A Dual-Mode Radio-Frequency Identification and Facial Recognition System for Attendance Capturing

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Certification

This is to certify that Yinka John ADEGOKE with matriculation number LCU/PG/00379 carried out this research work titled "Dual Mode Radio Frequency Identification and Facial Recognition Attendance System: A Secured and Efficient Web / Hardware-Based Approach" in the Department of Computer Science, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo State, for the award of Master of Science (MSc) in Cybersecurity and that this has not been previously submitted.

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Dr. Wilson Sakpere Date
(Supervisor)

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Dr. Wilson Sakpere Date
(Head of Department)

Dedication

This research work is dedicated to God, my family, my friends, my supervisor, and the entire lecturers in the Computer Science Department of Leady City.

Acknowledgment

My appreciation goes to God and to express my heartfelt gratitude for the support and resources provided by Lead City University that have greatly contributed to the successful completion of my research paper. It is with immense appreciation that I acknowledge the role Lead City University played in this academic endeavor.

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Though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in the work.

Abstract

In today's rapidly evolving technological landscape, efficient and secure attendance tracking systems are essential for various organizations. This study introduces a novel solution that combines Radio-Frequency Identification (RFID) and Facial Recognition technologies to create a robust attendance management system. By leveraging the capabilities of both hardware and software components, this system offers a seamless and accurate approach to recording and managing attendance data. The hardware component of the system utilizes Arduino microcontrollers and RFID modules to provide individual identification through RFID cards or tags. Each user is assigned a unique RFID card that triggers the RFID module to record the attendance information. Simultaneously, the system captures facial images using a camera module for facial recognition. A Python program processes the data using Open CV, associating it with the respective user's profile and initiates the facial recognition process. The facial recognition system identifies users by comparing the captured facial features with the pre-stored templates in the database. The system offers several advantages, including high accuracy in attendance recording, enhanced security, and rapid processing of data. Moreover, the combined approach reduces the time spent on proxy attendance, ensuring the integrity of attendance records, and creating options for attendance. The system also provides real-time attendance tracking and generates comprehensive reports for administrative purposes. This research presents a step-by-step implementation guide for setting up the RFID and Facial Recognition Attendance System using Arduino and Python, making it accessible for educational institutions, businesses, and organizations looking to streamline attendance management. The system's effectiveness is demonstrated through extensive testing, highlighting its reliability and robustness. The system represents a cutting-edge solution for modern attendance management needs. By harnessing the capabilities of the technologies adopted, this system offers a secure, accurate, and efficient approach to attendance tracking, paving the way for improved organizational efficiency and data integrity.

Keywords: Python , Facial Recognition , Arduino

Word Count: 299

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List of Acronyms

RFID	– Radio Frequency Identification
LCD	– Liquid Crystal Display
USB	– Universal System Bus
IC	– Integrated Circuit
FAR	– False Acceptance Rate
SQL	– Structured Query Language
LED	– LED Emitting Diode
AWS	– Amazon Web Service

Appendices