

Smart Digital Inaugural Lamp Using Magnetic Sensor Technology

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Abstract—The traditional practice of lighting oil lamps during inauguration ceremonies poses safety risks due to open flames and maintenance requirements. This paper presents the design and implementation of a Smart Digital Inaugural Lamp using magnetic sensor technology as a safe and modern alternative. The system employs reed switch-based magnetic sensors and LED modules to simulate flame lighting without physical contact or fire hazards. A magnet-equipped ceremonial stick activates the lamp, preserving the ritualistic experience while ensuring safety and reliability. The lamp structure is fabricated using 3D printing technology, enhancing durability and aesthetic appeal. Experimental results demonstrate low power consumption, high reliability, and effective contactless operation. The proposed system eliminates risks associated with fire, reduces maintenance, and offers reusability for multiple events. This solution is suitable for educational institutions, corporate functions, and public ceremonies, bridging the gap between tradition and modern technology.

Index Terms—Smart Device Control, User-friendly Interface, Digital Ceremony System.

I. INTRODUCTION

Lighting a lamp is a significant traditional practice in many cultures, symbolizing knowledge, prosperity, and the removal of darkness. It is commonly performed during inaugurations, academic events, conferences, and ceremonial functions. However, conventional oil lamps rely on open flames, which pose safety risks such as fire hazards, smoke generation, and the need for continuous maintenance. These limitations make traditional lamps less suitable for modern indoor environments. With the advancement of electronic systems and smart technologies, there is a growing

need to develop safer and more efficient alternatives that preserve cultural values while ensuring reliability. In this context, the Smart Digital Inaugural Lamp is proposed as an innovative solution that replaces the traditional flame with LED-based illumination. The system utilizes magnetic sensor technology to enable contactless activation, maintaining the ceremonial experience without requiring physical contact or open fire. The proposed system consists of reed switch-based magnetic sensors, LED modules to simulate the flame, a power supply unit, and a 3D-printed lamp structure. When a magnet attached to a ceremonial stick is brought near the sensor, the circuit is activated, and the LEDs glow, creating a realistic lighting effect. This approach ensures safe operation, low power consumption, and high reliability. Furthermore, the integration of 3D printing technology enhances the aesthetic appearance and structural durability of the lamp, making it suitable for repeated use in various events. The system effectively bridges the gap between traditional practices and modern engineering solutions, offering a practical, eco-friendly, and user-friendly alternative for ceremonial lighting.

II. OBJECTIVES

1. To design a modern digital inauguration lamp for ceremonial use.
2. To replace traditional oil lamps with a safe electronic system.
3. To implement magnetic sensor technology for contactless activation.
4. To develop a 3D printed lamp structure for durability and aesthetics.

III.SYSTEM ARCHITECTURE

A. Components Used

Hardware:

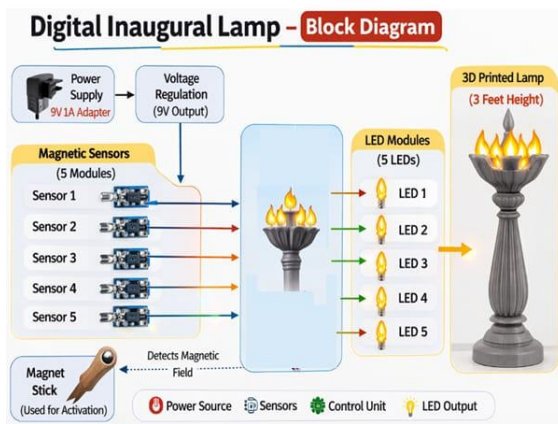
Component

- 1.Magnetic Sensor Module (KY-025)
- 2.LEDs (5 Units)
- 3.9V 1A Adapter
- 4.3D Printed Lamp
- 5.Magnet Stick
- 6.Connecting Wires

Software

- 1)Bambu Studio -3D printing preparation
- 2)CAD Software (Fusion 360 / SolidWorks)-Lamp design
- 3)Slicer Software-Generate printing layers

B. Block Diagram



C. Working Principle

- Power supply provides energy to the system.
- Sensor (magnetic reed switch) detects user action
- Controller activates LEDs.
- LEDs glow to simulate lamp flame.
- LEDs creates flickering flame effect.
- Safe operation without fire or oil.

IV.METHODOLOGY

1. Requirement Analysis - Identify need for a safe and flameless inauguration lamp
2. System Design - Design circuit using LEDs, sensor, and microcontroller
- 3.Component Selection - Choose LED lights, reed switch/touch sensor, Arduino, power supply

4.Sensor Integration - Connect magnetic or touch sensor to detect user action

V. RESULTS



1. Smart Digital Inaugural Lamp – Result

The Smart Digital Inaugural Lamp project successfully provides a safe and modern alternative to traditional oil lamps. The system works efficiently by using sensors and a microcontroller to control LED lights that simulate a real flame effect.

It eliminates the risks of fire, oil spills, and smoke, making it suitable for indoor and crowded environments. The LED flame effect, especially with PWM flickering, closely resembles a real lamp, maintaining the ceremonial feel.

Overall, the project proves to be safe, reliable, eco-friendly, and easy to operate, while preserving the cultural significance of lamp lighting in a digital way.

VI. CONCLUSION

The Digital Inaugural Lamp is a modern, safe alternative to traditional oil lamps used in ceremonies. It replaces open flames with LED lights that simulate a real flame, reducing fire risks. The system uses a magnetic sensor to detect a ceremonial stick with a magnet, allowing contactless activation of the LEDs. The lamp is made using 3D printing, making it lightweight, durable, and customizable while maintaining a traditional appearance. It uses simple, low-cost electronic components, consumes less power, and requires minimal maintenance. Overall, it is a reliable, reusable, and innovative solution that preserves cultural significance while incorporating modern technology.

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