted framework focused around GSM innovation. An interfacing mobile or GSM modem is associated with the microcontroller, which in the term is joined with the engine through the relay. In the event that the vehicle is stolen, the data is sent to the owner that somebody has stolen his vehicle. After that, the user or owner will send the message to GSM modem or mobile which is joined with motor ignition through transfer or relay to switch off the engine. Rashed et al. [10] describe a GPS based tracking system that keeps track of the location of a vehicle and its speed based on a mobile phone text messaging system. The system is able to provide real-time text alerts for speed and location. The present location can be locked and the system will alert the owner if the vehicle is moved from its present locked location. In every one hour, the GSM modem or mobile will inform the owner by messaging its location in the form of latitude, longitude and speed information. The owner or user can control or stop the vehicle by simply sending the message stop to GSM modem or mobile connected to the circuitry board. After receiving that message ignition system will turn off.

PROPOSED TECHNIQUE:

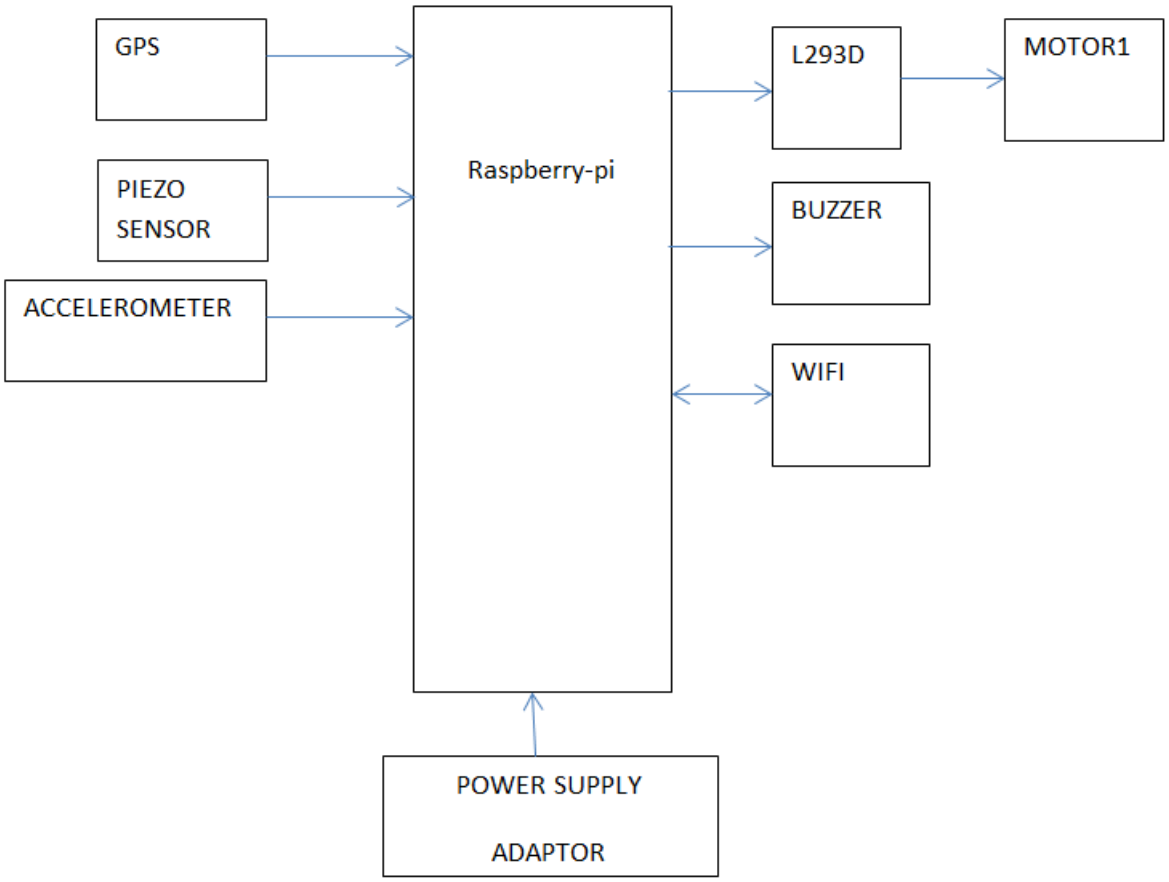

Fig: Proposed block diagram.

The diagram in the above figure shows the overall system. The system comprises of Raspberrypi-3 with inbuilt WIFI and many more peripherals, Accelerometer, Piezo sensor, L293D driver IC, DC Motor, 5V/2A adaptor, GPS module. This proposed system recognizes the locality by using GPS latitude, longitudes. Speed limits of the Locality are also captured and based on that limits; raspberry-pi checks whether this car is travelling within that limits or not. The car will be automatically taken in to control by raspberry-pi if any violation occurs by the driver. Accidents occurrence risks also reduced by using the accelerometer and piezoelectric sensors.

HARDWARE REQUIREMENTS

The **Raspberry Pi** is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation. The Raspberry Pi 3 Model B is the latest product in the Raspberry Pi 3 range with Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz, 1GB LPDDR2 SDRAM,.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE etc..

Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps) to promote the teaching of basic computer science in schools and in developing countries The original model became far more popular than anticipated selling outside of its target market for uses such as robotics. Peripherals (including keyboards, mice and cases) are not included with the Raspberry Pi. Some accessories, however, have been included in several official and unofficial bundles.

Every single location in the entire globe can be specified in terms of geographical coordinates. The geographical coordinate is a system which specifies any given location on the earth surface as latitude and longitude. There are devices which can read the geographical coordinates of a place with the help of the signals received from a number of satellites orbiting the earth. The system of satellites which helps in the positioning of a place is called Global Positioning System (GPS). The devices which can read the geographical coordinates of a place with the help of at least four GPS satellites are called GPS Receiver or simply GPS module.

An accelerometer is an electromechanical device that will measure the vibration or acceleration of motion of a structure. The force caused by vibration or a change in motion (acceleration) causes the mass to "squeeze" the piezoelectric material which produces an electrical charge that is proportional to the force exerted upon it. Since the charge is proportional to the force, and the mass is a constant, then the charge is also proportional to the acceleration. There are two types of piezoelectric accelerometers (vibration sensors). The first type is a "high impedance" charge output accelerometer. In this type of accelerometer, the piezoelectric crystal produces an electrical charge which is connected directly to the measurement instruments. The charge output requires special accommodations and instrumentation most commonly found in research facilities. This type of accelerometer is also used in high-temperature applications (>120C) where low impedance models cannot be used.

The L293D is an integrated circuit motor driver that can be used for simultaneous, bi-directional control of two small motors. Small means are small. The L293D is limited to 600 mA, but in reality, can only handle many small currents unless you have done some serious heat sinking to keep the case temperature down.

The direct current (DC) motor is one of the first machines devised to convert electrical power into mechanical power. Permanent magnet (PM) direct current converts electrical energy into mechanical energy through the interaction of two magnetic fields. One field is produced by a permanent magnet assembly; the other field is produced by an electrical current flowing in the motor windings. These two fields result in a torque which tends to rotate the rotor. As the rotor turns, the current in the windings is commutated to produce a continuous torque output.

The **piezo buzzer** produces sound based on the reverse of the piezoelectric effect. The generation of pressure variation or strain by the application of an electric potential across a piezoelectric material is the underlying principle. It consists of piezo crystals between two conductors. When a potential is applied

across these crystals, they push on one conductor and pull on the other. This, push and pull action, results in a sound wave. Most buzzers produce sound in the range of 2 to 4 kHz.

The proposed work can be applied to industrial needs, home or domestic applications, in banking and vehicular safety.

CONCLUSION:

This paper presents an efficient real-time a vehicle tracking system that is flexible, customizable and accurate using GPS, Raspberry-pi3 network, suitable for a wide range of applications all over the world. The combination of the software and hardware provides continuous and real-time tracking. It can also check vehicle driving nature, tyre pressure for safety happens and will notify immediately to the numbers provided in application by the end user and therefore people in the car can get service as early as possible by minimizing the casualties.

FUTURE ENHANCEMENT:

Further, this project can be enhanced to improve the efficiency of this methodology by inserting a camera module for recognition of lanes, traffic sign boards. This system monitors the vehicle condition like speed, turnings, signal jumps etc. based on the recognized sign. If any violation occurs, automatically takes the corresponding action without any human interaction.

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