

Capstone Project Phase I

REVIEW I

PROJECT TITLE

Domain

Supervisor Name

TEAM MEMBERS :

INDUSTRY NAME

CONTENT

ABSTRACT

- Adjusts street light brightness based on vehicle presence, reducing unnecessary energy consumption.
- Uses sensors to turn on lights automatically when ambient light levels drop, ensuring consistent road visibility.
- Identifies and reports faulty lights for timely maintenance, improving system reliability.
- Tracks the number of passing vehicles using IR sensors for traffic analysis.
- Employs NRF2401 modules for efficient data transmission between Arduino-based transmitters and ESP8266 receivers

INTRODUCTION

- Smart street lighting systems leverage advanced sensors and communication technology to enhance safety and visibility on roadways at night.
- These systems significantly reduce energy consumption by dynamically adjusting brightness based on vehicle movement, leading to cost savings for municipalities.
- By automating monitoring and control, smart systems improve response times to faults and maintenance needs, increasing overall operational efficiency.
- Smart street lighting provides better control and accuracy compared to traditional methods, ensuring that lighting meets the specific requirements of the environment.

LITERATURE REVIEW

(4 -6 slides)

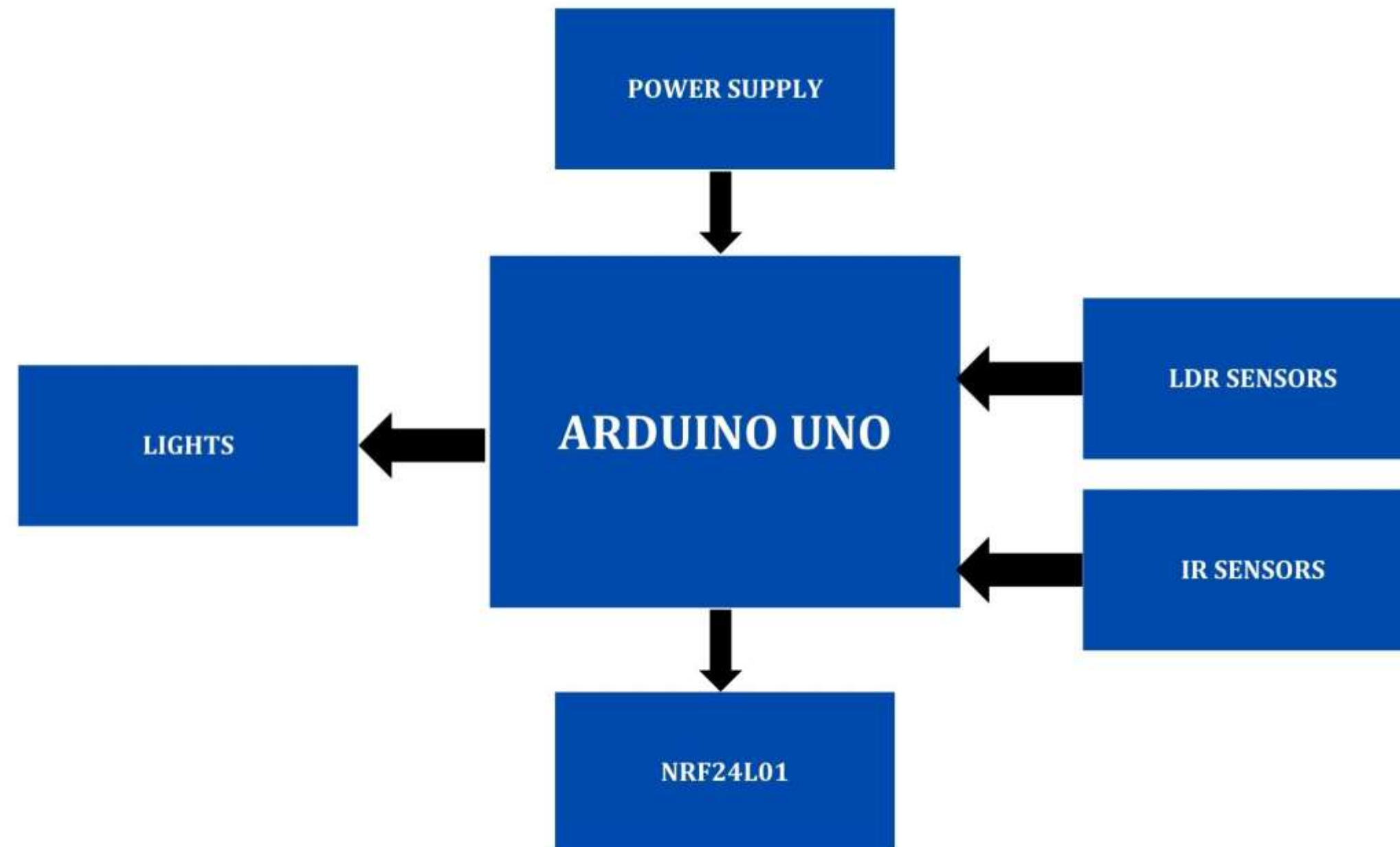
PROBLEM IDENTIFICATION

- Street lights stay fully lit all night, causing unnecessary electricity consumption.
- Detecting and fixing faulty street lights relies on manual inspection, leading to delays in maintenance.
- Conventional systems do not provide instant data tracking, limiting the ability to adjust lighting based on traffic flow.
- Current street lighting setups lack features for counting vehicles or monitoring traffic patterns.
- Lights operate at a constant level without adapting to changes in road activity, resulting in continuous energy use.

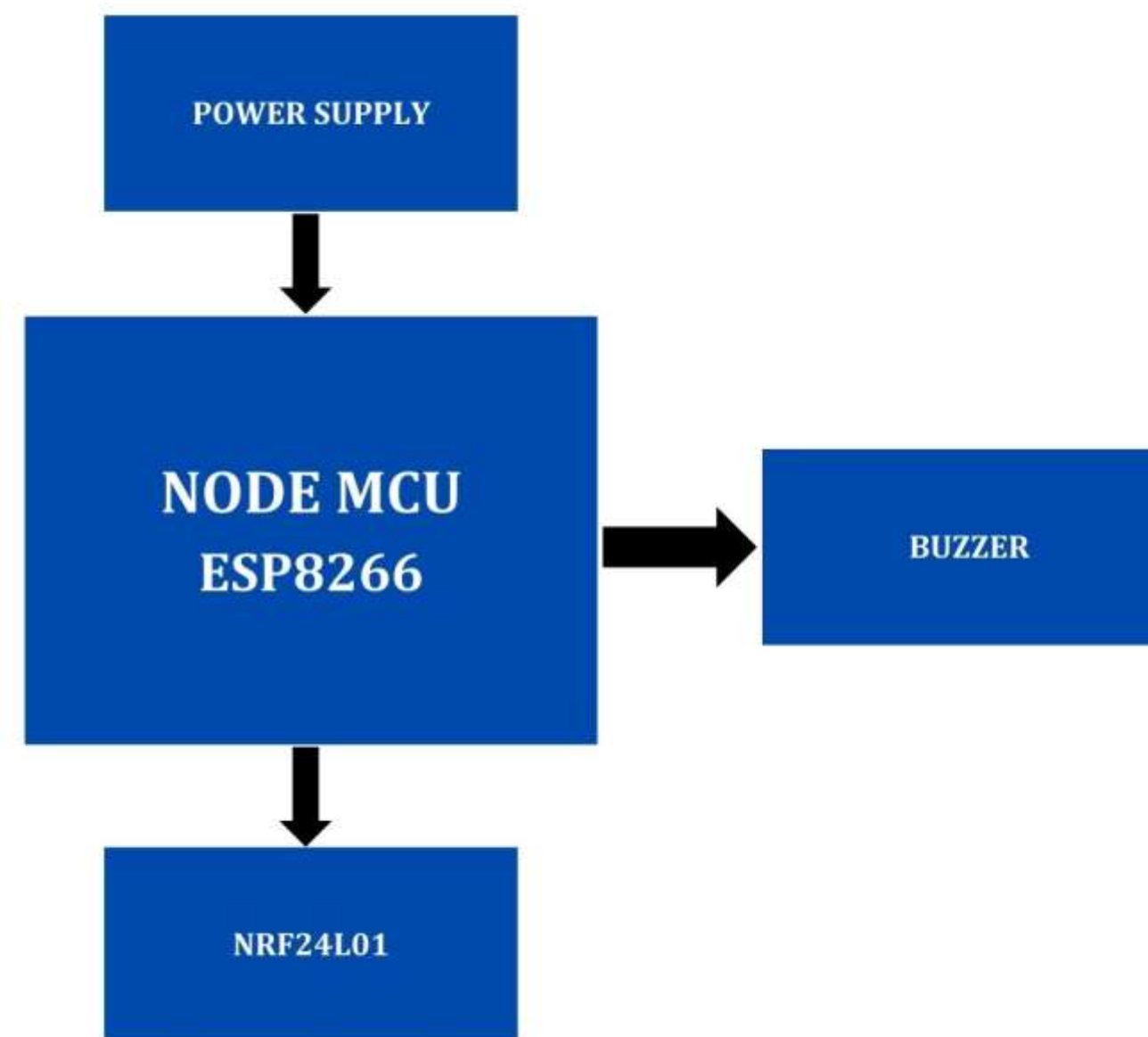
METHODOLOGY

- Uses sensors to identify faulty street lights and wirelessly report issues to the control center.
- Adjusts light brightness based on vehicle presence, detected through IR sensors, to save energy.
- Activates lights and enhances brightness when motion is detected, improving visibility for vehicles and pedestrians.
- Tracks the number of passing vehicles for traffic analysis and urban planning.
- Utilizes NRF2401 modules to transmit data on faults and maintenance from Arduino to ESP8266, which sends it to a local server for monitoring.

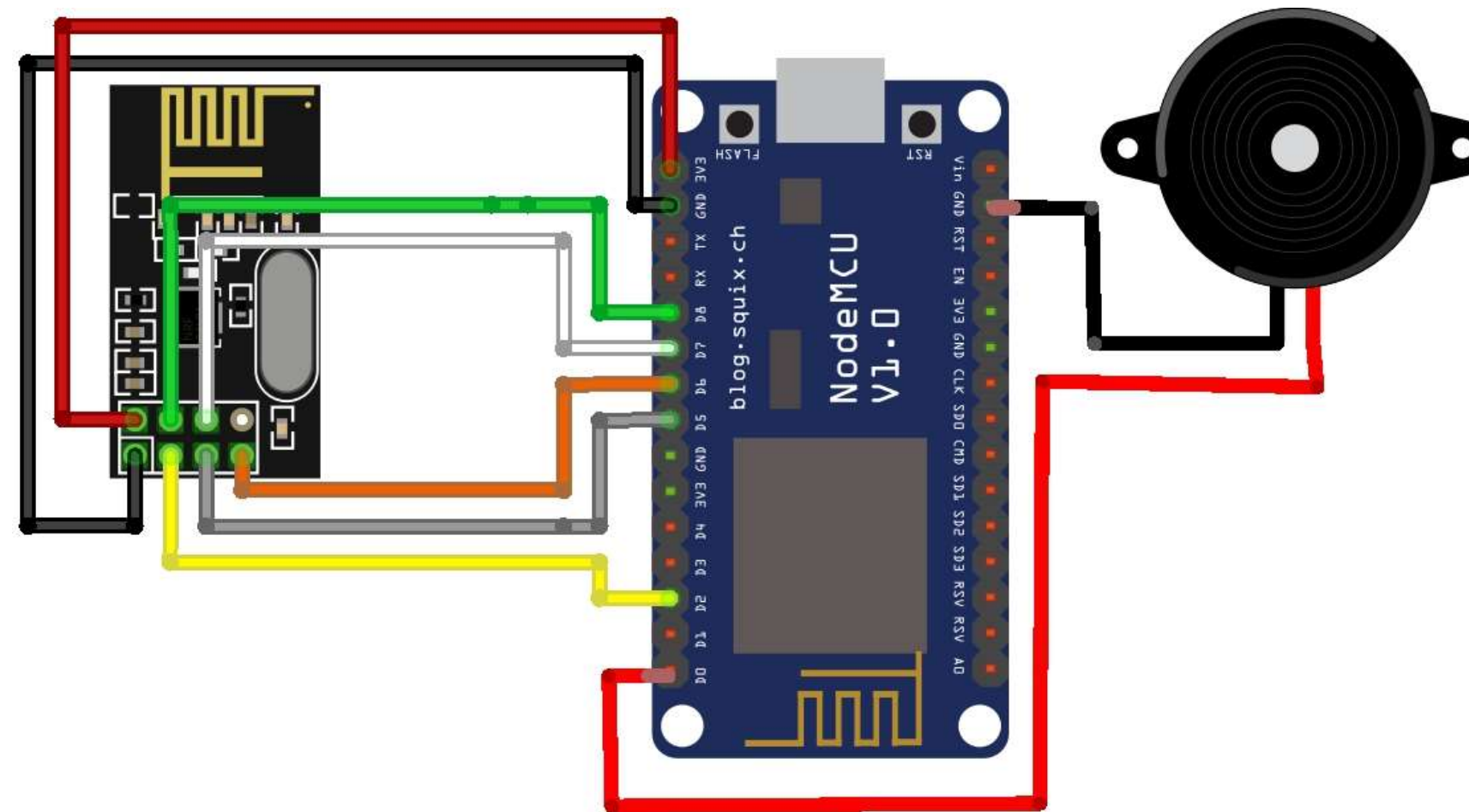
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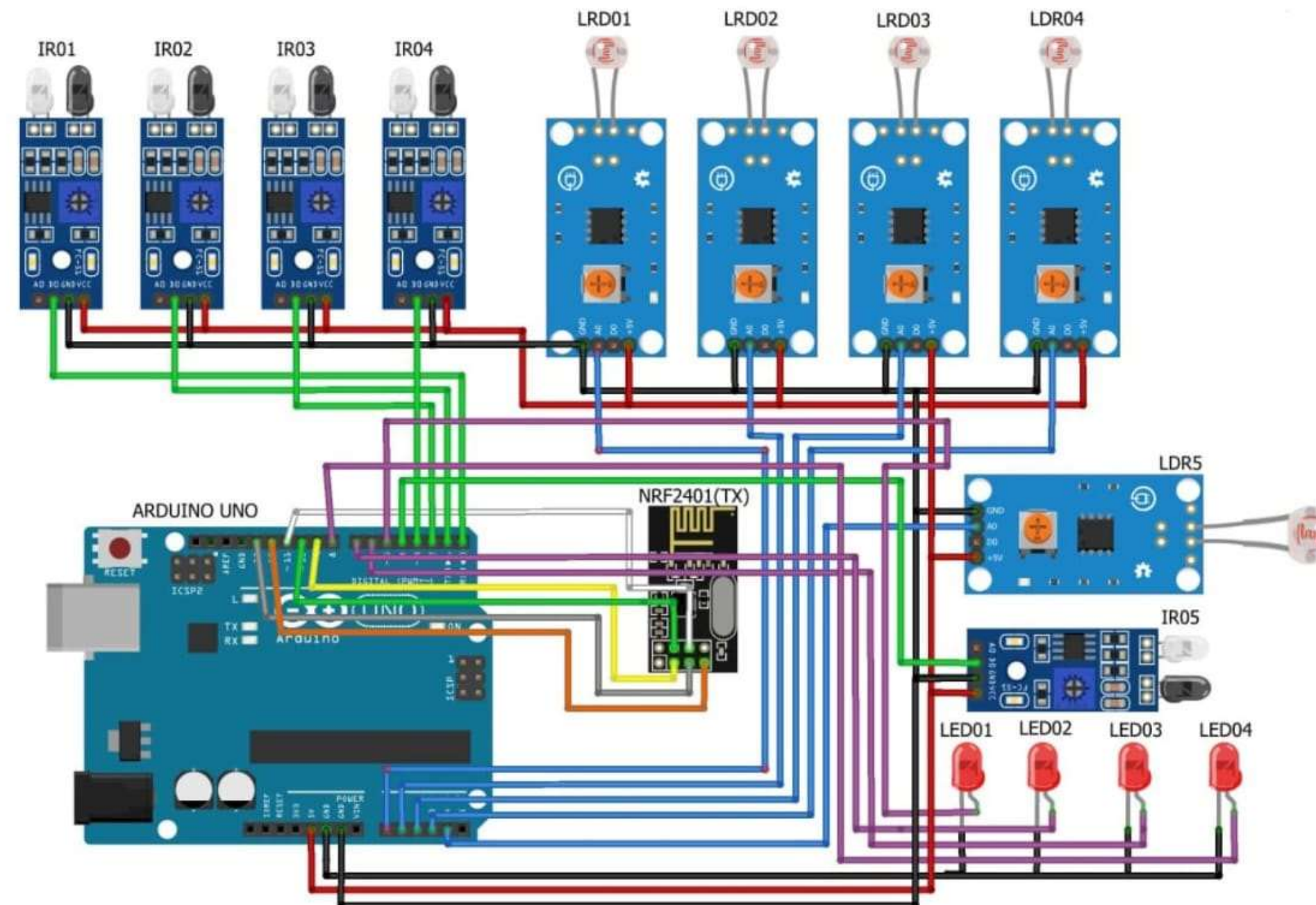
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CIRCUIT DIAGRAM RX



CIRCUIT DIAGRAM RX



SIMULATION / EXPERIMENTAL SETUP

RESULTS AND DISCUSSION

- The implementation of the Vehicle Movement-Based Smart Street Light System resulted in a significant improvement in energy efficiency by dimming lights when no vehicles are present, leading to considerable electricity savings.
- Enhanced fault management with quick detection and reporting reduced maintenance downtime.
- Scalable design allows easy expansion and integration of additional features, making it adaptable for larger areas.

REFERENCES

