An RFID Attendance System Using NodeMCU and Firebase

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***Abstract*—This thesis constructs a prototype attendance system based on RFID identification, an ESP8266 NodeMCU controller, and Firebase Realtime Database. An RC522 reader obtains the card identifier and sends it to the controller over SPI; the controller processes the identifier, updates the display, and transfers attendance information to the online database. The report also describes a web interface for viewing attendance records and exporting entries that include an identifier, name, time, and attendance status. The author documents the circuit connections, Arduino IDE setup, Firebase configuration, interface screens, and test observations. The reported hardware tests confirm communication between the reader, display, and ESP8266, and show records reaching Firebase. The work does not provide a measured identification error rate, a multi-classroom trial, or a security assessment of the deployed database. The author identifies role-based authorization and additional website functions as later development. The contribution is an implementation account and a functioning local demonstration of a connected attendance workflow, with its performance and operational suitability still to be evaluated.**

***Index Terms*—RFID, attendance, ESP8266, NodeMCU, Firebase, Internet of Things**

I. Introduction

Manual attendance recording can be slow to inspect and difficult to consolidate across sessions. The thesis proposes an RFID-based workflow in which a card scan is processed by a NodeMCU and stored in Firebase. A web interface then exposes the recorded information for review. The project is framed as an Internet of Things prototype rather than a completed campus deployment. Its central question is whether the selected hardware and cloud database can be connected into one attendance path [1]. Earlier ICTU student work on related designs is included here for context [4], [5]. Related published studies provide context for the subject and methods [6], [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

II. Methods

The system combines an RC522 RFID reader, an ESP8266 NodeMCU board, an OLED display, Firebase Realtime Database, and a website. The reader communicates with the controller over SPI; the display uses an I2C connection. The author configures Arduino IDE and the database project, implements card reading and data transfer, then presents the circuit and web interface. The website displays attendance time and status and supports viewing or exporting records. The source describes module connection checks and a demonstration of transferred data [1].

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III. Results

The report shows successful communication between the RFID module and ESP8266 and between the OLED module and ESP8266. It also shows attendance data transferred from the controller to Firebase and displayed in the website and realtime database screens. The examples include a recorded identifier, person name, time, and attendance status. These observations demonstrate the prototype's basic data path, but the source does not quantify reader reliability, network delay, data loss, or accuracy in a classroom trial [1].

IV. Discussion

The prototype establishes a connected hardware and software flow using inexpensive components, but the report leaves authorization and additional website functions for later work. Because it does not include a systematic security or reliability evaluation, the observed successful scans do not by themselves establish readiness for institutional attendance records. Card sharing, network interruption, and database access control are relevant operational questions that require separate testing before deployment. The author's own future-work section specifically proposes an administrative permission mechanism [1].

V. Conclusion

The thesis documents a working RFID, NodeMCU, and Firebase attendance prototype and shows that hardware events can reach the database and website. The source supports this connection through circuit descriptions and demonstration screenshots. It does not establish measured throughput or deployment reliability. Role-based access and broader website functions remain planned extensions, and practical testing would be needed before routine use [1].

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