

Intelligent Smart Traffic Signal System

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ABSTRACT

Intelligent traffic control system to pass emergency vehicles smoothly. Each individual vehicle is equipped with special radio frequency identification (RFID) tag (placed at a strategic location), which makes it impossible to remove or destroy. We use RFID reader system-on-chip to read the RFID tags attached to the vehicle. IR sensors counts number of vehicles that passes on a particular path during a specified duration. It also determines the network congestion, and hence the green light duration is decided dynamically by the system for that path. If the RFID-tag-read belongs to the stolen vehicle, then a message/mail is sent using messaging web api to the police control room and the owner also. In addition, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn ON the green light. Android application is used to view the current traffic.

Keyword : - RFID, Infrared Sensor, Light Emitting Diode.

1. Intelligent Smart Traffic Signal System

Intelligent Traffic Systems (ITS) applications for traffic signals including communications systems, adaptive control systems, traffic responsive, real-time data collection and analysis, and maintenance management systems enable signal control systems to operate with greater efficiency. Traffic signal control systems coordinate individual traffic signals to achieve network-wide traffic operations objectives. These systems consist of intersection traffic signals, a communications network to tie them together, and a central computer or network of computers to manage the system. Coordination can be implemented through a number of techniques including time-based and hard wired interconnection methods. Coordination of traffic signals across agencies requires the development of data sharing and traffic signal control agreements. The traffic system today is not up to date so to maintain traffic consistency we are implementing some ideas which may lead to efficiency up to some extent. As we can see today even the emergency vehicles have to wait due to inconsistent traffic system. Our suggested traffic system will surely solve such problems leading to efficiency.

1.1 Intelligent and flexible controlling of traffic signals

In current system, the time for traffic signal is fixed. There for traffic signals are not flexible and they do not help to reduce traffic problems. In our system, we are not keeping the time has more crowd, then the signal of that lane will be Green. So in this way traffic jam can be reduced to much extent.

1.2 Priority to emergency vehicles

As in current system, emergency vehicles as Ambulance has to face traffic. So, in our system if we see any emergency vehicle, then priority is given to that first and signal will be Green to that lane.

1.3 Detection of stolen vehicle

In current system, it is hard to detect the stolen vehicle. But in our system we are recognizing stolen vehicle with the help of RFID. So it will be easier. Controlling rule break- In current system, rule break identification is not easy but in our system, It will be easier.

1.4 Corruption

In current system, fine is paid by cash which can then be gone to police's pocket. But in our system fine is directly reduced from rule breaker's bank account and paid in govt. bank account. So corruption is reduced

2. Literature Survey

The various solutions to the traffic control problems suggested in the literature are presented, along with their merits and demerits. This was important as it was necessary for us to understand how the existing timers of traffic lights work. Information used for timing the timers. In existing system we can see that at any signals, if there is ambulance coming from one way then even if there is heavy traffic if there is low traffic at another way, then also ambulance or any other emergency vehicles then also it has to wait for signal to be green. so, this is the one issue. Another thing is if someone breaks the rule there is no traffic police then he can get away easily. this is another issue.

2.1 Existing Methodology

In existing system we can see that at any signals, if there is ambulance coming from one way then even if there is heavy traffic if there is low traffic at another way, then also ambulance or any other emergency vehicles then also it has to wait for signal to be green. so, this is the one issue.

Table -1: Literature Survey

Sr No.	Year	Author Name	Research PaperName
1	2016	Amani A. Saad, Hes- hem A. El Zouka, Sadek A. Al-Soufi	Secure and Intelligent Road Traffic Management System Based on RFID Technology
2	2015	Chandan Ratnani ,V.B. Vaghela ,D. J.Shahi	A Novel Architecture for Vehicular Traffic Control
3	2015	S. Amritha, S. C. Subramanian, and L.Vanajakshi.	Traffic Density Estimation using Dimensional Analysis
4	2015	Partha Sarathi Chakraborty, Arti Tiwarir	Real Time Optimized Traffic Management Algorithm for Intelligent Transportation Systems

3. System Design

This system provides the functionality of Two IR sensors and two switches for capturing car counts. The LEDs (on the board) is used to be rotated clockwise and the traffic timing manipulated according to the car count. RFID is used to detect registered vehicles, detect priority vehicles (ambulance, VIP, stolen, Normal vehicles which have broken the rule). Manipulation of LED is based on car counts. Priority vehicle detection and rule break detection is using RFID When rule break is detected the system must deduct some fine from users account.

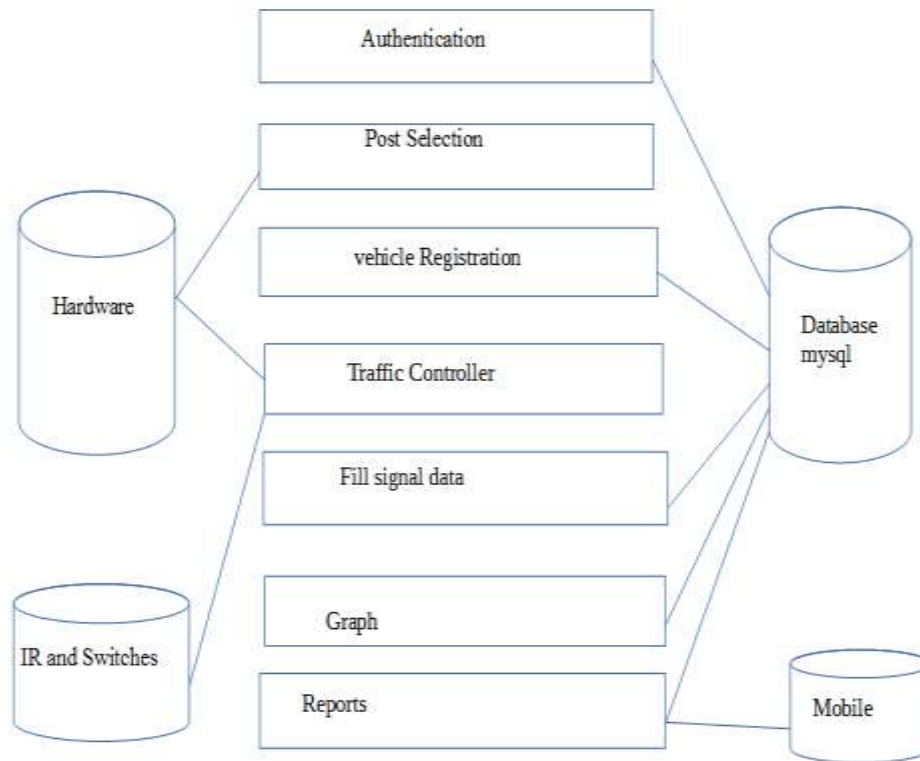


Fig-1: System Architecture

3.1 Arduino

Arduino refers to an open-source electronics platform or board and the software used to program it. Arduino is designed to make electronics more accessible to artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. Arduino is a hardware and software company, project, and user community that designs and manufactures computer open-source hardware, open-source software, and microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices.



Fig -2: Arduino

3.2 RFID

RFID are called as Radio frequency identification. It can automatically identify the electromagnetic fields and track tags attached to any objects which is movable or not. In the tags electronically information are stored. Passive tags can collect energy from a nearby RFID reader's radio waves and Active tags have a local power source such as a

battery and may operate at 10 cm hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the sight of the reader, so it may be attached with tracked objects. RFID is one the method for Automatic Identification and Data Capture (AIDC).

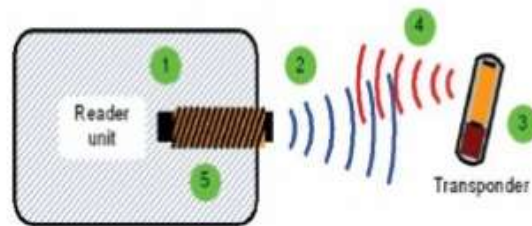


Fig -3: RFID

3.3 IR Sensors

Place of IR Sensors on Signal An infrared sensor is electronic device that are used to sense some aspects of the surroundings. IR sensor measures the heat of the object as well as detects the motion of object. These types of sensors measures only infrared radiation rather than emitting it that's why is called as a passive IR sensor. Usually in infrared spectrum, all the objects generate some form of radiations. These types of radiations are thermal and invisible to human eyes that can be detected by an infrared sensor. The emitter is nothing but an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which are sensitive to IR light of the same wavelength as that emitted by the IR LED. When photodiode receives IR light drops on it, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.



Fig -4: IR Sensor

4. CONCLUSIONS

The system provides dynamic traffic lights that will manipulate according to the size of the traffic and Vehicle detected with the help of RFID tag. The system must deduct a _ne when someone breaks rules and invalidated license after breaking five rules. Wireless sensor network is offering an extremely helpful platform for traffic monitoring that can support the current technology leading to the improvement of accuracy and life time. we have given an extension to the existing dynamic traffic signal control algorithm keeping in mind the sole objective of minimizing the average waiting time. We also include a scenario involving the worst case condition for management of emergency vehicles.

5. REFERENCES

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