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User Interference Intelligence Smart Transportation using IOT

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Abstract:- **With the increasing size of urban population, cities are facing a diverse range of issues such as severe traffic congestion deteriorating air quality, increasing road accidents, exploding growth in number of private vehicles. At the same time the share of public transport is decreasing. The reason is lack of dependable on public transport facilities. With the development information technology internet of things (IOT) is becoming a reality. IOT can assist in the integration of communication, control and information processing present in the public transportation system (PTS). This work deals with implementation of IOT in the public transport system by providing information such as bus number, arrival time, and the number persons on board to the end user. The cost effective prototype model developed collects data at the vehicle terminal, uploads the updated data to the user through the internet and makes data visible to the awaiting user. Key technologies used in the proposed work are RFID, GPS and controller with in-built WI-FI module.**

Keywords: WI-FI module, IoT, Smart Transportation, RFID, GPS, AHS.

1. INTRODUCTION

Extensive research has been focused on automated highway system (AHS) in the past two decades. The highway control system extracts useful and accurate traffic information for traffic flow control, such as vehicle count, vehicle speed, and vehicle classification [1].

The basic techniques involve detection and communication. In most of the automated highway systems, the intelligence is provided only to the vehicles, but in this case, the intelligence is provided to vehicles as well as the highway.

This intelligence system will decrease the load effort on the drivers as a part of the intelligence is being provided to the road. The proposed framework is shown in the Fig. 1. In this paper we present a novel approach for vehicle detection, communication, synchronization, and control strategies [2]. The basic framework of this system comprises of a highway and a narrow road linked to it. Here a vehicle on the narrow road wants to enter the highway and there is a possibility of another vehicle on the highway. This paper will present the control strategies for synchronizing the movement of these vehicles approaching the junction.

These strategies can be applied to solve the problem of steering an autonomous vehicle on a highway and a narrow road. The aim of this system will be to control the speed of the vehicle on the narrow road (which wants to enter the highway) without affecting the speed of the vehicle which is on the highway [3]. Thus we will strategize solutions in such a way that the vehicle on the narrow road will adjust itself without affecting any movement of the vehicle on the highway. The speed of both the vehicles will be calculated and based on that, the time required to reach the junction by each of them will be found out. The junction is the point of intersection of the highway and the narrow road [4].

The following will be achieved with the help of sensors, a data transmitter and a receiver. The sensors will be placed on the roads which will be able to detect the position and the speed of the vehicles [5]. There will be a data receiver on every vehicle.
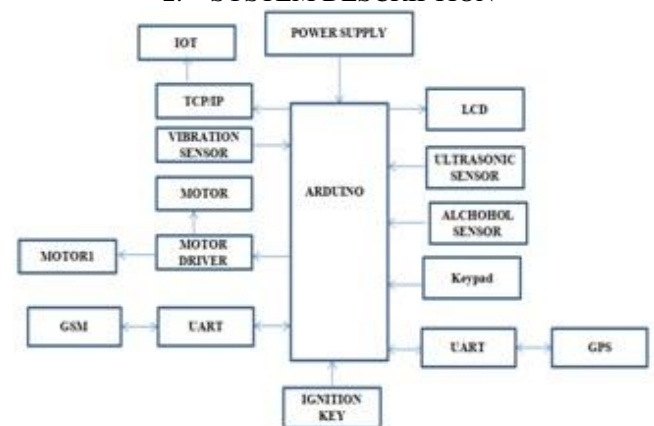
2. SYSTEM DESCRIPTION

Fig.1 Block Diagram of PTS

When there is a huge traffic on the one side of the traffic signal, it should be cleared as soon as possible. But in our existing traffic system, one should wait until their turn comes even if there is a heavy traffic in that particular lane.

To avoid this we can provide a sensor which is capable of analyzing the traffic intensity. This can be used to clear the traffic as soon as possible before causing a traffic jam. In this system, sensors are used to prevent loss of energy by the unnecessary usage of street lights at midnight.

At nights street lights are switched ON even if there are no travelling vehicles. So, in order to overcome this, sensors are used for street lights and when a vehicle pass through the sensors, the street light is switched ON' and when the vehicle passes the particular street light, the next street light will be switched 'ON' automatically and the previous lights are switched 'OFF'.

This is continued throughout the street thereby saving the energy. Ultrasonic sensors are used to detect the traffic intensity which gives a signal to arduino uno about the traffic intensity and this will be able to clear the traffic.

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2.1 ARDUINO UNO

Arduino is an open source microcontroller which can be easily programmed, erased and reprogrammed at any instant of time. Introduced in 2005 the Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices hat interact with their environment using sensors and actuators. Based on simple microcontroller boards, it is an open source computing platform that is used for constructing and programming electronic devices. It is also capable of acting as minicomputer just like other microcontrollers by taking inputs and controlling the outputs for a variety of electronics devices. It is also capable of receiving and sending information over the internet with the help of various Arduino shields, which are discussed in this work.

Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed easily using the C or C++ language in the Arduino IDE.

2.2 GPS

It stands for global positioning system. The original name for GPS is NAVSTAR GPS. It does not require the user to transmit any data and it operates independently of any internet reception. These technologies can enhance the usefulness of GPS positioning information.

2.3 VIBRATION SENSOR

These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge.

2.4 GSM

It stands for global system for mobile communication is a digital mobile network that is widely used by mobile phone users. GSM digitalize and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot.

2.5 ULTRASONIC SENSOR

It is an electronic device that measures the distance of a target object by emitting Ultrasonic sound waves, and converts the reflected sound into an electrical signal.

2.6 IOT

The Internet of Things or IOT is a system inter-related computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

2.7 ALCOHOL SENSOR

An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is an output reading. The sensor can activate at temperatures ranging from -10 to 50℃ with a power supply is less than 150Ma to 5v.

3. UART

A universal asynchronous receiver-transmitter is a computer hardware device for asynchronous serial communication in with the data format and transmission speeds are configurable. The electric signaling levels and methods are handled by a driver circuit external to the UART.

4. TCP/IP

TCP/IP stands for transmission control protocol /internet protocol, which is the set of networking protocols that allows two or more computers to communicate. The defense data network, part of the department of defense developed by TCP/IP and it has been widely adopted as a networking standard.

5. CONCLUSION

We have implemented and demonstrated the use of a novel intelligent traffic system. The system can provide real time sensor information to end users. The feasibility of the new scheme has been demonstrated by the actual implementation of the system and from the associated monitoring sessions. The session operations show the applicability and functionality of the implementation. This paper includes use of various sensors like IR sensor that detects various type of accidents, to avoid it, a novel idea is proposed for monitoring the accident over the highways.

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