

# Basic Details of the Team and Problem Statement

**Ministry/Organization Name/Student Innovation:** Ministry of Housing and Urban Affairs

**PS Code:** SIH1512

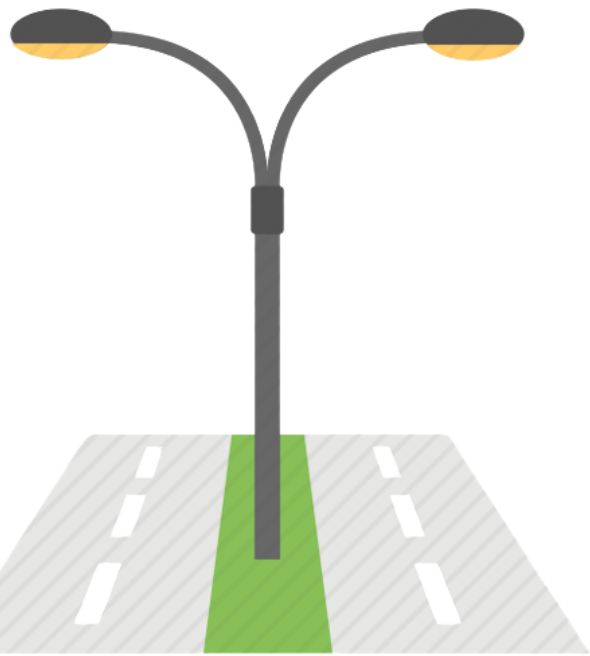
**Problem Statement Title:** Centralized Monitoring System for Street Light Fault Detection and Location Tracking

**Team Name:** Team Asterisk

**Team Leader Name:** Saptarshi Pal

**Institute Name:** National Institute Of Technology Durgapur

**Theme Name:** Smart Automation



## Idea/Approach Details

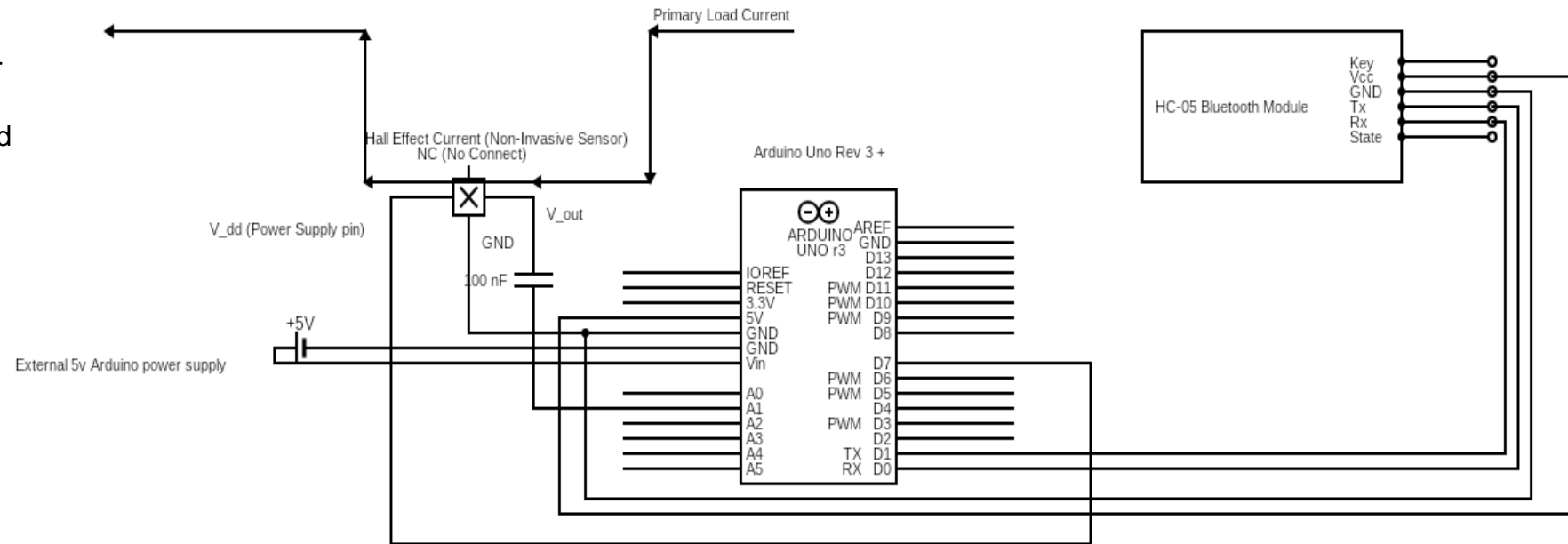
- **A Faulty lighting component detection system with a miniature custom PCB board mounted on a certain pole will be monitoring the health of 3-4 nearby components. Primary mechanism of detecting the fault is using the Hall Effect. Miniature hall effect current sensors mounted on each board will monitor current flowing to the component and (likely on future innovation) power levels through the wires nearby; in case of a faulty component, the hall current changes, prompting an alert to the nearest nodal system to which is paired to via wire/less communication channel along with node and branch Ids for pinpointing faults.**

The fault detection sequence is as follows:

1. A lighting component goes out for some reason
2. An accompanying change in current levels takes place
3. The hall effect current sensor picks up the change, feeds it to its microcontroller. The microcontroller has a lightweight and fast algorithm to detect whether the change signifies a fault or not.
4. The microcontroller if detects a fault, it communicates the same to the nearest node.
5. The node has communications channels to the authorities and communicates the message with the node Id, time, which can then be used by field techies to pinpoint the location of fault.

Please visit: [Circuit Diagram](#) for detailed view of the circuit diagram.  
[Please visit: Figma Design File Link](#) for detailed view of the Proposed layout  
 Please visit our [Flowchart](#) for proposed layout.

## Circuit Diagram



# Idea/Approach Details

## Use Cases

- **1. To manage fault detection of street lights in a centralized way at municipalities and panchayats which are usually limited in budget which is the sole purpose of this solution regarding the problem statement.**
- **2. Corporate firms with lot of lighting requirements, hence incentive to save energy on the same.**
- **3. Industries where lighting is essential for safety and inspection purposes, not a moment to lose.**
- **4. Private contractors and Energy and electrical providers who are employed to provide lighting systems for buildings and corporate or else sites.**

## Mini Glossary for terms used in this document:

1. **Node:** local street wise focal point of reporting for all modules in the street about any anomaly/fault.
2. **Branches:** the street-wise network emanating from a node
3. **Central Client/Authority Server:** The focal point for all the nodes in the client's primary network for escalation of fault reports from nodes all over the network.
4. **WCS6800/SCT013:** The specific sensor/s we intend to use in our prototype for detecting the hall current.[NON-INVASIVE Technology] [technology from Winson Semiconductors Corp., Taiwan, others]
5. **Arduino Uno R3/custom PCB:** The prototyping microcontroller board for purpose of prototyping. We intend to implement the idea on a custom printed PCB board in a more advanced stage (*proposed microcontroller for custom PCB: STM32F103C8T6*).
6. **HC-05:** The Bluetooth module to be integrated with Arduino for wireless inter-communication.

## Dependencies

- **1. Hardware Dependencies**
- **1.1. WCS6800/SCT013 Sensors:** primary sensors to detect current changes in street light circuits.
- **1.2. Arduino Boards/custom PCB:** collecting data from current sensors and processing it (*proposed microcontroller for custom PCB: STM32F103C8T6*).
- **1.3. LEDs and Light Posts:** relies on existing street light infrastructure for placement.
- **1.5. Mobile App:** To receive and display fault notifications for field inspectors.

### 2. Software Dependencies:

- 2.1. **Arduino IDE:** for programming and uploading code to Arduino boards.
- 2.2. **Server & Cloud Infrastructure:** to transmit data from nodes to servers (server-side infrastructure for data storage and management)
- 2.3. **Communication Dependencies: Local Area Network (LAN):** Needed for communication between Arduino and laptop during initial testing.

**3. Documentation:** Creation of user manuals, technical documentation, and project reports.

**4. Budget:** Budget for hardware, software, and development costs.

**5. Authority Regulatory Compliance:** Need to comply with regulations related to electrical installations.

# Team Member Details



**Team Leader Name:** Saptarshi Pal

Branch : B Tech Stream : ECE Year : 2nd

**Team Member 1 Name:** Souvik Dey

Branch : B Tech Stream : CSE Year : 2nd

**Team Member 2 Name:** Anamitra Hazra

Branch : B Tech Stream : CSE Year : 2nd

**Team Member 3 Name:** Riddha Roy Choudhury

Branch : B Tech Stream : ECE Year : 2nd

**Team Member 4 Name:** Rudradip Mukherjee

Branch : B Tech Stream : EE Year : 2nd

**Team Member 5 Name:** Deboleena Mishra

Branch : B Tech Stream : MME Year : 2nd



Thank you....