Mini Project Final Report On

SMART STREET LIGHTING SYSTEM

Submitted by:

(Group no. 15)

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PROJECT COMPLETION CERTIFICATE

This is to certify that Saudamini Ghosh (Registration No. 201600119), Senny Yumnam(Registration No. 201600126), and Shreyansh Singh (Registration No. 20140342) of Computer Science & Engineering Department of Sikkim Manipal Institute Of Technology has worked under my supervision and guidance from April'19 to November'19 and has successfully completed the project entitled "SMART STREET LIGHTING SYSTEM" in partial fulfillment of the requirements for the award of Bachelor of Technology in Computer Science and Engineering.

Mrs. Pratima Sarkar

 Assistant Professor,

Computer Science & Engineering Department,

Sikkim Manipal Institute of Technology

DECLARATION

We hereby declare that the work recorded in this project report entitled "SMART STREET LIGHTING SYSTEM" in partial fulfilment for the requirements of award of B.Tech in Computer Science & Engineering from Sikkim Manipal Institute of Technology (A constituent college of Sikkim Manipal University) is a faithful and bonafide project work carried out at SMIT, Majitar under the supervision and guidance of Mrs. Pratima Sarkar Assistant Professor, Computer Science & Engineering Department, Sikkim Manipal Institute of Technology. The results of this investigation reported in this project have so far not been reported for any other Degree/Diploma or any other technical forum. The assistance and help received during the course of investigation have been duly acknowledged.

Saudamini Ghosh (Reg 201600119) _____

Shreyansh Singh (Reg 20140342) _____

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ACKNOWLEDGEMENT

Presentation inspiration and motivation have always played a key role in success of any venture. We feel to acknowledge our in debtness and deep sense of gratitude to our guide Mrs. Pratima Sarkar whose valuable guidance and kind supervision gave us throughout the course which shaped the present work as it shows. We pay our deep sense of gratitude to Mrs. Kalpana Sharma, H.O.D, Computer Science & Engineering Department, Sikkim Manipal Institute of Technology to encouraged us to the highest peak and to provide us the opportunity to prepare the project. We are immensely obliged to our project coordinators Mrs. Pratima Sarkar for elevating inspiration and kind supervision in completion of our project. Last, but not the least, we would like to thank our Computer Science & Engineering Department, Sikkim Manipal Institute of Technology and to all the faculty members for giving us continuous support and guidance that has helped us in completion of our project.

DOCUMENT CONTROL SHEET

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7.	Abstract	Smart Street Lighting System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. The project is further extended to a security purpose project by installing a security system.
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CONTENTS

<u>ABSTRACT</u>

Smart Street Lighting System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependent Resistor (LDR) which senses the light actually like our eyes. It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. This project demonstrates an energy efficient street light intensity control system which does not need much maintenance.

The project is further extended to a security purpose project by installing a security system which will be built using voice recognition, GSM and GPS modules, which will detect when a person screams help and sends the location using GSM to the nearest Police Control Room.

INTRODUCTION

In today's world, we need to save electricity to a great extent. Smart street lighting system plays a significant role in using and saving electricity. We intend to do so using LDR sensor, motion sensor and LEDs.

Passive Infrared Sensor is used to detect any motion in the surrounding of the sensor. This sensor will be placed 15m away from the street lamp.

Light Dependent Resistor (LDR) is used to detect the intensity of sunlight or other external light. A threshold value is set and whenever the LDR sensor value is lower and PIR sensor gives a High result the lamp will turn on.

Fig. Passive Infra-Red (PIR)

Sensor

Fig. Light Dependent Resistor

Resistor (LDR)

The project further extends a hand in public security by installing a system on the street lamp. The system will be using a Voice Recognition Module, GSM & GPS Module. Whenever a person in need of help screams 'HELP!' the GPS sends the lamp's position using GSM to the nearest police control room.

Fig. Sound Detection module Sensor

Fig. GSM+ GPS module

OBJECTIVE

The primary objective of our research is to develop a system which will detect intensity of sun light and will switch ON/OFF the street light.

Public security will be enhanced with the system of voice recognition and GSM & GPS. When a person in need screams help, using GPS the location of the exact street lamp will be send to the nearest police control room using GSM.

LITERATURE SURVEY

Sl. No.	AUTHOR	TITLE	FINDINGS	RELEVANCE TO PROJECT
1.	Yogesh Pawar, Abhay Chopde And Mandar Nandre	"Motion Detection Using PIR Sensor" In International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 04 | Apr-2018	Experimentally showed that the sensitivity and resolution decreases when distance between object and PIR sensor increases. PIR sensors are not only used in motion detection but also used in temperature sensing from remote places.	A method to indicate the controller to change the state of the street lamps.
2.	Ms. M. Kokilavani And Dr. A. Malathi	"Smart Street Lighting System using IoT." In International Journal of Advanced Research in Applied Science and Technology ISSN: 2456-1959 Vol.3, No.11, November 2017.	Using sensors to save the power energy without any waste. Safe street lighting for peaceful vehicle movements.	It can effectively improve the control of light by using the LDR .
3.	Prof. K.Y.Rajput, Gargeyee Khatav, Monica Pujari and Priyanka Yadav	"Intelligent Street Lighting System Using GSM." In International Journal of Engineering Science Invention ISSN, Volume 2 Issue 3 || March. 2013 || PP.60-69	Approach to accomplish the demand for flexible public lighting systems by according to the traffic intensity and time of slots and also monitoring the weather conditions the nodes are being switched on/off .It monitors the need and thus saving power.	For the Street Light to be more power saving using GSM.

4	Ihtesham ul Ha, Zia Ur Rahman and Shahid Ali	"GSM Technology: Architecture, Security and Future Challenges". In International Journal of Science Engineering and Advance Technology, IJSEAT, Vol. 5, Issue 1. || ISSN 2321-6905 January-2017	The GSM specialized determinations characterize the distinctive components inside the GSM organize design. It characterizes the distinctive components and the routes in which they communicate to empower the general framework operation to be kept up.	This paper helped in understanding the working of the GSM module.
5	J.Parthasarathy	"POSITIONING AND NAVIGATION SYSTEM USING GPS ". International Archives of the Photogrammetry, Remote Sensing and Spatial Information Science, Volume XXXVI, Part 6, Tokyo Japan 2006	This system developed is a miniature of what can be done with the usage of GPS technology, since cost being a constraint for further advancement, it provides the users a wide variety of applications by using a basic GPS receiver which is costing less.	The working and explanation of GPS is obtained from this paper.
6	Nisha	"Voice Recognition Technique: A Review". In International Journal for Research in Applied Science & Engineering Technology (IJRASET) || Volume 5 Issue V, May 2017 || ISSN: 2321-9653	Voice recognition is computer analysis of the human voice, particularly for the target of translating words and phrases and routinely identifying who is speaking on the foundation of individual information incorporated in speech waves.	The working of Voice Recognition and explanation on Speech Recognition is obtained from this paper.

PROBLEM DEFINITION

There is a huge usage of electric resource, from charging a small phone to charging an electric car. So, it becomes a necessity to save electricity and energy. This System resolves the faulty street lamp issue, making it more eco-friendly and user friendly.

Road Crimes and accidents are happening frequently all over the world. This project tends to provide a helping hand by using GSM and informing the Police Control Room.

SOLUTION STRATEGY & METHODOLOGY

Basic strategy is to maximize saving of energy from street lamps by using Arduino UNO Controller, LDR sensor, PIR sensor, Voice Recognition Module and GSM & GPS.

When the Incident light Intensity on the LDR is lower than the threshold value and the motion sensor senses a motion the LED will be switch ON. The lamp will work only when the two sensors produce true values otherwise the lamp stays off.

LDR SENSOR: A photoresistor (or light-dependent resistor, LDR, or photo-conductive cell) is a light-controlled variable resistor. 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.

PIR SENSOR: A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications.

Voice Recognition Module: Voice Recognition Module is a compact easy-control speaking recognition board. It is a speaker-dependent module and supports up to 80 voice commands. Any sound could be trained as command. Users need to train the module first before recognizing any voice command. Voice commands are stored in one large group like a library. Any 7 voice commands in the library could be imported into recognizer. It means 7 commands are effective at the same time.

GSM: A GSM module or a GPRS module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM or GPRS system.

GPS: A GPS tracking unit is a navigation device normally carried by a moving vehicle or person that uses the Global Positioning System (GPS) to track the device's movements and determine its location.
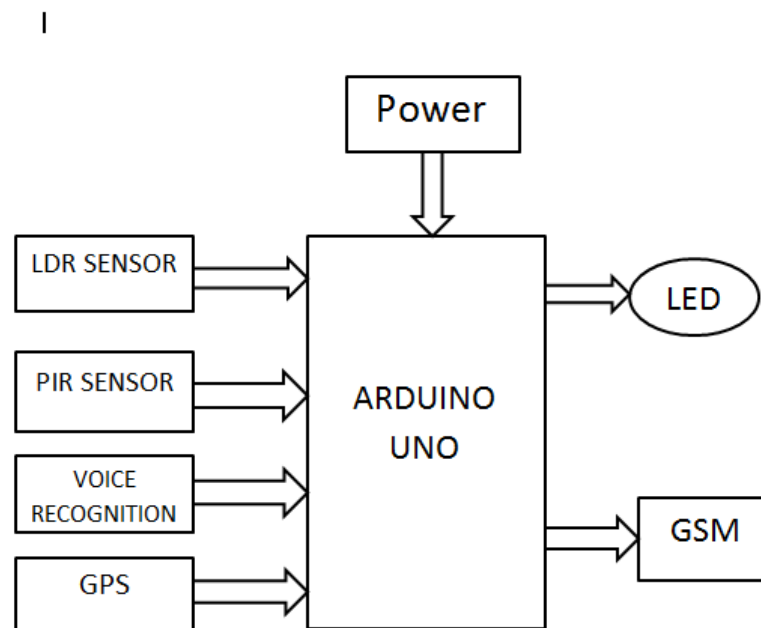
CIRCUIT DESIGN
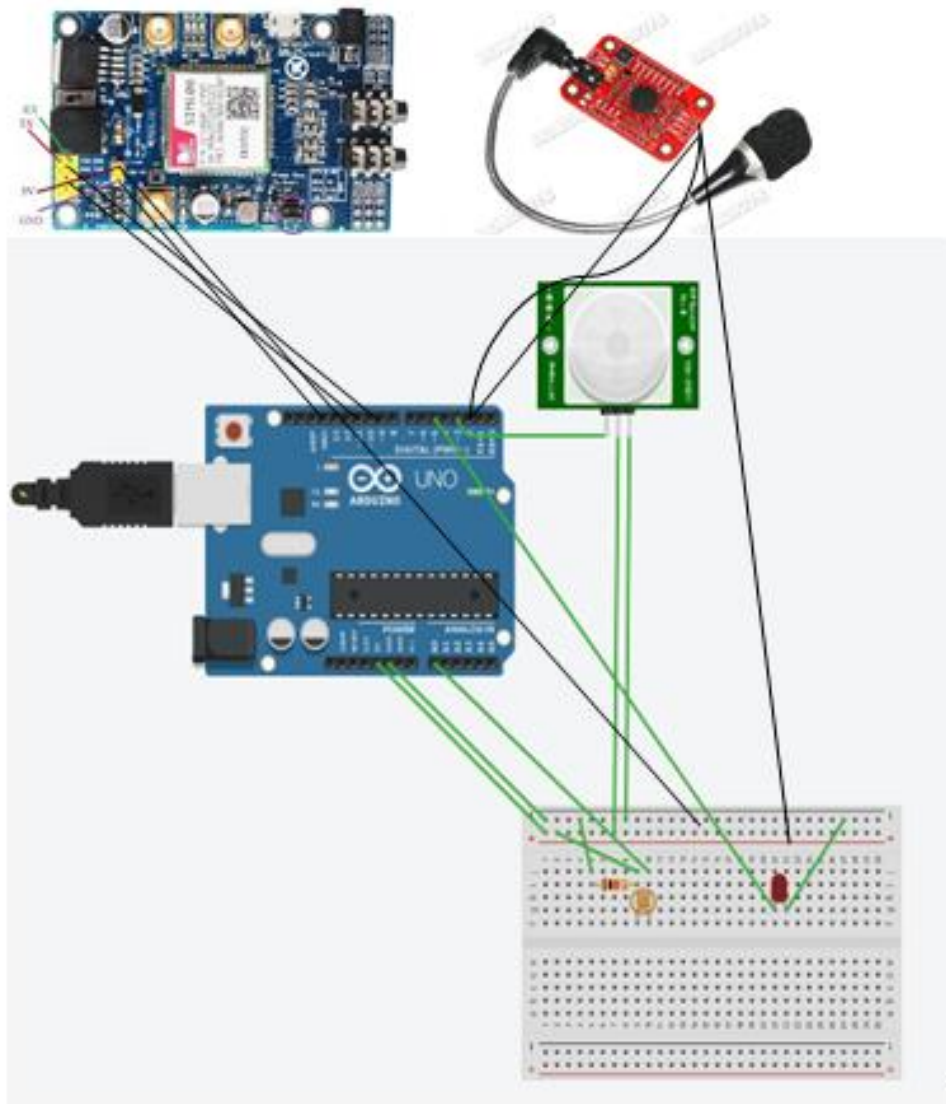
REQUIREMENTS:

- SOFTWARE REQUIREMENTS:
  - ARDUINO IDE

- HARDWARE REQUIREMENTS:
  - ARDUINO UN0
  - LDR Sensor
  - PIR Sensor
  - Voice Recognition Module
  - GSM & GPS Module
  - LED

IMPLEMENTATION

I

```
                          ┌──────────┐
                          │  Power   │
                          └────┬─────┘
                               │
                               ▼
┌──────────────┐      ┌──────────────────┐
│  LDR SENSOR  │─────▶│                  │─────▶ ( LED )
└──────────────┘      │                  │
┌──────────────┐      │                  │
│  PIR SENSOR  │─────▶│   ARDUINO        │
└──────────────┘      │     UNO          │
┌──────────────┐      │                  │
│    VOICE     │─────▶│                  │
│ RECOGNITION  │      │                  │─────▶ ┌──────┐
└──────────────┘      │                  │       │ GSM  │
┌──────────────┐      │                  │       └──────┘
│     GPS      │─────▶│                  │
└──────────────┘      └──────────────────┘
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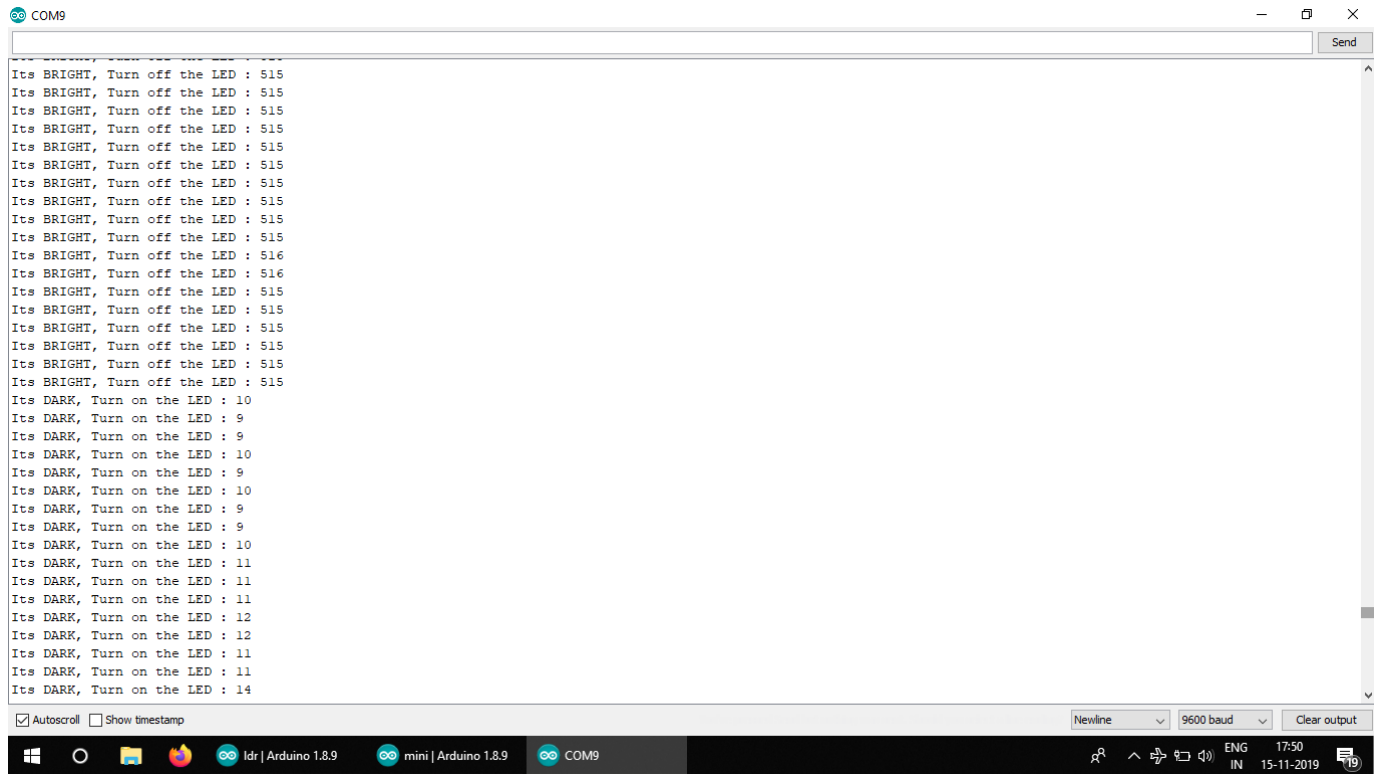
IMPLEMENTATION DETAILS

Arduino Controller is connected to all the sensors.

LDR and PIR sensor's value has to be true at the same for the light to be ON. The fog light will be triggered when the Optical Fog Sensor gives a true value.

The GSM will be triggered when the Voice Recognition Module detects a human voice calling out for 'HELP!', the location or co-ordinates of that lamp will be send to the nearest police control room.

EXPIREMENTAL RESULT

Fig. LDR sensor Output

```
COM9                                                                    —  □  ×
                                                                        Send
Recognizer cleared.
onRecord loaded
offRecord loaded
 MOTION DETECTED
 Its DARK, Turn on the LED : 515
 MOTION DETECTED
 Its DARK, Turn on the LED : 532
 MOTION DETECTED
 Its DARK, Turn on the LED : 535
 MOTION DETECTED
 Its DARK, Turn on the LED : 536
 MOTION DETECTED
 Its DARK, Turn on the LED : 536
 MOTION DETECTED
 Its DARK, Turn on the LED : 535
 MOTION DETECTED
 Its DARK, Turn on the LED : 535
 MOTION DETECTED
 Its DARK, Turn on the LED : 532
 MOTION DETECTED
 Its DARK, Turn on the LED : 531

 Sending mESsage
VR Index        Group   RecordNum       Signature
0               NONE    20              NONE



☑ Autoscroll  ☐ Show timestamp              Newline    115200 baud   Clear output
```
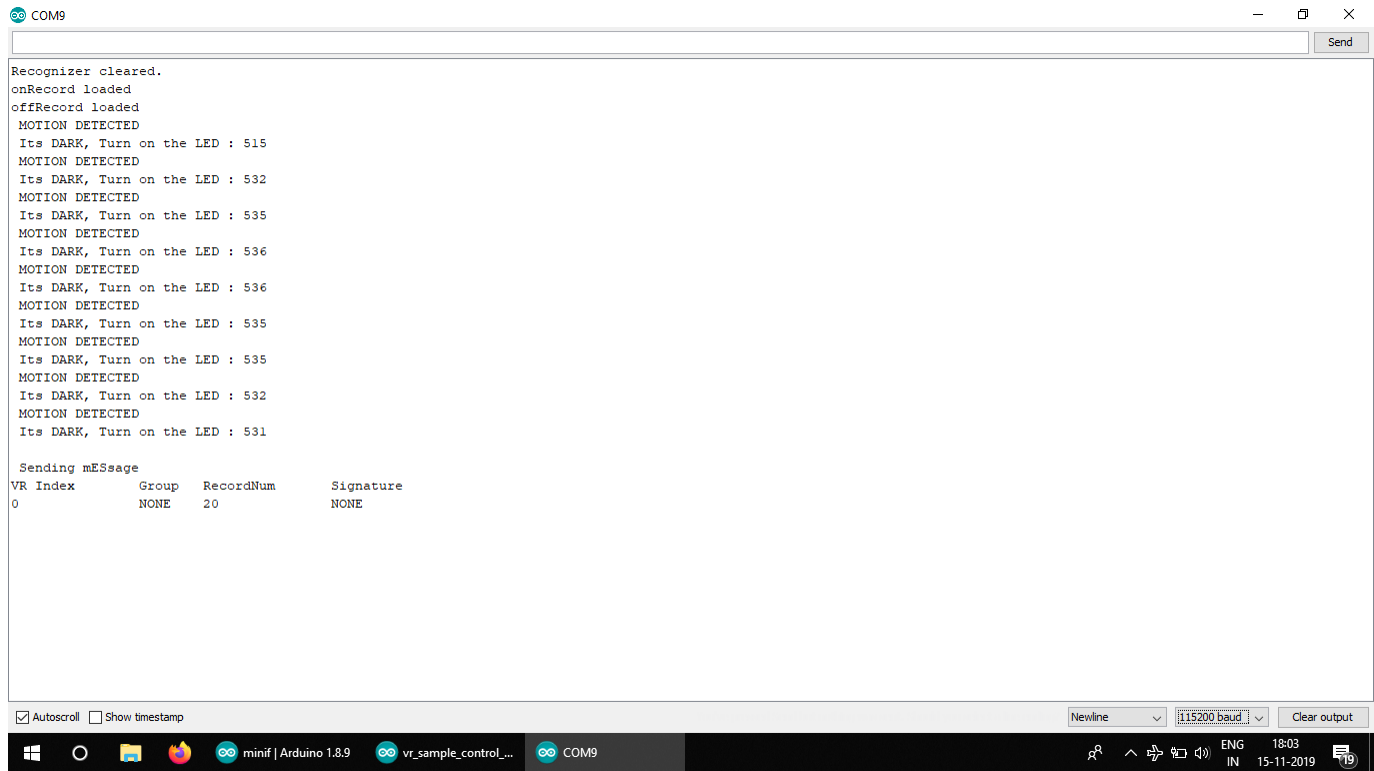
Fig. Main Output On Serial Monitor.

CONCLUSION

The model is described in a way which integrates new technologies offering ease of maintenance and energy savings. The proposed system is appropriate for street lighting in remote as well as urban areas where traffic is low at times. It is capable of taking corrective actions in case of unprecedented events of climatic changes.

Not only does this model save energy, it also proposed a public security enhancement step. And if this security system is implemented in real time, crime rates might become lower.

Hence, this project tends to save energy as well as increase public security to an extent.

LIMITATION

The basic limitation of this model is the unreliability of network as the GSM requires un-interrupted network in order to sent message.

And, the other limitation is that the PIR sensor not only detects human detection but it also detect animals.

FUTURE SCOPE

For future enhancement, this project can further be extended in pollution detection and using digital image processing accident detection can be added for public security.

GANTT CHART

Activity	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Literature Survey	🟥	🟥	🟥	🟥	🟥	🟥		
	🟩	🟩	🟩	🟩	🟩	🟩		
Problem Identification	🟥	🟥	🟥	🟥				
	🟩	🟩	🟩	🟩				
Analysis		🟥	🟥	🟥	🟥	🟥	🟥	
		🟩	🟩	🟩	🟩	🟩	🟩	
Design		🟥	🟥	🟥	🟥	🟥	🟥	
		🟩	🟩	🟩	🟩	🟩	🟩	
Implementation				🟥	🟥	🟥	🟥	🟥
				🟩	🟩	🟩	🟩	🟩
Documentation	🟥	🟥	🟥	🟥	🟥	🟥	🟥	🟥
	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩

🟥 PLANNED TIME

🟩 WORK DONE

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