Traffic Management System

Introduction

One of the major problems faced in any metro city is traffic congestion.
Heavy traffic is a headache for each and every person driving the vechicles and even to the traffic police in controlling the traffic.

Traffic congections has a negative impact on economy, the environment and the overall quality of life.

There are two ways through which traffic is been controlled

1)Manually
2)Systematically(controllers).

However the whole idea of a fixed time traffic light controller is not convenient for cities where traffic flow is variable.

For this reason a dynamic traffic control system is need, which controls the traffic signals according to the density of traffic.

In our project we focus on optimization of traffic light using IR sensor & Arduino UNO as a microcontroller.

In our project our approach is to take data/input from IR sensor it will allows us to detect whether the road is congested or not & will allows us to manage our traffic according to our input.

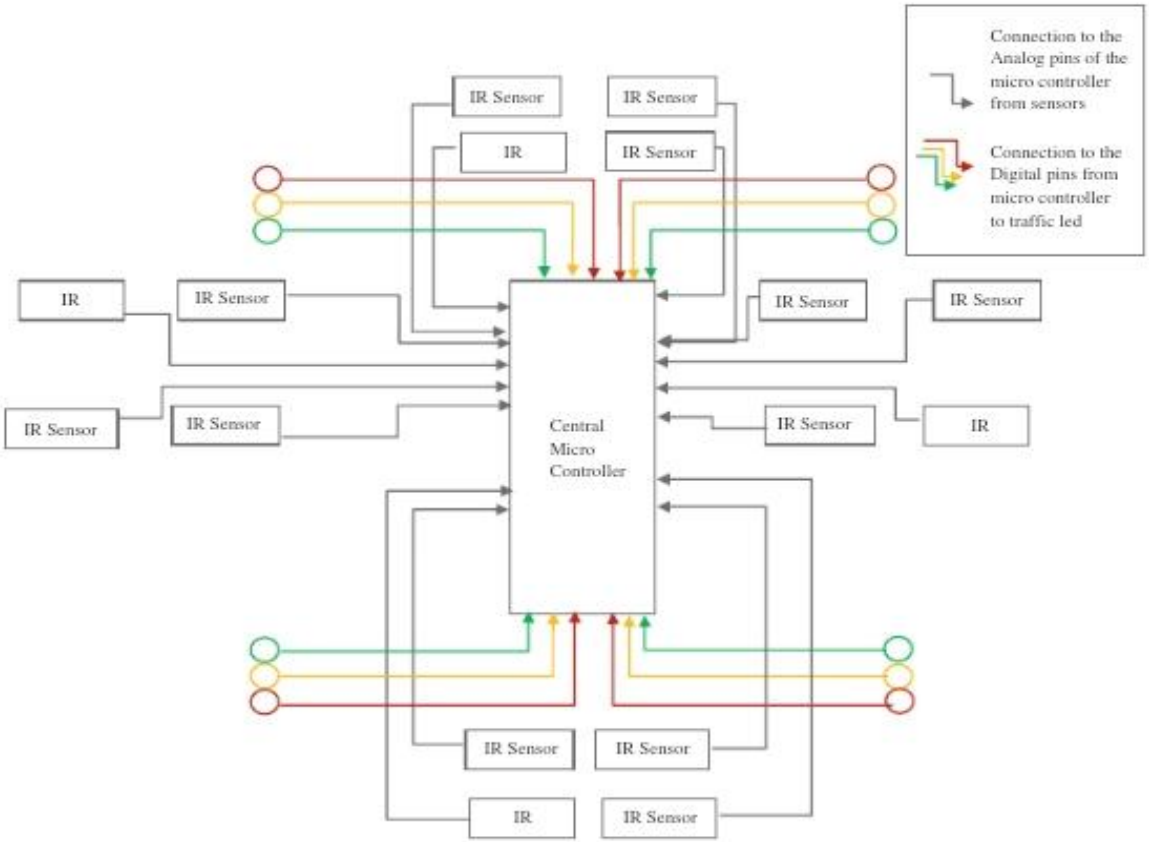
Realtime

Real-time systems in case of traffic managing system take the input of the currentsituation through video surveillance or WSNs and deal with the situation. The trafficsignals are controlled according to the presence of vehicles and are operated536 S.P. Biswas et al.automatically in real time. A real-time optimization model was used by Dotolieet al.
[1] that investigated the issue of traffic control in urban areas. The model tookinto considerations the traffic scenarios which also include pedestrians. This tech-nique was applied for analyzing real case studies. Wenjie et al.
[2] concentrate oncalculating the time that a vehicle requires to reach the intersection from a particularpoint, dynamically, by the use of sensors. By this, data performs various calcula-tions to find the green light length. Albers et al.
[3] used real-time data to monitorcurrent trafficflows in a junction so that the traffic could be controlled in a con-venient way. Reliable short-term forecasting video captured in a recorder plays animportant role in monitoring the traffic management system. The data required canbe easily provided by the CCTV cameras that can be beside the roads as perrequirement.

Data Analysis Systems

Data analytical systems are those systems that take the present or statistical data,process them in the processor, and then act according to predefined algorithm. Likereal-time systems, it may collect data in real time, but is unable to take any decisionin real time, i.e., it must follow the instructions that are provided to it. Yousef et al.[16] suggested a scheme of solving traffic congestion in terms of the average waitingtime and length of the queue at the isolated intersection and provide efficient flow inglobal traffic control on multiple intersections with the accordance of real-time data.Thus, the data collected can be used in various ways depending on the perspective ofthe user.

Hardware Implementation of the Method



FUTURE WORK

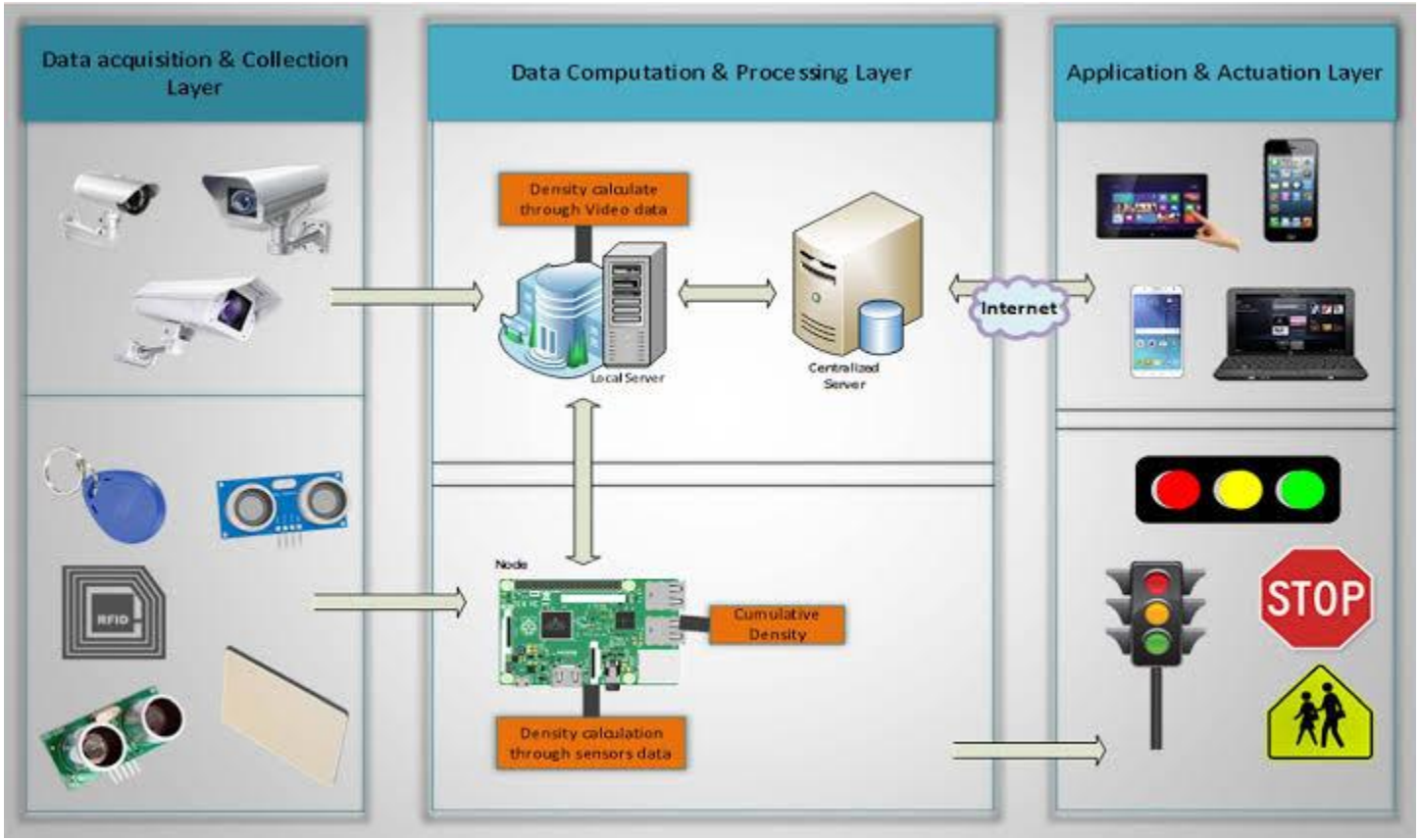
Even though the proposed system improves the current traffic monitoring system, there is room for the following improvements that can be added in the near future:

1) Accident Monitoring: Everyone is aware about the frequency of accidents that happen on the road. Whenever such an unforeseen event takes place, it takes a long time to provide assistance to the victim and this leads to many fatalities which could have been somehow prevented. With the help of traffic cameras installed at the junctions, any vehicle that happens to remain stationary in an inapt position (to avoid confusion with parked cars) could be identified as an effected automobile and the emergency services could be notified immediately. This would not only help them to respond faster in these kind of situations but also help in avoiding the resulting traffic jams.

2) Adaptive System for Emergency Vehicles: It is estimated that 1 in 10 patients in India loses his/ her life due to the ambulance being stuck in traffic [10]. This is a huge number and makes us realize how bad the existing traffic management is. To overcome this situation, a model can be trained which will allow the cameras to identify any emergency vehicle and allow it to cross a traffic junction at the earliest.

3) Recognizing Traffic Rule Violators: Traffic rule violators are a common sight on most traffic junctions. People tend break traffic laws and expect to get away with it without facing any consequences. Not long back, these offenders would be fined by identifying their number plate and sending them an online penalty.

Realtime-monitoring



Advantages of a Smart Traffic Management System

Cleaner, greener, safer, and more accessible roads are a few benefits of implementing IoT and intelligent technology.

It helps with the following:

- Reducing traffic jams and accidents on the streets
- Ensuring immediate clearance for emergency vehicles
- Facilitating safer and shorter commute times
- Reducing congestion & energy consumption at intersections
- Offering significant productivity benefits with real-time monitoring of crucial infrastructures
- Reducing operating costs with efficient traffic management processes
- Ensuring compliance with the regulations for reducing the carbon footprint
- Saving billions of gallons of fuel wasted every year
- Accurate tracking & quick recovery of lost and stolen vehicles

Functioning of Traffic Monitoring System Using IoT Capabilities

This intelligent system comprises several components, including wireless sensors, RFID tags, and BLE beacons installed at the traffic signals to monitor the movement of vehicles. A real-time data analytics tool connects the Geographic Information System (GIS-enabled) digital roadmap with control rooms for real-time traffic monitoring.

The smart traffic management system captures the images of vehicles at the signals using the digital image processing technique. This data is then transferred to the control room via wireless sensors. The system also leverages BLE beacons or RFID tags to track the movement of vehicles and keep traffic congestion in control, track down stolen vehicles and even clear the road for emergency vehicles that are installed with RFID readers.

Application of IoT in Traffic Management

City governments can improve their operations & infrastructure by placing IoT sensors and tracking devices on roads and highways for recording, analyzing, and sharing data in real-time.

Uses of IoT in Traffic Management
An intelligent traffic monitoring system using IoT capabilities has so many factors & use cases, including;

- Traffic Lights and IoT Control Systems
- Parking Enabled through IoT:
- Emergency Assistance through IoT
- Commute Assistance