VEMANA INSTITUTE OF TECHNOLOGY

(Affiliated to VTU & Approved by AICTE)

Major Project Report

On

LIFT CONTROLLING AND MONITORING SYSTEM

Submitted in partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering

in

Electronics and Communication Engineering

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Certificate

Certified that the Major-Project entitled “LIFT CONTROLLING AND MONITORING SYSTEM”, is carried out by the students listed on the title page in partial fulfillment for the award of Bachelor of Engineering degree in Electronics and Communication En- gineering, Visvesvaraya Technological University (VTU), Belagavi during the academic year 2024–25. The Major-Project report has been approved as it satisfies the academic requirements for the project work prescribed for the said degree.

Guide (Prof. Chandraprabha)
HoD (Dr. Parameshwara M C)
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Abstract

A real-time lift display system designed to enhance passenger experience and optimize lift operations. The system integrates sensors, controllers, and display technologies to provide accurate and timely information to passengers. Real-time data on lift location, direction, and estimated arrival times is displayed on a user-friendly interface, reducing wait times and anxiety. The system also enables lift operators to monitor and control lift performance remotely, improving efficiency and reducing maintenance costs. Experimental results demonstrate the effectiveness of the proposed system in enhancing passenger satisfaction and reducing lift operational costs.

(Extended abstract text from the report — expanded in Chapters below.)

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Chapter 1 Introduction

The real time lift display system provides the real time information about the elevator: direction of lift movement, the floor where the lift is present, load in the lift and number of people moving in and out of the lift at each floor. It improves the passenger experience as they can know their waiting time. The real time lift can work with the ESP32, sensors, controllers, display and the external power supply. The lift can be used in commercial buildings, residential buildings, public institutions, hospitals and so on.

Currently lifts are common where people need to wait; the real-time lift display shows the load, direction, floor of the lift and the number of people moving in and out of the lift. By implementing a Lift Monitoring and Control System, building owners and managers can ensure a safer, more efficient, and more enjoyable experience for occupants and visitors.

1.1 Aim

To design and develop a real time lift using sensors, controllers, display screen, software and power supply.

1.2 Objectives

1. To develop a real time lift display using controllers, sensors and power supply.
2. Ensure real time certainty of elevator position and status.
3. Enhance lift usage and reduce waiting time and ease maintenance.
4. Reduce energy consumption and improve building efficiency.

Chapter 2 Literature

Survey

Summaries of reviewed works (as in the report):

- **Design and implementation of an electronics elevator model:** Arduino- based elevator prototypes for education and proof-of-concept applications. (Block diagram and components like motors, sensors, displays.)
- **People counting in elevator car based on computer vision (2019):** CV- based people counting for elevators using ML models—handles dynamic environ- ments, lighting changes and occlusion challenges.
- **Intelligent elevator control and safety monitoring (2018):** Systems that op- timize elevator assignments, provide remote monitoring and predictive maintenance.
- **Connected smart elevator systems (2024):** IoT-enabled sensors, cloud plat- forms and analytics for building-scale elevator optimization.

(Include figures for block diagrams as needed. Placeholders left below.) Figure 2.1:

Block diagram of an electronic elevator model (placeholder).

Chapter 3

Design Methodology

3.1 System Overview

The proposed design consists of an ESP32, IR sensors, stepper motor, LCD display 16×2, buzzer, lift handling support and power supply.

Figure 3.1: Block diagram of Lift Controlling & Monitoring System (placeholder).

3.2 Flowchart

Figure 3.2: Flowchart of lift controlling and monitoring system (placeholder).

3.3 Components Required

3.3.1 Stepper motor

Stepper motors provide precise rotational control and are commonly used where accurate positioning is required.

3.3.2 LCD Display 16x2

A 16×2 character LCD to show current floor, direction, load, etc.

3.3.3 IR Sensor

Infrared sensors for presence and people counting (basic approach).

3.3.4 ESP32

ESP32 used as main controller (Wi-Fi + Bluetooth capable microcontroller).

3.3.5 Stepper motor driver

Driver that converts control pulses into coil currents; supports microstepping and current regulation.

3.3.6 Lift handling chain

Mechanical chain/support required for the lift model; material and maintenance notes.

Chapter 4

Results

Describe hardware setup, connections and output examples. Include photos or screenshots of the hardware, wiring and displayed LCD output.

Figure 4.1: Hardware connection (placeholder).

Figure 4.2: Output on LCD display 16×2 (placeholder).

Chapter 5 Conclusion

The Lift Monitoring and Display System is a technology that enhances safety, efficiency and passenger experience in lift operations. Integration of sensors, IoT devices and analyt- ics provides real-time monitoring and display of critical lift parameters enabling prompt detection of issues and optimization of performance. Future work may include cloud integration, advanced people counting using camera-based methods, and predictive main- tenance.

References

1. S. S. Rao et al., "Design and Implementation of Elevator Control System Using PLC", 2017.
2. A. K. Singh et al., "Elevator Monitoring System Using IoT", 2018.
3. R. K. Sharma et al., "Lift Control System Using Arduino and Sensors", 2019.
4. Choi, Jeong Woo, D H Yim, and S H Cho, "People Counting Based on an IR-UWB Radar Sensor", IEEE Sensors Journal, 2017.
5. And others as in the uploaded report. See original PDF for full list. :contentRefer- ence[oaicite:1]index=1

Appendix A

Appendix

A.1 Arduino / Microcontroller code excerpt

The following is the 7-segment / button example included in the original appendix. Place into your Arduino sketch if needed.

Listing A.1: 7-segment display example

```
/* Define pins for the 7−segment display segments */
const int segmentPins [] = {2, 3, 4, 5, 6, 7, 8}; // A, B, C, D, E, F, G
/* Define pins for floor buttons */
const int buttonPins[] = {9, 10, 11}; // Floors 0, 1, 2
/* Segment patterns for 7−segment display (common cathode) */
/* Representation for digits 0−2 */
```

```
const byte digitPatterns[] = {
  0b1000000,   // 0
  0b1111001,   // 1
  0b0100100    // 2
};
/* Current floor variable */
int currentFloor = −1;
void setup() {
  /* Set up segment pins as OUTPUT */
  for (int i = 0; i < 7; i++) {pinMode
    (segmentPins[i], OUTPUT);
    digitalWrite(segmentPins[i], LOW);
  }
  /* Set up button pins as INPUT with internal pull−up */
  for (int i = 0; i < 3; i++) {
    pinMode(buttonPins[i], INPUT_PULLUP);


  }
}
void loop() {
  /* Check each button */
  for (int i = 0; i < 3; i++) { // Loop only for 3 floors
    if (digitalRead(buttonPins[i]) == LOW) { // Button pressed (LOW because
      currentFloor = i;
      displayFloor(currentFloor);delay
      (200); // Debounce delay
    }
  }
}
/* Function to display the floor number on the 7−segment display */
void displayFloor(int floor) {
  /* Loop through each segment and set it according to the pattern */
  for (int i = 0; i < 7; i++) {
    digitalWrite(segmentPins[i], (digitPatterns[floor] >> i) & 0x01);
  }
}
```