Project Report

SMART STREET LIGHT: INTENSITY AND DENSITY BASED

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A thesis submitted in part fulfilment of the course in

Embedded System

(2019-2020)

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Chapter 1: Introduction

With the growing population, the need for power consumption has increased exponentially. Variety of technological advancement make use of the energy we have – electricity, wind energy, tidal, gas powered stations etc. But with the drop in resources, it has become imperative that we act on conserving the energy.

1.1 Problem Statement

Street Light System that has been employed for over a decade now, is a victim of such revolution. The continuously glowing street lamps and the power being consumed has drastically increased and hence demands an efficient method to adapt the surge in consumption.

1.2 Objective

Smart street light system tries to find solution for the faster depletion of energy resources due to the inefficient usage and wastage of limited valuable resources. This project help to decrease the wastage of electricity by controlling the working of street light system that attributes to a good amount of electricity bills in our nation. This project does not include methods to incorporate usage of renewable resources like solar energy but instead tries to embrace an effective way to improve the conservation and consumption.

Chapter 2: Requirements

Constraints are mainly in the hardware that regulate the brightness of the light by considering the traffic on the street at a specific time.

2.1 Hardware Requirements

LDR – Light Dependent Resistor

Light-dependent resistor is an active component that decreases resistance with respect to receiving luminosity (light) on the component's sensitive surface. The resistance of a photoresistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits, and light-activated and dark-activated switching circuits.

Ultrasonic Sensor

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

Arduino

Arduino is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible. The hardware consists of an open-source hardware board designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. Current models feature a USB interface, 6 analog input pins, as well as 14 digital I/O pins which allows the user to attach various extension boards. The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The Diecimila, Duemilanove, and current Uno provide 14 digital I/O pins, six of which can produce pulse width modulated signals, and six analog inputs.

8x8 LED Matrix

These matrixes can be made by circuiting 64 LEDs, however that process is time consuming. Now a day they are available in compact forms. These compact modules are available in different sizes and many colours. The cost of module is same as cost of 64 LEDs, so for hobbyists this is easiest to work on.

2.2 Software

Arduino IDE: - An environment set-up specifically designed for Arduino Microcontrollers like UNO etc.

Chapter 3: Analysis

3.1 Scope, usage and distribution

The difficulty of developing a system that not only reduces the power consumption but works efficiently has always been a perplexing issue. Should the project be successful at overcoming this flaw, it deals with major Street Light System around the globe – making them effective and tangible. It targets the government and private sector that wishes to transcend into future-like idea and cares for the environment.

Chapter 4: Architecture and Design

4.1 Data Flow and Use Case

System for controlling on\off of lights:
Use Case Description
- Sunlight intensity less than 250 lux.
- Sunlight intensity greater than 250 lux
- More the vehicle density more the brightness
- Less the vehicle lesser the brightness.
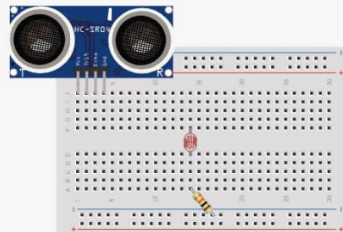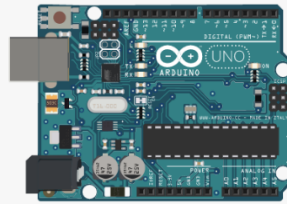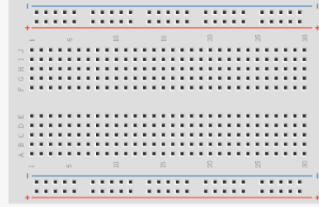
Flow of events
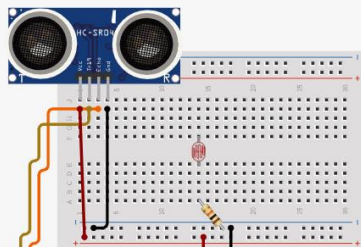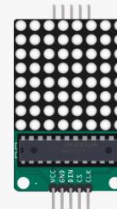- If the intensity is less than 250 then switch on the lights.
- Else switch off the light

LDR MODULE (up)
For sullight sensing

LDR module(facing lamp)

ULTRASONIC SENSOR

MICROCONTROLLER

LAMP

GPS MODULE

TO CONTROL SYSTEM
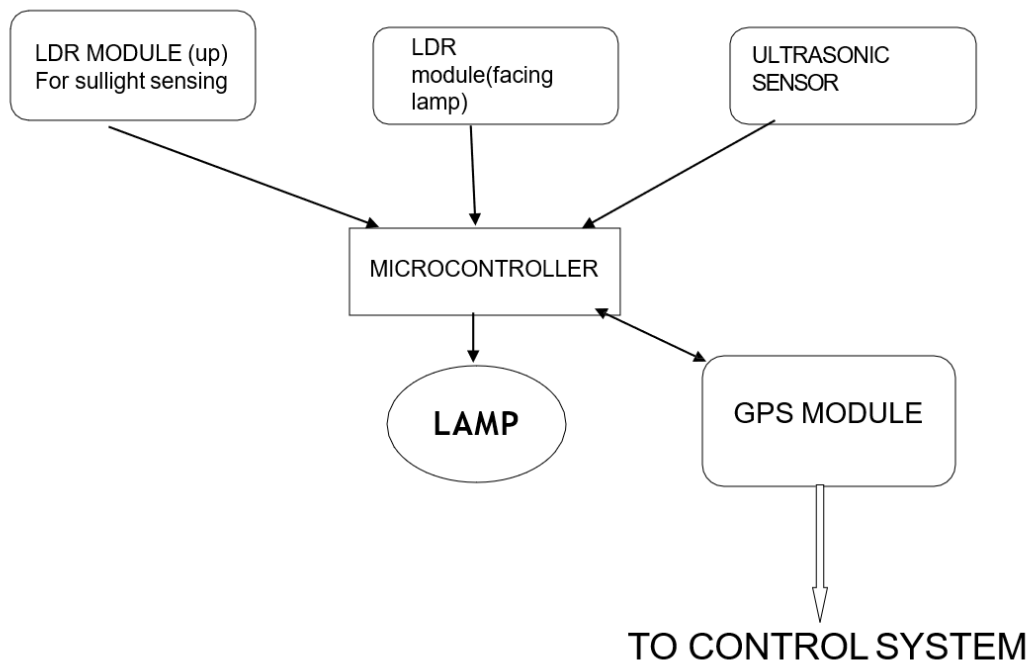
4.2 Design Procedure
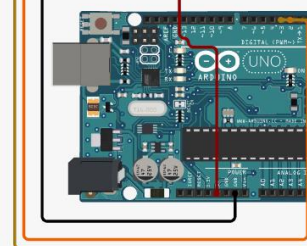
Step by step procedure: -

1.

2.

3.

4.

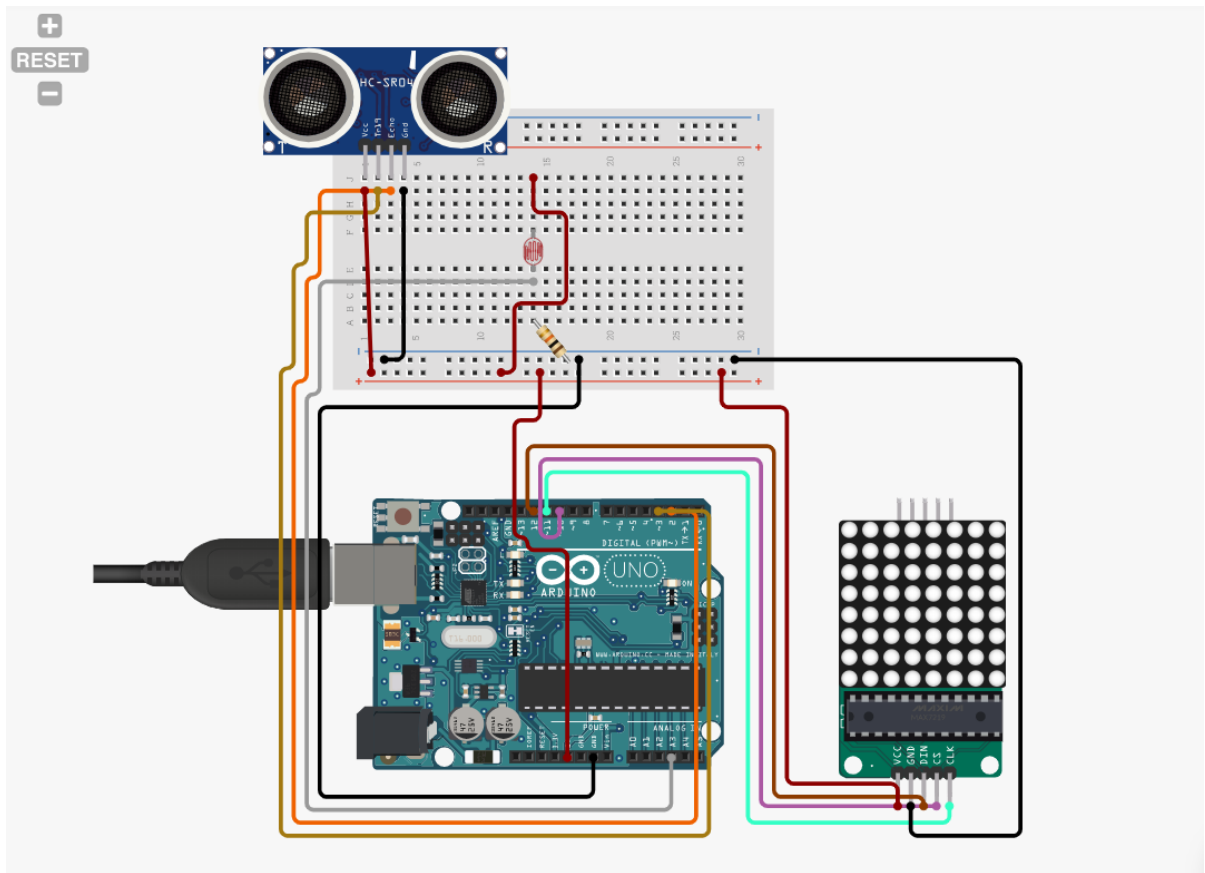## 3.3 Simulation

https://drive.google.com/file/d/1DPPM-KzPaDupcO7G_6XZ-
cbq_p_uv7AA/view?usp=sharing

Chapter 5: Conclusion

Conserving energy is really needful at this time of age, and what else could be better than improving the primary consumption source. Smart Street Light system is a step forward to efficient lighting and eco-friendly system.

Though the idea seems an effective process, implementing is even easier. What challenges us would be an idea to maintain and connect each and every unit to a single automated system that governs the working and an error feedback system. Though the unit shuts off at a fault, it would be tough to track down a single fault and still not affect the entire network.