Ahsanullah University of Science & Technology
Department of Computer Science & Engineering
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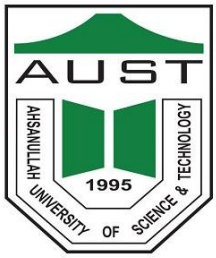

CSE 3216

Microcontroller Based System Design Lab

Project Report

Project Name: *Traffic Controller System*

Submitted To

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Objective :

Traffic Jam refers to a long line of vehicles on the road leading to a serious roadblock. It is a common feature of the major roads of Bangladesh. It is also seen in the town or even rural roads. There are some causes behind this. Firstly, many drivers are ignorant of traffic rules while some deliberately violate traffic rules. This leads to serious roadblocks. That is why we had proposed the "**Traffic Controller System**". This project will help reduce traffic and save people's precious time. Our traffic controller system uses "**PIR sensor**" to detect the presence of a car. If any car passes through the road while the traffic lights are red then the "PIR sensor" sends a signal to the "**Ultrasonic sensor**". This sensor then sends another signal to the motor and the motor activates the spike which is set under the road and punctures the car's tire. This process will make the drivers strictly follow the traffic rules which will help us to reduce a lot of traffic problems.

Social Values :

Traffic jam kills our valuable time and decreases productivity. It also has severe social and economic impacts. In [1], the impacts of traffic jam were investigated which included mental pressure, headache, dust allergy, digestion problem and dehydration, harassment, waste of time, extra transportation cost. Our system will be able to reduce these problems. Sometimes drivers might be drunk while driving and may not notice the traffic signal which can result in several kinds of damages. Through this system, the drivers will not be allowed to cross the traffic signals illegally which will save both people and property. The cars will be saved from damages and people will be saved from accidents. The authors in [2] observed that road safety measures can lead us towards achieving the SDG 3.6 goal of reducing death rates by 50% over the next decade. Thus, this system aims to create social impact by reducing traffic jam and ensuring safer road travel.

Required Components :

These following parts and tools were required for building the "**Traffic Controller System**" project:

1. Arduino Mega
2. Servo Motor
3. Ultrasonic sensor
4. PIR sensor
5. PVC board
6. Bread board
7. Cables
8. Lifo battery
9. LED lights
10. Resistors
11. Barrier (nails)
12. Buzzer
13. Keypad
14. LCD
15. Traffic light

Working Procedure :

The basic components that react to the input are:

- PIR Sensor
- Ultrasonic Sensor

The components that receive commands:

- Servo motor
- Buzzer

Firstly, to activate the whole system a traffic police has to input the correct password through a keypad. After entering the correct password, he/she can select which lane's system to enable by pressing the number of lane on the keypad. Example: To enable lane 1, one has to press 1. When a lane's system is enabled and if the PIR sensor detects any motion in any other lane, the ultrasonic sensor will start to calculate the distance of the vehicle. If the car passes a certain distance, the system will first trigger a buzzer. This will give a warning signal to the driver. If the driver still doesn't stop, then after coming at a certain distance, the spike from the street will rise with the help of a servo motor.

Budget :

Equipment	Quantity	Budget (tk)
1. Arduino Mega	1pc	1200
2. Servo Motor	4pc	880
3. Keypad	1 pc	210
4. Sonar Sensor	4 pc	440
5. PVC board	1 pc	100
6. Bread board	1 pc	110
7. Wires	1 set	160
8. Battery	1 pc	50
9. LED lights	12 pc	15
10. Resistors	10 pc	100
11. Nails	20 pc	30
12. Buzzer	4 pc	60
13. PIR sensor	4pc	440
14. LCD	1 pc	230
15. Traffic Light	4 pc	200
Total		**4225**

Total budget 4225 BDT.

Members Contribution :

1. Nushrat Jahan Shorna - Buzzer
2. MD Mejbah Ur Rahman Sowad - Servo Motor
3. Tashfiq Nahiyan Khan - Keypad
4. Nawrin Tabassum - PIR Sensor, Ultrasonic Sensor

Difficulties :

1. IR sensors can sense the reflectivity of an object at a particular wavelength and this reflectivity is what gives it color. So, IR sensors don't sense colors in the normal use of that word. As a result, IR sensors could not be used in this system to detect traffic light color.

2. Only one tone can be generated at a time with the tone() function. If a tone is already playing on a different pin, the call to tone() will have no effect. So, no two buzzers can be played simultaneously in this system. A certain amount of delay has been used to solve this problem.

3. Proteus software was crashing repeatedly while building the system. Also, some of the components required for the project were not available in proteus which resulted in several problems. Example: The color sensor needed to detect the color of traffic lights are not available in proteus.

Future Work:

1. A traffic police must be present all the time to control the traffic lights. In the future, we want to automate the control of the traffic lights so that the lights turn on or off automatically after a certain period. It will be useful to save a lot of time.

2. Currently, there is no pedestrian crossing check in this system. We want to include pedestrian crossing checks so that the pedestrian movements

can also be controlled through this system. It will ensure pedestrian safety on the road.

3. If an ambulance is stuck on a signal, it may cause damage or death of a patient. Thus, we want to incorporate an ambulance detection method in this system so that an ambulance is given priority to cross the signal. It will be helpful to save patients' lives.

Conclusion :

Reducing traffic jam can not only provide a peaceful urban life but also ensure social and economic development. The system will contribute to lowering traffic jam by confirming strict maintenance of traffic rules. It will save our valuable time and enhance productivity which will lead to improved social standards and national income. Hence, the system will make an impact by providing a useful road safety measure.

References :

[1] S. I. Khan *et al.*, “Traffic Congestion in Dhaka city: Suffering for City Dwellers and Challenges for Sustainable Development,” *Eur. J. Soc. Sci.*, vol. 57, no. 1, pp. 116–127, 2018, [Online]. Available: http://www.europeanjournalofsocialsciences.com/.

[2] D. Mohan, A. Jha, and S. S. Chauhan, “Future of road safety and SDG 3.6 goals in six Indian cities,” *IATSS Research*, vol. 45, no. 1. pp. 12–18, 2021, doi: 10.1016/j.iatssr.2021.01.004.