



Traffic Density Detection and Signal Adjustment

Obaidur Rahman (170020017, obaidur.rahman.17002@iitgoa.ac.in)

Arihant Baid (170020001, arihant.baid.17002@iitgoa.ac.in)

Rajat Kumar Dalai(170010003, rajat.dalai.17001@iitgoa.ac.in)

Dushyant Chetiwal (170010010, dushyant.chetiwal.17001@iitgoa.ac.in)

Introduction

The aim of this project is to implement a traffic signal system which automatically allocates suitable green light durations to every lane based on the traffic density of that particular lane i.e. A road with greater traffic will obviously require more green light time as compared to other roads which barely have any traffic and this system will help us optimize it.

System Overview

The system will estimate the amount of traffic in a lane through IR detectors. A clock will always be running allocating a specific amount of time to each lane's traffic lights(Red, Yellow and Green). The duration of green light for a lane will change depending on its traffic intensity classified as light, medium and heavy.

The traffic intensity is determined by two sets of IR emitters and detectors for each lane. Processing Unit is where the calculation for time allotment of green light will take place.

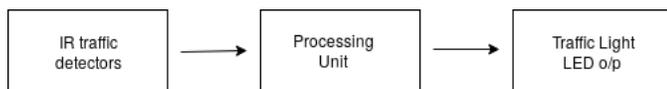


Fig. 1: Block diagram of functionality.

Component Details

1. IR traffic detectors
2. Arduino
3. Breadboard
4. Resistors
5. LED Output(12 RGY LEDs)

Estimated Budget- 600 rupees

Phase-1

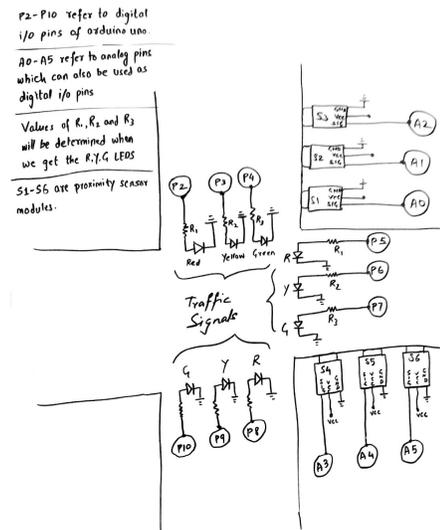


Fig. 1: Circuit diagram

Phase-2

Our aim to create a functioning prototype and its testing was achieved in this phase in the desired time frame and within the planned budget. Although the number of IR sensors used are fewer than initially planned because of unavailability, the project works just as it was required. The traffic signals for the four lanes cycle through RGB Leds with the time allotted to green light being adjusted depending on the traffic in that lane which is evaluated by the use of IR sensors.

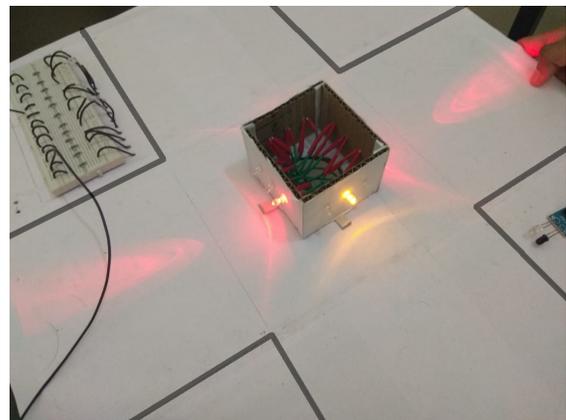


Fig. 2: Overview



Fig. 3: Arduino Circuitry

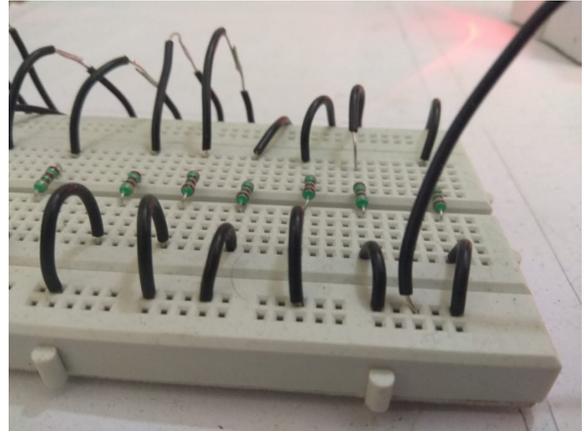


Fig. 4: Breadboard Circuitry

Conclusion

This project gave us an opportunity to think about real life applications of the knowledge we have gathered and apply it to make life a bit easier and efficient. We learned a lot about the problems that can occur and difficulties while implementing any idea. We improved our technical skills and our ability to handle both hardware and software. We have understood that even the most complex looking machinery can be brought down to a simple logical problem. It was fun working as team.

We would like to express our gratitude to Prof. Nandakumar Nambath for giving us this opportunity.

References

- 1] Course Lecture Notes
- 2] Arduino Uno (<https://www.arduino.cc/reference/en/>)