SMART DRIVE INNOVATION LI-FI ENABLED SMART TRANSACTIONS, ADAPTIVE LIGHTING AND AUTOMATED BRAKING FOR ENHANCED SAFETY AND DRIVE-THRU EXPERIENCE

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR

ANNA UNIVERSITY: CHENNAI 600 025

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M. KUMARASAMY COLLEGE OF ENGINEERING, KARUR
(Autonomous Institution affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this project report **"SMART DRIVE INNOVATION LI-FI ENABLED SMART TRANSACTIONS, ADAPTIVE LIGHTING AND AUTOMATED BRAKING FOR ENHANCED SAFETY AND DRIVE-THRU EXPERIENCE"** is the bonafide work of **"ABINAYA P (20BEE4001), ABIRAMI S (20BEE4002), INDHUMATHI R (20BEE4023), MADHURAMBIGA S (20BEE4045)"** who carried out the project work during the academicyear 2023-2024 under my supervision. Certified further, that to the best of my knowledge thework reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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This Project Work II (18EEP402L) has been submitted for the End Semester Project viva voce Examination held on _____

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

We affirm that the Project report titled "**SMART DRIVE INNOVATION LI-FI ENABLED SMART TRANSACTIONS, ADAPTIVE LIGHTING AND AUTOMATED BRAKING FOR ENHANCED SAFETY AND DRIVE-THRU EXPERIENCE"** being submitted in partial fulfillment for the award of **Bachelor of Engineering** in **Electrical and Electronics Engineering**, is the original work carried out by us. It has not formed the part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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I certify that the declaration made above by the candidates is true to the best of my knowledge.

Mr. S. Dinesh Kumar M.E.,
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VISION AND MISSION OF THE INSTITUTION

VISION

To emerge as a leader among the top institutions in the field of technical education

MISSION

- Produce smart technocrats with empirical knowledge who can surmount the global challenges.
- Create a diverse, fully-engaged, learner-centric campus environment to provide quality education to the students.
- Maintain mutually beneficial partnerships with our alumni, industry and professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To produce smart and dynamic professionals with profound theoretical andpractical knowledge comparable with the best in the field.

MISSION

- Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- Produce highly competent professionals with thrust on research.
- Provide personalized training to the students for enriching their skills.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Graduates will have flourishing career in the core areas of Electrical Engineering and allied disciplines.

PEO2: Graduates will pursue higher studies and succeed in academic/research careers.

PEO3: Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.

PEO4: Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAMME OUTCOMES (POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree programme, the students will be able to:

- **PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

- **PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- **PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

- **PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- **PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- **PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

- **PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- **PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

- **PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

- **PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

- **PO11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

- **PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOME (PSOs)

The following are the Program Specific Outcomes of Engineering Students:

PSO1: Apply the basic concepts of mathematics and science to analyze and design circuits, controls, Electrical machines and drives to solve complex problems.

PSO2: Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.

PSO3: Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real world problems.

Abstract (key words)	POs mapping
Li-Fi, intelligent payment options, Adaptive lighting solutions, Automated braking mechanisms	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2,PSO3

ABSTRACT

The application of Li-Fi technology as a cornerstone of intelligent systems has garnered considerable interest recently. This innovative approach seeks to elevate safety standards and redefine the drive-through experience by harnessing Li-Fi transmitters and receivers, alongside LDR and ultrasonic sensors, an Arduino controller, and a suite of relays and motors. This integrated system is engineered to offer intelligent payment options, adaptive lighting solutions, and automated braking mechanisms, thereby ensuring a seamless and efficient driving encounter. Leveraging Li-Fi technology facilitates swift and secure data transmission, rendering it an optimal choice for enhancing road safety. Through the incorporation of diverse sensors and components, real-time data gathering and analysis become feasible, empowering the system to dynamically adjust to evolving driving conditions. Additionally, a user-friendly LCD is incorporated for intuitive monitoring and control. In essence, this conceptual framework holds great promise in bolstering safety measures and revolutionizing the drive-through journey via the adoption of Li-Fi Technology.

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LIST OF ABBREVIATIONS

S.NO	ABBREVIATION	EXPANSION
1.	Li-Fi	Light-Fiedlity
2.	VLC	Visual Light Communication
3.	RFID	Radio Frequency Identification
4.	LDR	Light Dependent Resistor
5.	I2C	Inter-Integrated Circuit