

Multi Sensor System and Automatic Shutters for Bridge- An Approach

A.Mohan^a, G,Prabha^a, Arun.V^b

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Abstract: As cities become smart cities, the number of vehicles has grown significantly over time, causing critical issues including traffic congestion, accidents, and many other issues. This system will be based on a number of contemporary technologies, including wireless sensor networks (WSNs), surveillance cameras, and IoT. For monitoring both the flow of traffic and the number of parking spaces in a smart city which is proposed in this article. The proposed system also includes cutting-edge features, such as the ability to remotely view traffic flow and the number of nearby parking spaces via an Android mobile application, that make it easier for drivers to locate free parking spots and cut down on unnecessary trips. Drivers can take alternate routes and avoid traffic jams thanks to this. Our solution combines three interconnected smart subsystems—crossroad management, parking space management, and a mobile application—to connect residents to a smart city.

Keywords: sensor system, automatic shutters, smart city, traffic management.

1. Introduction

Nowadays, people spend the majority of their time outside of their homes, traveling frequently to shopping malls and other attractions as well as to work and the city center. Parking services were developed as a result of the unbalanced daily mobility that was undoubtedly caused by this in order to reduce the amount of unnecessary driving around the city center just to find a parking spot. On the one hand, this harms the city's ecosystem and increases carbon dioxide emissions. On the other hand, it makes city traffic more congested and makes drivers more irritated, both of which will undoubtedly lead to traffic accidents.

2. Methodology

Cities have recently experienced exponential growth as a result of the shifting nature of the global economy and the modern lifestyle [1]. One example of the locations where smart cities are implemented is in medical facilities, businesses, hospitals, offices, transportation, and parking lots [2-4]. Over the past five years, the number of automobiles has increased alarmingly, posing a number of serious challenges to the expansion of cities. These problems include traffic jams, accidents, and even illnesses caused by drivers' stress and annoyance. These issues are the result of poor traffic organization in cities, particularly at road crossings based on outdated traffic

signal management systems, and the incompetent crusade of drivers in search of available parking spots in densely populated areas of vehicles. In this article, we will demonstrate a smart and intersected system based on the installation and operation of wireless device networks at room lot junctures and road intersections to make cities and roads smarter. This system consolidates two intellectual systems—the intelligent parking system and the traffic light control structure into a particular, distinct system to unite peoples to their city's roads and parking spaces remotely and in real time via a single mobile application.

3. Procedure

- As we take padi bridge as an example. There is lots of traffic arises even at bridges too.
- Due to this traffic occurrence we came to suggest of using automatic sensor shutter system .
- In this we have made a model of bridge of size 1.5x1.5metres using steel.
- We have fixed the sensors which identifies the density of vehicles on the lane
- There is a provision of free lane for left turns.
- Then we made sensors placed on all four left sides of ridge .
- Each sensors are having shutter connected with them.
- At center traffic signals were fixed for the

^aAssistant Professor, Department of civil Engineering, Easwari Engineering College, Ramapuram, Chennai, India.

^bStudent, Department of civil Engineering, Easwari Engineering College, Ramapuram, Chennai, India.

Corresponding author : mohanbarasu@gmail.com.

indication .

- The sensor senses which of four lane has high traffic or density of vehicles .
- Then that shutter opens for 30 seconds.
- Then it closes at interval of 10 seconds.
- And then next high traffic lane shutter gets opened.
- Likewise the traffic over the bridge can be controlled and also reduces accidents.
- There is also a manual operation control for opening and closing of shutter in case of emergency like ambulance, accident, etc...

4. Application of Sensor System in Bridge

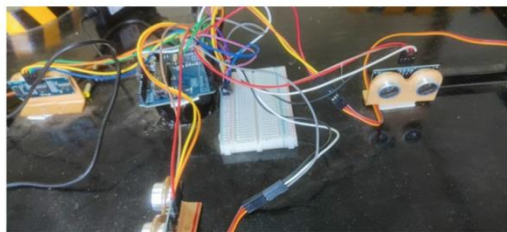
- The Arduino's Digital Pin 8 is initially connected to the

Data OUT of the PIR sensor. The remaining two PIR sensor pins, Vs and GND, are connected to +5V and GND, respectively.

- The second channel of the L298N Motor Driver Module was utilized for the motor driver. As a result, the L298N Motor Driver's IN3 and IN4 are connected to the Arduino's Digital Pins 2 and 3.
- The enable pin of the second motor in the L298N Module is connected to +5V. Each L298N module typically has a jumper that connects the Enable pins directly to +5V. This is an option that you have.
- Since the project's motor is a 5V motor, I connected a 5V supply to the Motor Driver Module.
- Finally, the motor of the CD Tray is connected to the OUT3 and OUT4 of the L298N Motor Driver Module.



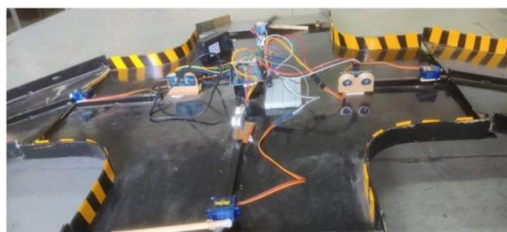
Fig 1 fixing sensors at the junction of the bridge



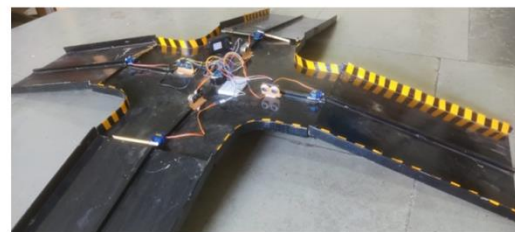
(A)



(B)



(C)



(D)

Fig 2 (a) Sensor system, (b) Top view of model, (c)&(d) Model of the bridge with sensor systems

In contrast, this technology suffers from a significant flaw that is reflected in its excessive energy consumption and prevents it from being suitable for battery-powered sensors that are expected to last for many years. Nevertheless, despite its slow data transmission rate, the ZigBee standard provides features that even more

effectively meet the energy-saving requirements of sensor networks. Additionally, a selection criterion is this technology's low cost and high level of dependability.

5. Conclusion

By this idea we can control the traffic occurrence over bridge and also accidents get reduced. As we can also build bridges like kathipara likewise but it requires more area and also consumes more materials for construction rather than that we can prefer this concept which leads to reduction in cost and also area. This shutters are fixed mainly due breaking of traffic rules. Bridges were constructed due to continuous free moment of vehicles but due to increase in population day to day and also usage of common vehicles like buses were reduced everyone were using own vehicle for transportation which causes traffic even over bridges too. The main drawback is implementation of this concept was not needed for current scenario but in future it can be implemented.

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