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Centralized Monitoring System for Street Light Fault Detection and Location Tracking

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***Abstract*—**Managing urban street lighting poses a significant financial challenge for cities, requiring a fresh approach to curbing energy consumption and bolstering environmental stewardship while maintaining operational efficiency. To address this imperative, we introduce an innovative automated street lighting system, which seamlessly incorporates state-of-the-art sensors and wireless modules. At its core, a Light Dependent Resistor (LDR) diligently monitors ambient lighting conditions, orchestrating streetlight activation and deactivation in response to the environment. This LDR-centric approach not only enhances energy conservation but also incorporates a robust fault detection mechanism. Furthermore, a GSM module ensures timely notification of light faults to designated users, while a cloud-based infrastructure, accessible via a Wi-Fi module, permits real-time monitoring and system management, transcending geographical and temporal limitations.

***Keywords*—** Managing urban street lighting, Light Dependent Resistor, GSM module etc.

I. INTRODUCTION

This pioneering initiative represents the convergence of cutting-edge technology aimed at delivering a sustainable solution for urban infrastructure management. Through the optimization of energy efficiency, heightened environmental responsibility, and streamlined administrative oversight, our groundbreaking street lighting system stands poised to make a substantial impact on the urban infrastructure landscape

II. OBJECTIVES:

The primary objective of this project is to deploy an advanced automated control and fault detection system for street lamps, optimizing energy efficiency and ensuring cost-effective street lighting while offering a swift response to faults and mitigating errors associated with manual operation. Leveraging the Internet of Things (IoT), the system incorporates real-time weather data to determine optimal ON/OFF states using a Light Dependent Resistor (LDR) sensor for light detection. Daylight triggers an OFF status, conserving energy, while darkness activates the street lights. The system continuously monitors the lamps, generating alerts if deviations occur. SMS notifications are then sent to ward members and servicemen for quick fault resolution. Data from LDR sensors is securely stored in the cloud, allowing remote access for monitoring, analysis, and optimization, contributing to safer and energy-efficient urban lighting.

III. METHODOLOGY- PROPOSED SYSTEM:

a. System Architecture and Weather Sensing:

The system is underpinned by meticulously designed Arduino programming, enabling precise control of street lighting. It incorporates a Light Dependent Resistor (LDR) to continuously monitor ambient light levels. This LDR data is used to distinguish between daytime and nighttime conditions, facilitating informed decisions for street lamp activation.

b. Automated Street Lamp Control:

The system automates street lamp control, eliminating the need for manual operation. During nighttime, it activates street lights, enhancing energy conservation and safety. In contrast, during daylight hours, the system intelligently deactivates street lamps to reduce energy consumption when natural light is sufficient.

c. Fault Detection and Alerting:

Beyond control, the system offers fault detection by monitoring LDR values. When non-functional street lamps are identified, the system promptly sends alert messages via a GSM module to predefined recipients, ensuring swift maintenance and enhancing urban safety.

d. Cloud-Enabled Remote Access and Data Storage:

The system connects to cloud storage through a Wi-Fi module, providing users with real-time access to the street lighting system's status from anywhere. The Wi-Fi module also serves as a data storage solution, ensuring secure storage of sensor data for efficient management and historical data retrieval.

e. Innovative Urban Street Lighting Solution:

This methodology represents a transformative innovation in urban street lighting, characterized by energy-efficient

operation, comprehensive fault detection, and the convenience of remote administrative oversight. It enhances urban safety, energy efficiency, and data accessibility in urban infrastructure management.

BLOCK DIAGRAM

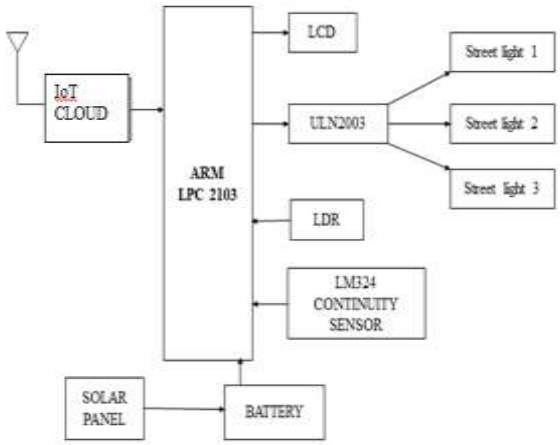

Figure 1: Proposed Methodology

IV. WORK PLAN

Activity / Month	1	2	3	4	5
Purchase of hardware Equipment					
Implementation of MATLAB					
Interfacing hardware with MATLAB					
Product designing					
Testing of the proposed work					

Figure 1: Proposed Methodology

V. BUDGET

Sl. No.	Name of the components	Estimated Costs (Rs.)
1)	ARM Processor(LPC2103)	900
2)	Street Lights and Driver model (3 Units)	2180
3)	Battery	950
4)	LDR sensor (8 Units)	90
5)	Solar Panel	2,300
6)	IOT Cloud Server(Rent per month)	699
7)	PCB and Fabrication	2000
8)	Total	9119

VI. Conclusion:

In conclusion, this paper underscores the implementation of an automated street light control and fault detection system, intricately intertwined with cloud storage functionality. Notably, this innovative system intuitively regulates street light activation in response to prevailing environmental conditions, offering both efficiency gains and heightened safety within urban landscapes. Furthermore, it provides a robust mechanism for the expedient identification of lighting faults, seamlessly transmitting alert notifications to authorized personnel for immediate corrective action. The system's capacity for remote monitoring via cloud storage underscores its potential as a valuable asset to municipal corporations, facilitating agile oversight and management. Looking ahead, this pioneering initiative hints at a promising future, wherein sensor and power supply faults can be addressed and lighting power judiciously adjusted, thus perpetuating an evolving commitment to resource optimization and environmental responsibility. This research paves the way for a dynamic shift in urban infrastructure management, encapsulating the essence of modernity and technological ingenuity.

REFERENCES

[1] Rahmat, R.F.; Syahputra, M.D.; Andayani, U.; Lini, T.Z. Probabilistic neural network and invariant moments for men face shape classification. In IOP Conference Series: Materials Science and Engineering; IOP Publishing: Bristol, UK, 2018; Volume 420, p. 012095.

[2] Bansode, N.; Sinha, P. Face Shape Classification Based on Region Similarity, Correlation and Fractal Dimensions. Int. J. Comput. Sci. Issues (IJCSI) 2016, 13, 24.

[3] Pasupa, K.; Sunhem, W.; Loo, C.K. A hybrid approach to building face shape classifier for hairstyle recommender system. Expert Syst. Appl. 2019, 120, 14–32. [CrossRef]

[4] W. Rawat and Z. Wang, Deep convolutional neural networks for image classification: A comprehensive review, Neural Computation, vol.29, no.9, pp.2352-2449, 2017.

[5] Jiankang Deng, Shiyang Cheng, NiannanXue, Yuxiang Zhou, and StefanosZafeiriou. Uv-gan: Adversarial facial uv map completion for pose-invariant face recognition. In CVPR, pages 7093–7102, 2018.

[6] Victoria FernándezAbrevaya, AdnaneBoukhayma, Stefanie Wuhrer, Edmond Boyer. A Decoupled 3D Facial Shape Model by Adversarial Training. ICCV 2019 - International Conference on Computer Vision, Oct 2019, Seoul, South Korea. pp.9418-9427, ff10.1109/ICCV.2019.00951ff. ffhal-02064711v3

[7] Young, S, Natalia, F, Sudirman, S and Ko, CS (2019) Eyeglasses frame selection based on oval face shape using convolutional neural network. ICIC Express Letters, Part B: Applications, 10 (8). pp. 707-715. ISSN 2185- 2766, 2019

[8] 16, 1105. [CrossRef] [PubMed] 56. Aldibaja, M.A.J. Eye Shape Detection Methods Based on Eye Structure Modeling and Texture Analysis for Interface Systems. Ph.D. Thesis, Toyohashi University of Technology, Toyohashi, Japan, 2015