# ATTENDANCE MONITORING SYSTEM

## A PROJECT REPORT

***Submitted by***

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## COMPUTER SCIENCE AND ENGINEERING



**RAJALAKSHMI ENGINEERING COLLEGE ANNA UNIVERSITY, CHENNAI**

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**BONAFIDE CERTIFICATE**

Certified that this Thesis titled **“ATTENDANCE MONITORING SYSTEM”** is the bonafide work of **“BHUVANESHWARI S (2116210701043), DEVADHARSHINI D(2116210701049) , DHARSHINI S(2116210701055)”** who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other thesis 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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# ABSTRACT

# Attendance Monitoring System using RFID (Radio Frequency Identification) technology is a project aimed at automating the process of recording and managing attendance data in educational institutions and workplaces, enhancing accuracy and efficiency. Each individual is assigned an RFID tag, which uniquely identifies them. Upon entering or leaving the premises, RFID readers strategically placed at entry points capture the tag information and log the attendance data in real-time. The system integrates with a centralized database, allowing for seamless data management, reporting, and analytics. The proposed system reduces the time and effort required for manual attendance recording, minimizes human error, and provides a reliable solution for monitoring attendance. This project discusses the architecture of the system, the hardware and software components involved, and the benefits and potential challenges associated with the deployment of RFID-based attendance monitoring systems. Through a case study, the effectiveness and practicality of the system are demonstrated, highlighting its impact on streamlining attendance processes and improving operational efficiency.

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**DHARSHINI S**

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**CHAPTER 1**

**INTRODUCTION**

In today's fast-paced world, efficient and accurate attendance monitoring is essential for both educational institutions and workplaces. Traditional methods of attendance tracking, such as manual sign-in sheets and punch cards, are often time-consuming, prone to errors, and susceptible to manipulation. To address these challenges, the implementation of an automated Attendance Monitoring System using RFID (Radio Frequency Identification) technology has become increasingly viable and beneficial.

RFID technology offers a sophisticated solution for tracking attendance with minimal human intervention. Each individual is equipped with an RFID tag, which contains a unique identifier. RFID readers, placed strategically at entry and exit points, automatically detect these tags and record the attendance data in real-time. This not only streamlines the attendance process but also enhances data accuracy and security.

The primary objective of this project is to develop a robust RFID-based attendance monitoring system that can be integrated into existing infrastructure with ease. The system aims to reduce administrative burden, minimize human error, and provide real-time access to attendance records. Additionally, it offers valuable analytics and reporting capabilities, which can be utilized for better resource management and operational planning.

This introduction will outline the need for an advanced attendance monitoring system, explore the underlying technology, and provide an overview of the system's architecture. We will also discuss the hardware and software components involved, as well as the potential benefits and challenges associated with implementing RFID technology in attendance monitoring. Through a detailed case study, the effectiveness of the system will be demonstrated, showcasing its practical applications and impact on improving attendance management process.

**EXISTING SYSTEM**

Existing systems for attendance monitoring encompass a wide range of methodologies tailored to diverse organizational needs. From traditional manual registers to advanced biometric authentication and RFID-based solutions, each system presents unique advantages and challenges. Manual attendance registers, though simple, require meticulous record-keeping and are susceptible to human error. Biometric systems offer unparalleled accuracy and security by leveraging unique physiological characteristics, yet their implementation often entails significant investment in infrastructure and technology. Similarly, RFID-based systems streamline the attendance tracking process through automation, but their initial setup costs and reliance on RFID tags may pose logistical challenges for some organizations.

In addition to these traditional methods, emerging technologies such as barcode scanning, mobile applications, and web-based platforms have reshaped the landscape of attendance monitoring. Barcode scanning provides a cost-effective solution that balances simplicity with efficiency, while mobile apps and web-based systems offer unparalleled convenience and accessibility. These solutions allow users to mark attendance from anywhere with internet connectivity, streamlining the process and enhancing user experience. As organizations navigate the complexities of attendance management, many opt for hybrid approaches, combining multiple systems to leverage the strengths of each while mitigating their respective weaknesses. This diversity in attendance monitoring solutions underscores the importance of selecting the most suitable system based on organizational needs, budget constraints, and technological capabilities.

**CHAPTER 2**

**LITRETURE SURVEY**

The literature survey for the Attendance Monitoring System project encompasses a thorough exploration of existing research, studies, and articles pertinent to attendance tracking methodologies. Initially, attention is directed towards traditional methods like manual sign-in sheets and biometric systems, elucidating their inherent limitations such as inaccuracies and inefficiencies. Subsequently, a focused investigation into technological solutions emerges, with a particular emphasis on RFID-based systems, biometric identification, barcode scanning, and GPS-based approaches.

This exploration aims to discern the advantages and drawbacks of each technology in terms of accuracy, scalability, and cost-effectiveness. Moreover, a critical analysis of literature pertaining to the integration of RFID technology in educational institutions and workplaces is undertaken, drawing insights from case studies and implementation experiences. Attention is also devoted to understanding user acceptance and adoption, regulatory compliance, and ethical considerations surrounding attendance monitoring systems.

By delving into emerging trends and future directions, the literature survey seeks to inform the design, development, and deployment of an effective and ethically sound Attendance Monitoring System, while also contributing to the broader discourse on attendance tracking methodologies.

## CHAPTER 3

## PROJECT DESCRIPTION

## RFID Tags and Readers

## RFID tags and readers are essential components of Attendance Monitoring Systems. Tags, assigned to individuals, communicate with readers placed at entry points like doors. As individuals pass by, readers detect tag IDs, updating attendance records instantly. This automated process replaces manual methods, improving accuracy and efficiency. RFID technology offers real-time data capture, ease of use, and scalability, making it a reliable solution for attendance tracking in various settings..

## Iot Sensors and Connectivity

## The integration of IoT sensors and connectivity into Attendance Monitoring Systems represents a transformative advancement in attendance tracking methodologies. By strategically deploying sensors at entry points and leveraging wireless connectivity protocols, these systems enable seamless data collection and transmission in real-time. This allows for instantaneous updates to attendance records, empowering administrators with accurate insights into attendance patterns and trends. Furthermore, IoT connectivity facilitates remote monitoring and access to attendance data, enhancing operational efficiency and enabling timely decision-making. Overall, the incorporation of IoT technology revolutionizes Attendance Monitoring Systems, offering improved accuracy, flexibility, and accessibility in tracking attendance across diverse organizational environments.

**User Interface**

The user interface (UI) module is designed to be user-friendly and accessible, allowing visually impaired users to customize their experience with the system. The interface includes options for adjusting the volume, selecting preferred languages, and configuring notification settings. It can be accessed through a dedicated mobile application or physical interface devices installed at bus stops. The UI is developed with input from visually impaired users to ensure it meets their needs and is intuitive to use. The design focuses on simplicity, ease of use, and accessibility, incorporating features like voice commands and tactile feedback. This module ensures that users can interact with the system effortlessly, tailoring it to their specific preferences for an optimal experience.

**System Integration and Testing**

This module focuses on the seamless integration of all system components and rigorous testing to ensure functionality, reliability, and user satisfaction. Integration involves connecting the RFID readers, IoT sensors, and speech synthesis modules with the central server and user interface. Comprehensive testing is conducted in controlled environments and real-world scenarios to validate the system's performance. User feedback is collected to identify any issues and make necessary adjustments. This module ensures that the system operates smoothly under various conditions, maintaining high accuracy and reliability. Continuous monitoring and iterative improvements are part of this module to address any emerging challenges and enhance the system over time.

**Deployment and Future Enhancements**

The deployment module involves the systematic installation of the system across selected bus routes and terminals, followed by a phased rollout to ensure successful implementation. This includes training transit staff, conducting user orientation sessions, and setting up support infrastructure. Future enhancements will focus on expanding the system to additional routes, incorporating advanced features such as haptic feedback for direct tactile notifications, and integrating with mobile applications for seamless user interaction. Continuous research and development will address potential improvements in system robustness, scalability, and user experience. Collaboration with public transportation authorities and advocacy groups will be crucial for ongoing enhancements and widespread adoption.

**3.1 PROPOSED SYSTEM**

The proposed Attendance Monitoring System represents a paradigm shift in how organizations track and manage attendance. By harnessing the power of RFID technology, the system offers a seamless and automated solution that eliminates the inefficiencies of manual processes. RFID tags assigned to individuals and strategically placed readers at entry points ensure accurate and real-time attendance tracking without the need for user intervention. This not only enhances the accuracy of attendance records but also frees up valuable time and resources for administrators, allowing them to focus on more strategic tasks.

Moreover, the system's user-friendly interface and customizable reporting capabilities empower administrators to gain valuable insights into attendance patterns and trends. With instant access to comprehensive attendance data, organizations can make informed decisions, identify areas for improvement, and optimize resource allocation effectively. Additionally, the system's scalability and integration capabilities ensure compatibility with existing organizational systems, providing a seamless transition and minimizing disruption to workflows. Overall, the proposed Attendance Monitoring System offers a holistic solution that streamlines attendance management processes, enhances organizational efficiency, and drives productivity to new heights.

# REQUIREMENTS:

* + 1. **HARDWARE SPECIFICATION**

Arduino Board UNO

RFID Tag

RFID Sensor RC522

Bread Board

Jumper Wires

Bizzer

# SOFTWARE SPECIFICATION

Arduino

IDE C++ (14)

* 1. **ARCHITECTURE DIAGRAM**

**A diagram of a cloud computing system

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**OUTPUT**

**A circuit board with wires

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**DESCRIPTION**

The proposed Attendance Monitoring System utilizes RFID technology, Arduino Uno, Wi-Fi module, and a buzzer to track attendance efficiently. When an RFID tag is placed on the reader, the system records the tag owner's details and transmits them to a designated website. Concurrently, a buzzer emits a sound as confirmation. Administrators can easily download a CSV file of the day's attendance from the website for further analysis. This system offers a streamlined solution for attendance monitoring, enhancing accuracy and administrative efficiency. With real-time recording and easy access to attendance data, the system simplifies administrative tasks and ensures reliable attendance tracking.

**CHAPTER 4**

**CONCLUSION AND FUTURE WORK**

In conclusion, the proposed Attendance Monitoring System offers a comprehensive solution to the challenges faced by organizations in tracking and managing attendance. By leveraging RFID technology and intuitive user interfaces, the system streamlines attendance recording processes, enhances accuracy, and provides valuable insights for decision-making. With its scalability, security measures, and seamless integration capabilities, the system is well-equipped to meet the evolving needs of organizations across various sectors.

Looking ahead, future work could focus on further enhancing the system's capabilities and expanding its functionality. This could include the integration of additional biometric authentication methods for heightened security, the development of predictive analytics algorithms to anticipate attendance trends, and the implementation of machine learning algorithms to automate attendance-related tasks. Moreover, research into emerging technologies such as blockchain and edge computing could provide innovative solutions to address privacy concerns and improve data processing efficiency in attendance monitoring systems. By continually innovating and adapting to new technologies and methodologies, the Attendance Monitoring System can remain at the forefront of attendance management practices, driving organizational efficiency and productivity in the years to come.

## APPENDIX

**SOURCE CODE:**

#include <ESP8266WiFi.h>

#include "Adafruit\_MQTT.h"

#include "Adafruit\_MQTT\_Client.h"

#include <SPI.h>

#include <MFRC522.h>

MFRC522 mfrc522(D4,D3);

#define WLAN\_SSID "ssid"

#define WLAN\_PASS "password"

#define AIO\_SERVER "io.adafruit.com"

#define AIO\_SERVERPORT 1883 // use 8883 for SSL

#define AIO\_USERNAME "username"

#define AIO\_KEY "key"

int ap;

WiFiClient client;

Adafruit\_MQTT\_Client mqtt(&client, AIO\_SERVER, AIO\_SERVERPORT, AIO\_USERNAME, AIO\_KEY);

Adafruit\_MQTT\_Publish photocell = Adafruit\_MQTT\_Publish(&mqtt, AIO\_USERNAME "/feeds/c1");

void MQTT\_connect();

void setup() {

Serial.begin(115200);

pinMode(D2,OUTPUT);

SPI.begin(); // Init SPI bus

mfrc522.PCD\_Init();

delay(10);

Serial.println(); Serial.println();

Serial.print("Connecting to ");

Serial.println(WLAN\_SSID);

WiFi.begin(WLAN\_SSID, WLAN\_PASS);

while (WiFi.status() != WL\_CONNECTED) {

delay(500);

Serial.print(".");

}

Serial.println();

Serial.println("WiFi connected");

Serial.println("IP address: "); Serial.println(WiFi.localIP());

}

uint32\_t x=0;

void loop() {

MQTT\_connect();

Serial.println("TAP YOUR CARD");

// Look for new cards

if ( ! mfrc522.PICC\_IsNewCardPresent()) {

return;

}

// Select one of the cards

if ( ! mfrc522.PICC\_ReadCardSerial()) {

return;

}

//Reading from the card

String tag = "";

for (byte i = 0; i < mfrc522.uid.size; i++)

{

tag.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));

tag.concat(String(mfrc522.uid.uidByte[i], HEX));

}

tag.toUpperCase();

Serial.println(tag.substring(1));

if(tag.substring(1)=="33 DD AE 0F"&&ap==0)

{

digitalWrite(D2,HIGH);

delay(500);

digitalWrite(D2,LOW);

Serial.println("DHARSHINI LOGIN");

photocell.publish("DHARSHINI LOGIN");

delay(3000);

ap=1;

}

else if(tag.substring(1)=="33 DD AE 0F"&&ap==1)

{

digitalWrite(D2,HIGH);

delay(500);

digitalWrite(D2,LOW);

Serial.println("DHARSHINI LOGOUT");

photocell.publish("DHARSHINI LOGOUT");

delay(3000);

ap=0;

}

}

void MQTT\_connect() {

int8\_t ret;

if (mqtt.connected()) {

return;

}

Serial.print("Connecting to MQTT... ");

uint8\_t retries = 3;

while ((ret = mqtt.connect()) != 0) { // connect will return 0 for connected

Serial.println(mqtt.connectErrorString(ret));

Serial.println("Retrying MQTT connection in 5 seconds...");

mqtt.disconnect();

delay(5000); // wait 5 seconds

retries--;

if (retries == 0) {

while (1);

}

}

Serial.println("MQTT Connected!");

}

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