

IOT Based System Providing User Assistance for Signal Monitoring and Alerting

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Abstract: Drivers often evince gratuitous “hurry up and wait” behaviour, leading to violation of traffic rules and causing accidents. The acceleration also causes a loss in energy as well as fuel if the vehicle stops completely. Also, roads are becoming overloaded with an increasing number of vehicles, this situation urges predominance on a signal with the relevance of user vehicle speed. So, we propose an application based system which allows the user to adjust the speed of the vehicle in accordance with signal moniterance. The system also advises the user about speed prediction and to take the decision to avoid tramping over the signal which could be disastrous. It provides the real-time density of traffic using sensors on a particular route. The system shows influences of IOT the Internet of Things refers to the ever-growing network of physical objects for internet connectivity and the communication that occurs between objects and other Internet-enabled devices and systems. However, the RF device will measure the distance of the user's vehicle from the signal. After an assessment of the speed, the user will be assisted with the desired safe speed.

Keywords: Optimal speed advisory, Signal manipulation, Traffic density

I. INTRODUCTION

Traffic has the ability to irritate the best of us and it's getting worse. What if that can be changed with intelligent traffic signals? The use of internet has increased in the last few years and many different sectors in India have taken advantages of it. It has helped in speeding up many processes. Due to less complexity of use even a non-IT professional can use the internet to take advantage of these services. Many sectors use the internet for their operation so we are using the same for achieving our goal.

In India, many people are unaware of the traffic rules and the consequences that are causing because of violating the traffic rules. The default behaviour of the user is to accelerate whenever he reaches the signal and notice that the signal is about to turn green. But if the user stops completely at a red signal, both energy and the fuel are wasted due to unnecessary acceleration. So it gave rise to a solution that will monitor the traffic system and assist the user. Our system acknowledges the user with the estimated speed that will help the user to cross the signal without violating the signal. This will ultimately result in the reduction of the accidents and also avoid signal jumping as well as a traffic rules violation. Along with these, the user is availed with the real time of the signal and density on his way.

II. RELATED WORK

Yiran Zhao, Shen Li, Shaohan Hu, Lu Su, Shuochao Yao, Huajie Shao presents GreenDrive, a smartphone-based intelligent speed adaptation system that helps reduce fuel consumption and meet travel time requirements. Both realistic and large-scale SUMO simulations and small-scale real-world experiments show that our system is able to effectively learn traffic signal schedule, and over real-time optimal speed advice to drivers according to travel time requirements

III. METHODOLOGY

Proposed System: We propose an application based system which allows the user to adjust the speed of the vehicle in accordance with signal moniterance. The system also advises the user about speed prediction and to take the decision to avoid tramping over the signal which could be disastrous. It provides the real-time density of traffic using sensors on a particular route. The system shows influences of IOT the Internet of Things refers to the ever-growing network of physical objects for internet connectivity and the communication that occurs between objects and other Internet-enabled devices and systems. The system will consist of two modes, one is for normal user and other is for Government officials which can request the admin for signal manipulation.

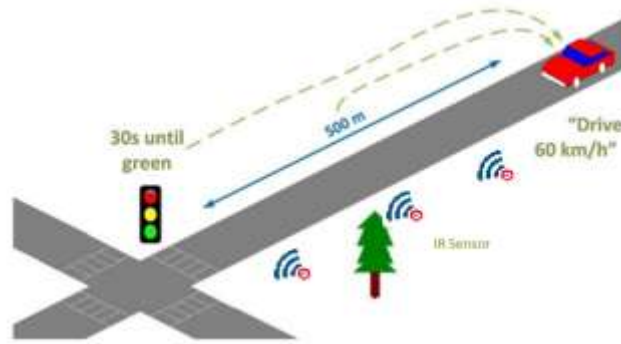


Fig: Proposed System

The system consists of Three modules viz. Client, Admin and Admin Control.

Client: Clients will be using the android application, an android application is used to fetch the required data such as signal timings, traffic density along with the distance from signal to assist the user with the desired speed and the traffic density on the intended route.

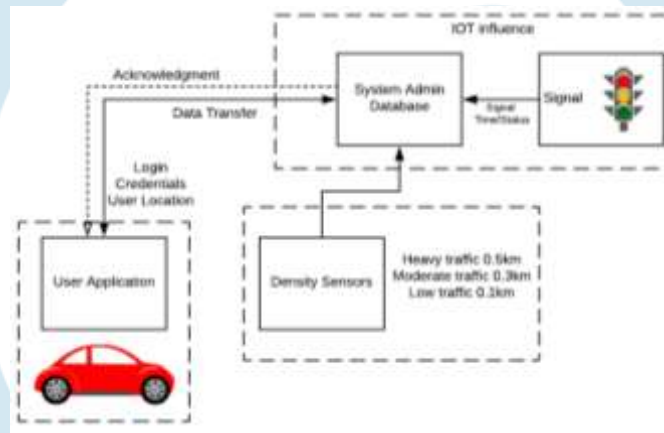


Fig: System Architecture

Admin and Admin Control: Admin will grant permission to manipulate signals, for respected government officials, and also if high traffic density is detected. The system consist of the Signal LEDs, RF Receiver, IR sensor, and the Wi-Fi module. The LEDs will be on for some time and act as the traffic signal. IR sensor is used to measure the density of traffic on the route. The server is at PC for processing the request by the user to manipulate the signal time based on the authorization of the user.

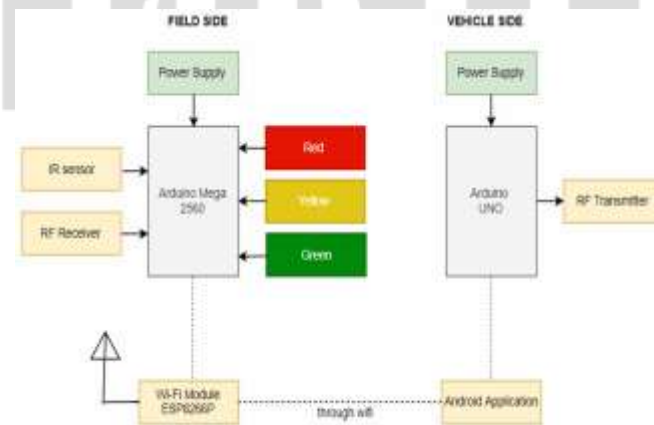


Fig: IOT Influence

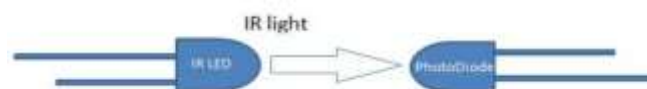
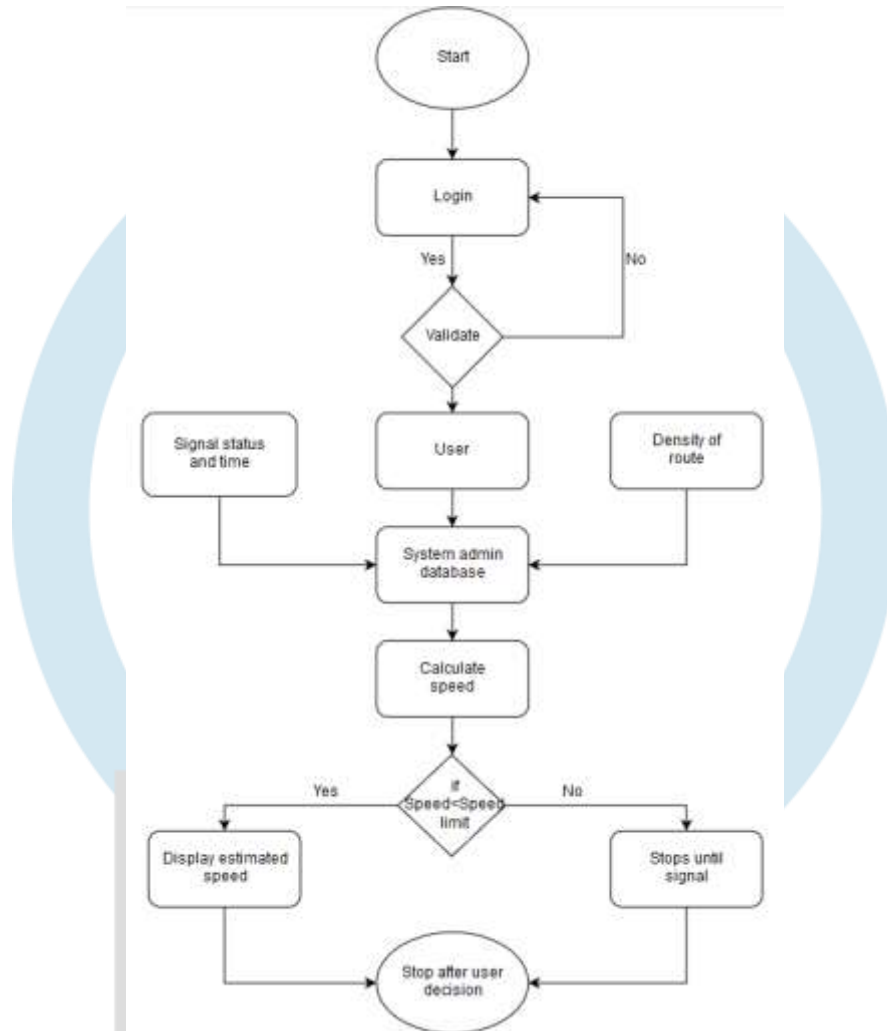


Fig: IR (Direct incidence)

Direct incidence is the technique used by IR, the IR LED is placed in front of a photodiode with no obstacle in between. Using this we can detect whether there is traffic on the intended route or not.

Consider the following flow chart in which the flow of the system is defined. The first user will log in through an android application, there will be two modes first one will be a normal user and the second one will be a government official. After login, the user location will be detected using RF sensor and if it is near to any traffic signal, the system will detect the distance between user vehicle and traffic signal, which will be used for optimal speed calculation. After calculating the estimated speed the user will be provided with the optimal speed, traffic density, signal live time and status. If the estimated speed is more than the speed limit, then the application will tell the user to stop. The application consist of voice, using which information will be provided to the user.



IV. CONCLUSION AND FUTURE SCOPE

IOT based system ensures the safety of the user through signal monitoring and alerting the user in heavy traffic during switching of a signal on a particular route. The system warns the user to limit his speed by providing the required estimated speed through his journey at any signal crossing. Further, the system also intends to avoid traffic rule violation, signal jumping by driving with an estimated speed. User is acknowledged with the density of traffic on a particular route through a direct incidence IR technique. The signal can be manipulated by a government official for passing the dignitary personnel through dense route. In future scope, we can add vehicle control feature which will control the vehicle speed while reaching the traffic signal automatically.

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