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ECC1361 INDUSTRIAL ELECTRONICS AND APPLICATIONS

INTELLIGENT MANAGEMENT AND CONTROL OF ELECTRICAL LOADS USING A MICROCONTROLLER

A PROJECT REPORT

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRONICS AND COMMUNICATION ENGINEERING

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

NOVEMBER 2025

M.KUMARASAMY COLLEGE OF ENGINEERING, KARUR

(Autonomous Institution affiliated to Anna University, Chennai)

BONAFIDE CERTIFICATE

Certified that this project report **"INTELLIGENT MANAGEMENT AND CONTROL OF ELECTRICAL LOADS USING A MICROCONTROLLER"** is the bonafide work of "**DHARSHINEE S S (927623BEC036), DURKA SRI N (927623BEC051), ELAMATHI S (927623BEC053)"** who carried out the project work during the academic year 2025- 2026 under my supervision.

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This Project Work ECC1361 INDUSTRIAL ELECTRONICS AND APPLICATIONS report has been submitted for the End Semester Project viva voce Examination held on ________________.

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ACKNOWLEDGEMENT

We gratefully remember our beloved **Founder Chairman, (Late) Thiru. M. Kumarasamy**, whose vision and legacy laid the foundation for our education and inspired us to successfully complete this project.

We extend our sincere thanks to **Dr. K. Ramakrishnan, Chairman**, and **Mr. K. R. Charun Kumar, Joint Secretary**, for providing excellent infrastructure and continuous support throughout our academic journey.

We are privileged to extend our heartfelt thanks to our respected Principal, **Dr. B. S. Murugan, B.Tech., M.Tech., Ph.D.,** for providing us with a conducive environment and constant encouragement to pursue this project work.

We sincerely thank **Dr. N. Mahendran, B.E., M.E., Ph.D., Professor and Head, Department of Electronics and Communication Engineering**, for his continuous support, valuable guidance, and motivation throughout the course of this project.

Our special thanks and deep sense of appreciation go to our **Project Coordinator,**

Dr. K. Sheikdavood, B.E., M.E., Ph.D., Assistant Professor, **Department of Electronics and Communication Engineering,** for his exceptional guidance, constructive suggestions, and unwavering support, all of which have been instrumental in the successful execution of this project.

We would also like to acknowledge **Dr. P. Sakthi, B.E., M.E., Ph.D.,** Assistant Professor, our **Project Supervisor** for her constant encouragement, continuous supervision, and coordination that contributed to the smooth progress and completion of our project work.

We gratefully thank all the **faculty members of the Department of Electronics and Communication Engineering** for their timely assistance, valuable insights, and constant support during various phases of the project.

Finally, we extend our profound gratitude to our **parents and friends** for their encouragement, moral support, and motivation, without which the successful completion of this project would not have been possible.

ABSTRACT

Modern electric supply systems typically disconnect the whole line as a protection measure in the event of a sudden overload condition. Sometimes this results in extremely inconvenient service interruptions and unnecessary transient issues in the electric supply system. This article describes an intelligent load-management structure that enables the ongoing measurement of the current requirements of each load using an IoT-enabled monitoring solution that continuously records the real-time current requirements. The advantage of this system over more conventional electrical protection schemes, which simply disconnected the power supplies of all loads, is that it isolates only the load that has exceeded its current capacity, while maintaining all the other loads. This is all monitored using an Internet of Things (IoT) service such as the ESP8266 to utilize real-time current values combined with the continuous monitoring of current data, with mobile alerts, while logging data remotely to the cloud for subsequent review from a mobile or web application. The results of the experiments show the intelligent load-management system provides improved supply stability, increased overall service, and improved energy efficiency. The system is low-cost, scalable, and readily utilized in household and industrial applications, helping to maintain stability in power delivery and assist managing energy utilization.

Abstract (Key words)	POs Mapping
Internet of Things (IoT), Arduino UNO, LCD Display, Current Sensor, Relay Driver, Power Supply, Electrical Load Control	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2

SDG Goal		Remarks
SDG 9	Promotes innovation in electrical safety and smart infrastructure development.	Enhances automation and supports smart grid advancements.

Project Component	Relevant IEEE Standards
Arduino UNO Microcontroller	IEEE 802.11
ACS712 Current Sensor	IEEE 1451
ESP8266 Wi-Fi Module	IEEE 802.15
Relay Module	IEEE 60947
LCD Display (16 x 2)	IEEE 1680.1
Power Supply Unit	IEEE 60255
Connecting Wires & Terminals	IEEE 383

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LIST OF ABBREVIATIONS

ELCB	Earth Leakage Circuit Breaker
GSM	Global System for Mobile Communications
IoT	Internet of Things
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MCB	Miniature Circuit Breaker
MPC	Model Predictive Control
SMS	Short Message Service

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF LOAD MANAGEMENT

Electrical power distribution networks play a crucial role in supporting residential, commercial, and industrial operations. With the rapid growth of modernization, automation, and the widespread use of electrical appliances, the electrical load connected to distribution systems has increased significantly. This rise in consumption has created complex challenges such as voltage fluctuations, overloading, unexpected equipment failure, and complete system shutdowns. Traditional protection devices—such as fuses, MCBs, and ELCBs have been widely used for decades. Their operation is simple: whenever a fault or overload occurs, they disconnect the entire supply line. While this ensures basic protection, it also leads to full system blackout, affecting all loads even if only a single load is faulty. Such a blanket-disconnection approach is inefficient, inconvenient, and unsuitable for today's demanding electrical systems where uninterrupted supply is crucial. Load management refers to the systematic regulation and supervision of electrical loads to ensure proper power distribution, balanced consumption, and efficient operation. Modern electrical systems require smarter load management techniques that not only monitor load conditions continuously but also take corrective actions instantly to prevent catastrophic failures. The need of the hour is an intelligent load management solution capable of understanding load characteristics, measuring current drawn by each load in real-time, identifying abnormalities, performing selective disconnection, and enhancing overall safety without compromising performance or user convenience. This project proposes such an intelligent system by integrating microcontrollers, sensing devices, IoT connectivity, and relay-based switching to provide an advanced approach to energy management.

1.2 NEED FOR INTELLIGENT LOAD MANAGEMENT

The growing dependency on electrical appliances, automated systems, and industrial machinery has increased the strain on power distribution infrastructures. As households and industries continue to adopt modern technologies that demand higher power, distribution systems must accommodate varying load conditions more efficiently. This situation has created an urgent need for smarter load monitoring systems. Intelligent systems provide several advanced capabilities, including:

- **Real-time load monitoring :** Real-time current measurement ensures continuous supervision of individual load behaviour. The system instantly detects fluctuations, unusual consumption patterns, and load variations that might lead to overload or equipment malfunction.
- **Automatic overload detection :** Conventional systems only respond after a fault becomes critical, but intelligent monitoring enables early detection of gradual current rise, allowing timely preventive action. This reduces electrical hazards and improves longevity of connected equipment.
- **Selective tripping :** Unlike traditional systems that disconnect the entire supply, selective tripping isolates only the load crossing its current threshold. This prevents unnecessary shutdown of all loads and ensures continuous functionality of unaffected loads. Such selective isolation is highly beneficial for critical systems requiring uninterrupted power.
- **Remote IoT monitoring :** With IoT integration, the electrical system

becomes remotely accessible from any location. Users can monitor current usage, check status of loads, detect faults, and receive instant alerts on mobile devices. This improves usability, reliability, and decision-making for power management.

- **Improved supply reliability :** Selective tripping, faster fault response, and real-time monitoring collectively boost the reliability of the entire electrical network. The system ensures minimal downtime, stable power delivery, and protection of sensitive loads.

Overall, the shift from conventional protection systems to intelligent load monitoring brings significant improvements in safety, energy efficiency, operational stability, and user convenience.

1.3 OBJETIVES OF THE PROJECT

The objective of this project is to design a low-cost and intelligent electrical load monitoring system that improves safety and efficiency. It aims to measure the real-time current of each load, detect overload conditions accurately using ACS712 sensors, and disconnect only the overloaded load through Arduino-based selective tripping. The system also integrates IoT monitoring using ESP8266 to provide remote status updates and alerts via the Blynk platform, while a 16×2 LCD offers immediate local display of current values and load status. Overall, the project seeks to reduce downtime, prevent full system shutdown, and offer a scalable solution for homes and industries..

1.4 SCOPE OF THE PROJECT

The intelligent load management system is versatile, scalable, and suitable for various environments. Its scope includes:

- **Smart homes** : Homes increasingly rely on multiple appliances such as air conditioners, heaters, refrigerators, and washing machines. This system helps in preventing overloads and improving safety.

- **Educational institutions :** Laboratory equipment, computers, and other electrical devices require reliable power. Selective tripping helps maintain uninterrupted lab activities.
- **Small industries and workshops :** Machines like motors, drills, compressors, and welding units often cause sudden surges. Intelligent load monitoring ensures safe operation and reduces downtime.
- **Energy-efficient buildings :** With smart meter integration, the system supports energy auditing and improves building energy efficiency.
- **IoT-based automation systems :** The system can be integrated into broader IoT platforms, enabling centralized monitoring for smart power systems.
- **Smart grid and future energy systems :** The proposed model can be adapted for micro-grids, renewable energy systems, and distributed control networks.
- **Research laboratories :** Useful for research in embedded systems, energy monitoring, automation, and intelligent control.

This wide applicability makes the system highly adaptable for different environments requiring safe, efficient, and smart power consumption.

1.5 ORGANIZATION OF THE REPORT

This report is organized into nine chapters to ensure a clear and systematic presentation of the work. Chapter 1 provides the introduction, background, objectives, and scope of the project. Chapter 2 offers a detailed review of related research, existing systems, and technological developments. Chapter 3 presents the system analysis, highlighting the existing problems, feasibility study, and requirements. Chapter 4 explains the system design using diagrams and architectural models. Chapter 5 describes the hardware components and software tools involved in building the system. Chapter 6 discusses the control logic and automation algorithms used. Chapter 7 covers implementation details, circuit diagrams, and programming aspects. Chapter 8 presents the results, analysis, and system performance evaluation. Finally, Chapter 9 concludes the report and provides suggestions for future enhancements.

CHAPTER 2

LITERATURE REVIEW

2.1 IOT-ENABLED SMART HOME FAULT DETECTION SYSTEMS

Teja et al. [1] developed an IoT-enabled smart home management system capable of detecting electrical faults and remotely monitoring load conditions through a cloud platform. Their work emphasized the importance of integrating sensors, microcontrollers, and communication modules to achieve real-time fault detection. While the system offered improved visibility and convenience, it lacked an intelligent mechanism to selectively isolate only the faulty load. This limitation highlights the need for a more advanced load management system capable of performing real-time detection and selective tripping, which the present project aims to address.

2.2 SMART BILLING AND TAMPER-ALERT LOAD MONITORING

Islam et al. [2] proposed a smart billing meter that includes tampering alert features and automated overload notification mechanisms. Their system successfully addressed consumer-side transparency in energy usage and offered secure monitoring of electrical consumption patterns. However, the design focused primarily on billing accuracy and tamper detection rather than on real-time overload protection or selective load isolation. This demonstrates a research gap in the development of intelligent control systems that provide both monitoring and protective functionalities simultaneously.

2.3 USER-ENABLED LOAD MANAGERS FOR APPLICATIONS

Ayodele et al. [3] worked on a user-enabled load management system that allows consumers to prioritize and control electrical appliances. The research demonstrated that demand-side participation significantly enhances energy conservation and maintains optimal operating conditions. Although effective for user-controlled scheduling, the system does not include automatic overload detection or autonomous load isolation, thereby limiting its ability to protect against real-time fault conditions.

2.4 GSM-BASED LOAD SWITCHING TECHNIQUES

Vignesh et al. [4] designed a GSM - based electrical load control system for remote home applications. This system allowed switching of appliances via SMS and offered enhanced flexibility for home automation. While GSM provides remote accessibility, the system suffers from slow response time and network dependency. It does not incorporate current sensing or automatic overload detection mechanisms, making it unsuitable for real-time protection. This limitation supports the need for IoT-based, sensor-integrated systems with faster operational capability.

2.5 IOT-BASED SMART ENERGY MANAGEMENT PLATFORMS

Saleem et al. [5] proposed an IoT-based smart energy management system with cloud analytic for real-time decision making, performance monitoring, and predictive analysis. The study demonstrated the effectiveness of IoT in large-scale distributed energy systems. However, its complexity and higher implementation cost make it less suitable for small home or laboratory-scale applications. The present work adopts the IoT principle from this study but aims to provide a low-cost and simplified implementation suitable for domestic and small industrial use.

2.6 MICROPROCESSOR-BASED LOAD CONTROL ARCHITECTURES

Kanovskyi et al. [6] introduced a microprocessor-based control system with extended functionalities, including load monitoring and automated control features. Their work proved the capability of embedded systems in improving energy utilization efficiency. However, the study lacked IoT integration and focused only on centralized control without offering selective load disconnection during overload conditions. This establishes a gap that the proposed system fills by combining microcontroller-based control with IoT monitoring.

2.7 INTELLIGENT POWER MANAGEMENT IN ELECTRIC VEHICLES

Lu et al. [7] examined an intelligent power management system for electric vehicles using edge computing. This approach demonstrated the advantages of distributed computation and real-time response in modern power management applications. The idea of fast decision-making is relevant to electrical load protection as well. While the study focuses on electric vehicles rather than domestic loads, the underlying principles of quick overload detection and autonomous control are highly applicable to this project.

2.8 LOAD MANAGEMENT IN INDUSTRIAL ELECTRICAL SYSTEMS

Kucuk et al. [8] developed an intelligent supervisory system for industrial electrical load management. Their work focused on continuous monitoring, control, and optimization of power distribution to improve reliability in large-scale industrial facilities. Although the system provided excellent functionality for industrial environments, it is complex and expensive. The need for a compact and low-cost solution for small-scale applications remains unanswered, which motivates the development of the present Arduino-based selective load control system.

2.9 DISTRIBUTED LOAD CONTROL IN NAVAL ELECTRICAL SYSTEMS

D'Agostino et al. [9] investigated load management strategies in naval power systems, highlighting the importance of decentralized control for improving system resilience. Their research demonstrated that distributed architectures reduce disturbances during variable load conditions. This principle is relevant to this project, as the proposed system also handles loads independently, ensuring that a fault in one load does not affect the operation of others.

2.10 MICROCONTROLLER-BASED POWER MANAGEMENT IN MICROGRIDS

Belvedere et al. [10] presented a microcontroller-based power management system for standalone micro-grids with hybrid power supply sources. Their work showed that microcontrollers can effectively manage loads, prioritize supply, and maintain system stability. While their system is designed for micro-grids, the fundamental concept of using a microcontroller for intelligent load decisions strongly supports the technical approach adopted in this work.

2.11 MODEL PREDICTIVE LOAD MANAGEMENT - SMART BUILDINGS

Zong et al. [11] implemented model predictive control (MPC) for active load management in intelligent buildings. MPC algorithms help predict future load behavior and optimize consumption patterns. Although effective in smart building applications, MPC requires high computational power and complex algorithms. In contrast, the proposed system utilizes a simpler and more practical approach using threshold-based current sensing, making it suitable for smaller and more cost-sensitive applications.

2.12 INTELLIGENT CAMPUS-WIDE ELECTRICAL SAFETY SYSTEMS

Yanhui et al. [12] developed an intelligent load characteristic identification system for campus environments. The system improves power supply safety by quickly responding to anomalies and managing load distributions efficiently. This research reinforces the need for automated protection mechanisms and demonstrates how intelligent systems can prevent electrical hazards. The proposed system uses similar concepts but narrows its focus to individual load monitoring and selective tripping at the household or laboratory level.

CHAPTER 3

EXISTING SYSTEM

The existing system (Fig 3.1) represents a traditional household or industrial electrical setup in which all loads are connected through a single distribution line protected by a fuse or MCB. When an overload occurs in any one appliance, the protection device disconnects the entire supply line, causing every load to shut down simultaneously. No real-time monitoring takes place, and the system relies completely on manual inspection to identify the faulty appliance. Since the protection is not load-specific, the system provides no way to determine the exact cause of the overload or to isolate only the faulty load. As a result, unnecessary power interruptions occur frequently, affecting overall safety and efficiency.

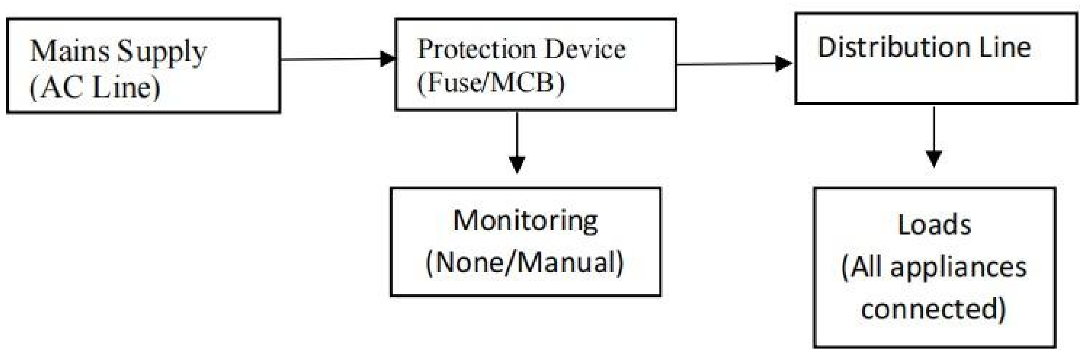

Figure 1. Existing system of the intelligent management and control of electrical loads.

3.1 DRAWBACKS OF EXISTING SYSTEM

- **Single protection point:** One MCB/fuse protects all loads; cannot isolate individual faulty loads
- **Complete shutdown:** Entire system turns OFF even if only one load exceeds the limit

- **No real-time monitoring:** Current usage of each load is not measured or displayed
- **Manual fault detection:** User must physically identify which device caused the overload
- **No IoT connectivity:** System cannot send alerts or remote notifications
- **No selective control:** Cannot independently switch or manage loads

CHAPTER 4

PROBLEM STATEMENT

Traditional overload protection mechanisms used in residential, commercial, and industrial environments operate only at the circuit level and do not have the capability to isolate individual loads. When any appliance exceeds its current limit or develops a fault, the protective device disconnects the entire supply line, resulting in complete system shutdown rather than isolating only the affected load. This leads to unnecessary inconvenience, interruption of essential services, reduced productivity, and increased safety risks. Additionally, existing protection systems provide no facility for remote monitoring, real-time notifications, or detailed information about the status of each load. Users cannot identify the specific device that caused the abnormal condition, making troubleshooting slow and inefficient. As electrical systems become more complex and energy consumption continues to rise, dependency on such traditional protection becomes increasingly inadequate and unreliable. Therefore, there is a strong need for an intelligent, efficient, and cost-effective load management system capable of monitoring each load independently, detecting overload conditions at the appliance level, and isolating only the faulty load without disturbing the operation of other loads. The system must also integrate IoT-based real-time monitoring and alert mechanisms to enhance safety, improve energy efficiency, enable preventive maintenance, and ensure complete visibility and control over all connected electrical loads.

CHAPTER 5

PROPOSED SYSTEM

The proposed system introduces an intelligent and automated method for monitoring electrical loads and preventing complete power shutdown during overload conditions. The system workflow is shown in Fig. 4.1. When the Electrical Load Management System is switched ON, the current drawn by each individual load is continuously sensed using dedicated ACS712 current sensors. These sensors convert the load current into equivalent analog voltage signals and send the collected data to the Arduino microcontroller for processing.

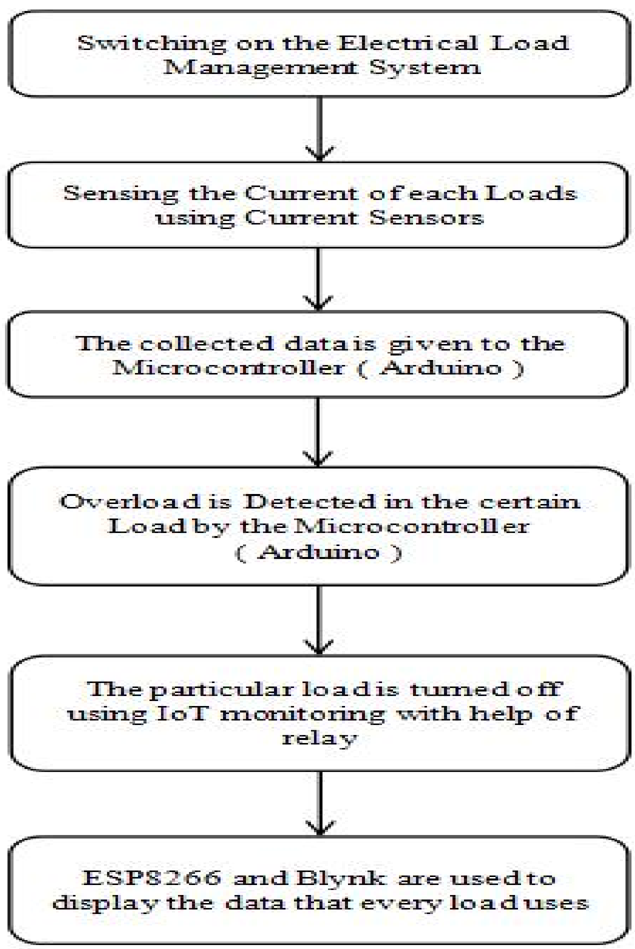

Figure 2. Workflow of the intelligent management and control of electrical loads.

The Arduino analyzes the incoming current values and compares them with predefined threshold limits assigned for each load. If any load exceeds its safe current rating, the microcontroller detects the overload condition immediately. Instead of disconnecting the entire supply line, the proposed system isolates only the specific overloaded load by switching OFF its corresponding relay. This selective tripping method ensures that all other loads continue operating normally without interruption.

The system also incorporates IoT functionality through the ESP8266 Wi-Fi module, which transmits real-time load data and overload notifications to the Blynk cloud platform. Users can remotely monitor current consumption of each load and view the ON/OFF status through their mobile devices. This enhances system transparency, improves safety, and provides instant fault alerts. The workflow ensures continuous sensing, intelligent decision-making, selective load control, and remote monitoring—offering a complete smart electrical management solution.

CHAPTER 6

BLOCK DIAGRAM

6.1 BLOCK DIAGRAM OF THE PROPOSED SYSTEM

The block diagram of the proposed intelligent load monitoring and protection system is shown in Fig. 6.1. The system consists of three major functional sections: sensing, processing, and switching. The AC loads are connected through relays, while each load is continuously monitored using individual current sensors (ACS712). These sensors provide analog current feedback to the Arduino UNO, which acts as the central controller of the entire system.

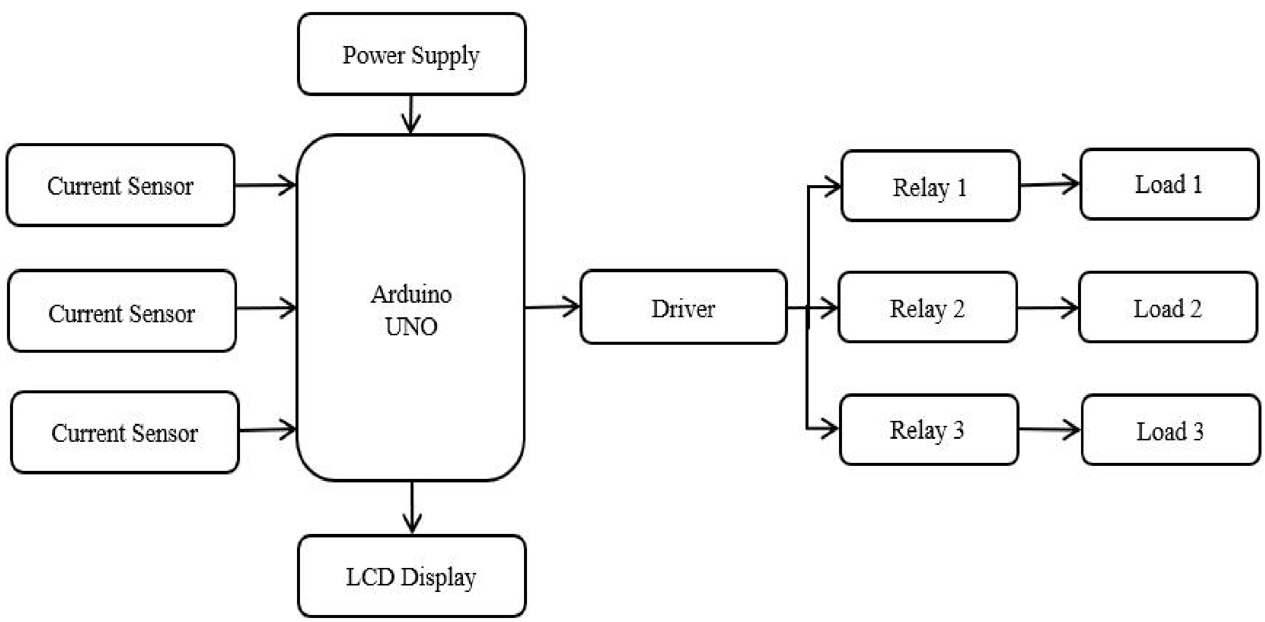

Figure 3 .Proposed system of the intelligent management and control of electrical loads.

The Arduino receives power through a regulated power supply and processes real-time current values from each sensor. If any load exceeds the predefined current threshold, the Arduino immediately commands the corresponding relay—through a relay driver—to disconnect only that overloaded load. This ensures selective tripping, preventing full shutdown of all loads and improving system reliability. An LCD display is interfaced with the Arduino to show live current readings and ON/OFF status of each load. The combination of sensor-based monitoring, microcontroller decision-making, and relay switching enables safe, automated, and efficient load management.

6.2 COMPONENTS DESCRIPTION

6.2.1 Arduino UNO

Figure 4. Arduino UNO

The Arduino UNO is the main control unit responsible for reading current values, analyzing overload conditions, and sending control signals to the relay driver. It executes the protection algorithm and manages both display and communication interfaces.

2. Current Sensors (ACS712)

ACS712 Hall-effect current sensors are used to measure the real-time current drawn by each load. These sensors provide accurate analog output, enabling early detection of overload conditions.

3. Relay Driver

Figure 5. Relay Driver

The relay driver acts as an interface between the Arduino and high-power relays. It amplifies the low-power control signals from the Arduino and ensures safe switching of AC loads.

4. ESP8266 Microcontroller

The ESP8266 module sends current readings and load information to the Blynk IoT platform. Users can monitor the system remotely through their smartphone, receiving instant notifications during overload conditions. This ensures continuous awareness and enhances safety.

Figure 6. ESP8266 Microcontroller

5. LCD Display

The LCD display shows real-time current readings and load statuses. It provides immediate visual feedback to the user, helping them understand the system condition and identify overloads quickly.

6. Power Supply Unit

The power supply unit provides stable 5V DC to all electronic components. It ensures that the Arduino, sensors, relays, and IoT module operate without fluctuations, enabling reliable performance of the entire system.

CHAPTER 7

RESULTS AND DISCUSSION

The intelligent load monitoring and control system was successfully implemented using Arduino UNO, ACS712 current sensors, relays, ESP8266 module, and a 16×2 LCD. The system was tested under different load conditions to verify overload detection, selective tripping, and IoT-based monitoring. The results clearly demonstrate the effectiveness of the proposed solution compared to traditional single-MCB protection systems.

7.1 BEFORE TRIPPING CONDITION

Before initiating any overload condition, all loads operate within their rated current limits. As shown in Fig. 7, the ACS712 current sensors measure the real-time current of each load and display the readings on the LCD. This ensures that the user can visually monitor the operation of every appliance. The IoT monitoring dashboard also displays the same values in real time, confirming stable operation.

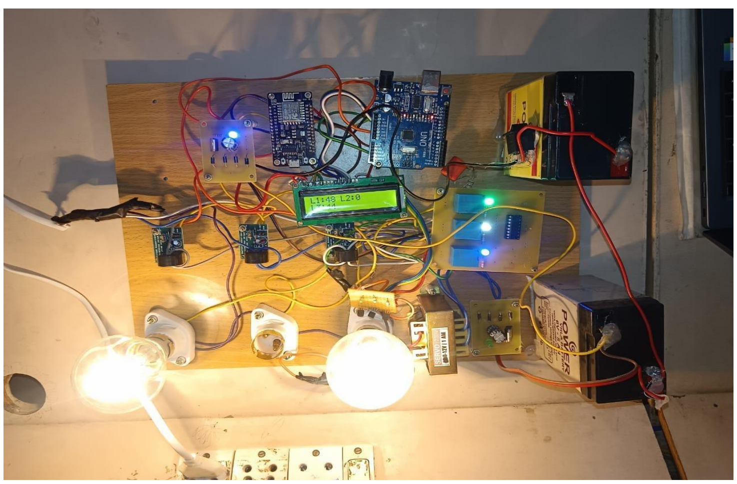

Figure 7. The hardware platform in normal operating condition when all loads are active.

Observations

- All loads remain ON
- No relays are triggered
- Current values remain within safe limits
- LCD and Blynk App show normal readings

7.2 AFTER TRIPPING CONDITION

When an overload is intentionally introduced on a specific load, the system immediately identifies the excessive current through its sensor reading. As soon as the current exceeds the predefined threshold, the Arduino processes the data and activates selective tripping for that specific load.

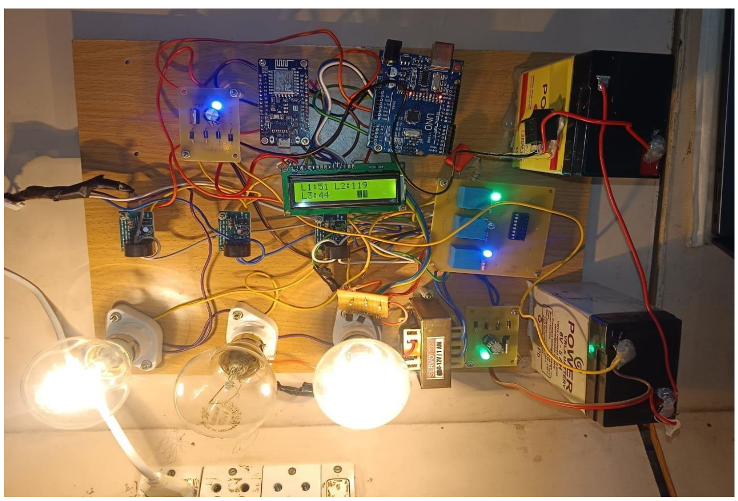

Figure 8. An overload-condition and selective tripping condition when Load 2 is turned off as it is overloaded.

In Fig. 8, only the overloaded load is turned OFF, while the remaining loads continue to operate normally. This feature is far more efficient compared to traditional systems where a single fault causes complete power shutdown.

Observations

- Only the overloaded load is isolated

- Relay corresponding to that load switches OFF
- No interruption to other loads
- LCD displays "Load X Tripped"
- The system responds within milliseconds

7.3 IOT-BASED MONITORING THROUGH BLYNK APPLICATION

The ESP8266 Wi-Fi module enables seamless IoT connectivity with the Blynk cloud platform. Through this, the user can monitor system status remotely from anywhere. As illustrated in Fig. 7.9, the Blynk dashboard displays the current consumption of each load and its ON/OFF status.During an overload event, users receive an immediate push notification indicating which load has tripped. This enhances safety and system awareness even when the user is away.

IoT Features

- Real-time current dashboard
- Fault and overload alerts
- Remote load status visualization
- Cloud-based monitoring with logs

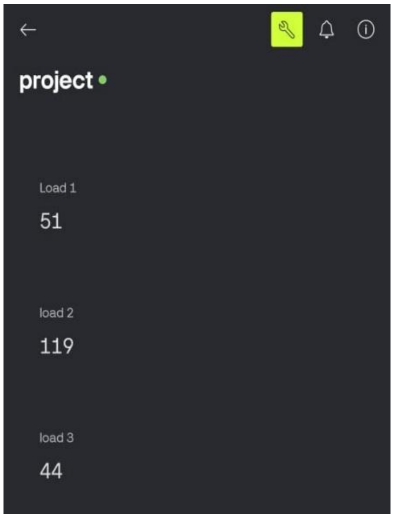

Figure 9. The IoT monitoring dashboard, which shows live current values for Load 1, Load 2, and Load 3.

CHAPTER 8

CONCLUSION & FUTURE WORK

8.1 CONCLUSION

The intelligent management and control of electrical loads system successfully demonstrates automation and energy efficiency. It monitors electrical parameters like voltage, current, and power consumption in real time. The microcontroller and sensors work together to make quick decisions for switching loads safely. Both local and IoT-based remote control ensure convenience and flexibility for users. Overall, the system reduces human effort while improving reliability and operational safety.The automated load scheduling and priority logic effectively prevent overload conditions and reduce energy wastage. Sensor-based monitoring allows the system to respond instantly to abnormal situations, protecting appliances and ensuring uninterrupted operation. The IoT dashboard provides real-time monitoring and remote access, making the system modern and user-friendly.

8.2 ADVANTAGES OF THE PROPOSED SYSTEM

The proposed system reduces energy usage by ensuring that only necessary loads are operated. High-priority loads run first while low-priority loads are controlled intelligently. Automated scheduling and threshold-based control prevent unnecessary energy consumption.

Smart automation allows the system to work continuously without human intervention. It improves operational efficiency and ensures appliances operate within safe limits. Safety mechanisms like overload protection further enhance reliability.

8.3 LIMITATIONS

The system depends on a stable internet connection for real-time remote monitoring. In case of network failure, remote control may not work, although local automation continues.Sensor range is limited, meaning very high or very low electrical parameters outside the designed range may not be accurately detected. This may require additional calibration for extreme conditions.

8.4 APPLICATIONS

The system can be implemented in homes to control lighting, fans, water pumps, and other appliances efficiently. It reduces electricity bills and prevents energy wastage.In industries, it can manage multiple machines and motors, ensuring smooth operation and avoiding overload. The system also helps in monitoring energy usage in real time.Smart cities can benefit by integrating this system for street lights, traffic signals, and public utilities. Automated control reduces human effort, improves safety, and ensures optimal energy consumption across urban infrastructure.

8.5 FUTURE ENHANCEMENTS

Artificial intelligence can be integrated for load prediction, allowing the system to anticipate energy usage patterns. This will make automation smarter and more efficient.Solar energy integration can be added to make the system sustainable. The controller can prioritize renewable energy sources to reduce dependence on the grid.Mobile app development with advanced features like notifications, alerts, and scheduling can improve user interaction.

APPENDICES

```
#define BLYNK_TEMPLATE_ID "TMPL3QUtMs-4P"
#define BLYNK_TEMPLATE_NAME "project"
#defineBLYNK_AUTH_TOKEN"Bx19VfqZIMHgXLnO5xewNSQpo7vebDWY"
#define BLYNK_PRINT Serial
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
int sen1=0,sen2=0,sen3=0,sen4=0;
char ssid[] = "project";
char pass[] = "123456789";
int a;
char VoteCount;
// Cayenne authentication info. This should be obtained from the Cayenne
Dashboard.
String Message="UNAUTHORIZED ACCESS";
void setup()
{
  Blynk.begin(BLYNK_AUTH_TOKEN, ssid, pass);
Serial.begin(9600);
}
void loop()
{
  Blynk.run();
```

```
 if(Serial.available()>0)
{
 char VoteCount=Serial.read();delay(100);
   if(VoteCount=='A')
{
 float A=Serial.parseFloat();
  Blynk.virtualWrite(V0,A);delay(200);
}
 if(VoteCount=='B')
{
 float B=Serial.parseFloat();
   Blynk.virtualWrite(V1,B);delay(200);
}
  if(VoteCount=='C')
{
 float C=Serial.parseFloat();
   Blynk.virtualWrite(V2,C);delay(200);
}
}
}
```

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ACCEPTANCE LETTER

Manuscript ID : **ICACRS435**
Manuscript Title : **Intelligent management and control of electrical loads using a microcontroller**
Author/s : **P.Sakthi, Dharshinee S.S, Durka Sri N, Elamathi S**

Dear Author/s,

Greetings from Mount Zion College of Engineering and Technology (MZCET)!

We are pleased to inform you that your research manuscript, as mentioned above, has been accepted for presentation at the International Conference on Automation, Computing and Renewable Systems (ICACRS 2025). The conference will be held from December 10–12, 2025, at Mount Zion College of Engineering and Technology, Pudukkottai, Tamil Nadu, India.

You have been selected to deliver an oral presentation of your research work at the ICACRS 2025 conference. This international event brings together leading researchers, academicians, and industry professionals to share their insights and foster innovation in the fields of automation, computing, and renewable systems.

In this regard, we kindly request you to submit the final manuscript, copyright form, and other required documents to the conference email at the earliest to facilitate timely publication of your paper. When submitting your final manuscript, please ensure that all revisions are clearly highlighted as per the reviewer comments provided.

We look forward to your valuable participation in ICACRS 2025.

Best Regards,

Conference Chair

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