

Fingerprint Based Attendance Management System for Boarding Students

Ngan T.T. Le

Thai Nguyen University of Technology, Thai Nguyen city, Viet Nam

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ABSTRACT: The fingerprint attendance system aims to flexibly and improve the management efficiency of an educational institution using biometric technology. This saves time wasted on naming and it provides an efficient method of marking attendance. In addition to fingerprinting, the device will measure students' body temperature to check their health. The device is fixed on each dormitory used to grade without teacher intervention. Students will be asked to place their finger on the fingerprint sensor for attendance and place it close to the temperature sensor to check their temperature. Direct management on Google Sheets can monitor and edit flexibly.

KEYWORDS: Fingerprint, Attendance, Biometric, Temperature sensor, Google Sheets.

I. INTRODUCTION

In most schools, the management of boarding students is quite complicated because students live in a very crowded dormitory building. With the practical effect brought to users, the problem of fingerprint dot application is always a smart solution that is now trusted by the school for application in the management and control of access. The conventional attendance system applied in an education system where teachers name each student and mark attendance is a waste of time especially in the current context when the number of students is increasing day by day. In May 2016, S. Hassan and D. Zubair Asghar, from [4] have used PHP and MySQL as a back-end design. HTML, CSS and JavaScript were used as front end tools. It accepts data from user through MySQL it stores data into cloud. This model was designed basically to maintain attendance data and segregates defaulter students. Drawback of this system was that in this, fingerprint sensor which is used it collects 200 samples at a time which is acceptable for one batch but not for the whole college. Here we will have to transfer data in multiple cycles to the cloud which is not effective [9-12]. This attendance system, in

addition to fingerprint attendance, also measures the temperature of each student during the epidemic season, contributing to ensuring the health of students. After students have completed the step of confirming their information, all their information is stored thanks to specialized software. Compact device, making a difference compared to other devices.

II. HARDWARE AND SOFTWARE DESCRIPTION

Fingerprint attendance system used Node-MCU as micro-controller to control all information and data processing. It has an embedded Wi-Fi module inside which makes the system compact. In addition to the Node-MCU, we have used a Fingerprint Sensor named R307 which is used to scan the fingerprints of students and accordingly it sends that data to the Node-MCU. Use the temperature sensor to measure body temperature. To make this product user-friendly, it has an LCD screen which is used to display the message to the user. The software used is Arduino IDE used to program NodeMCU and Google Script Editor to track student attendance.

III. DESCRIPTION AND METHODOLOGY

As shown in Figure 1, students will have to register their respective fingerprints in fingerprint sensor R307 and then those fingerprints will be randomly registered inside R307 memory. Whenever a student places his/her finger on the fingerprint sensor, that fingerprint will be matched with the recorded fingerprint and attendance will be updated on the corresponding Google sheet. Students with less than 75% attendance will be periodically notified by email.

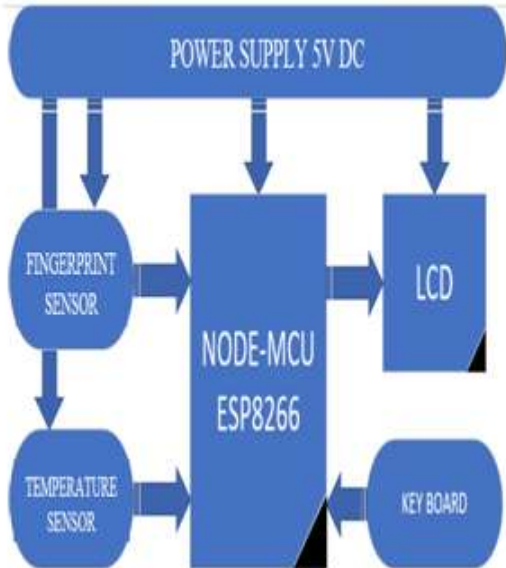


Figure1. Block diagram of Smart Time Attendance System

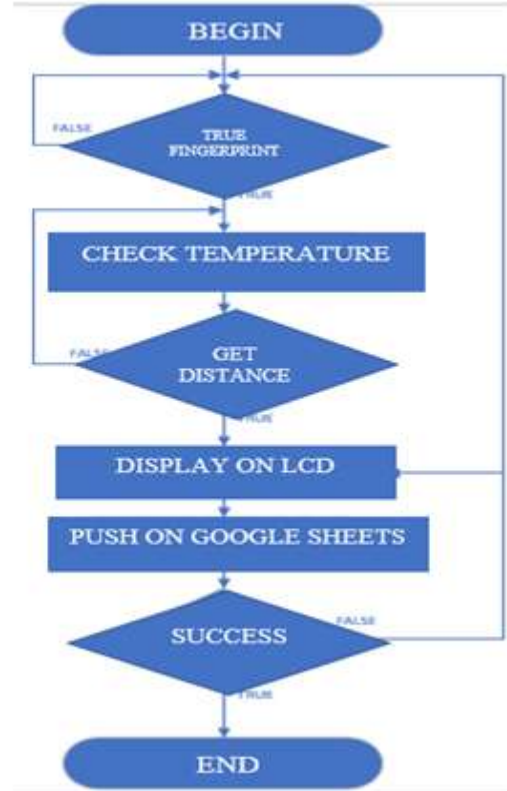


Figure 3.Graph of the attendance process

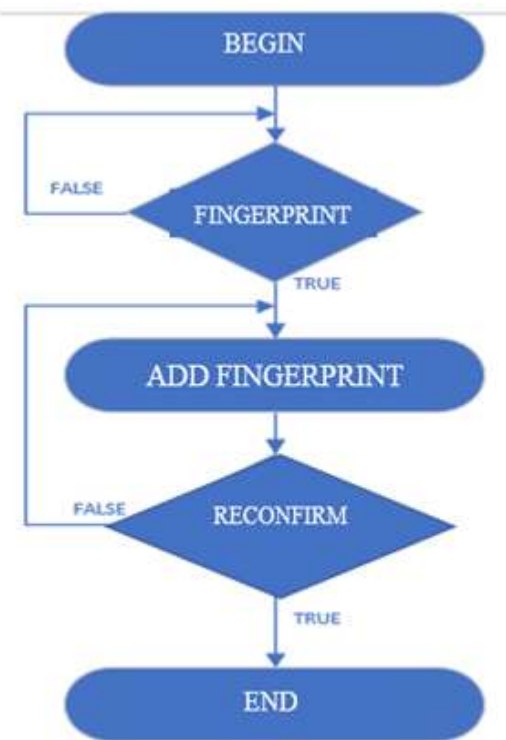


Figure2. Flowchart of fingerprint registration process

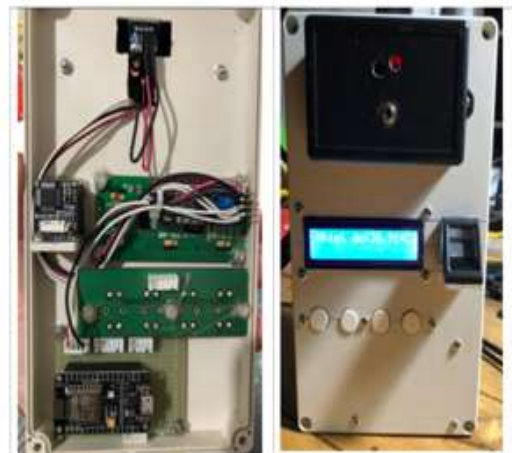


Figure 4. Execution device

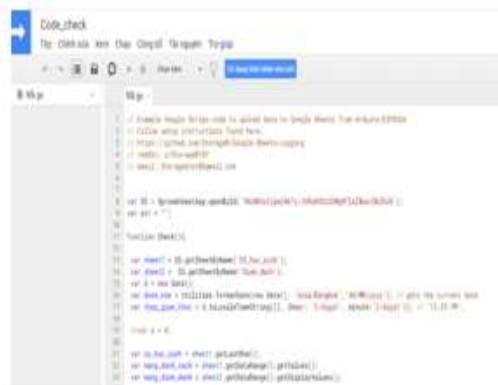


Figure 5. Editing the source code on Google Script

IV. DEVICE OPERATION

Features of the device:

Device security: The device is secured from unauthorized access with fingerprint authentication. Only authorized persons can access the device. He has to install the device and select the batch for timekeeping. The resetter and power switch are located in the unit's internal cabinet and cannot be accessed by students. The time displayed is taken directly on the universal time system, so it is very accurate.

Non-contact body temperature check: The device will display the specific temperature as the bored zone temperature when the measurer moves into the correct standard distance, this distance is taken by the proximity sensor.

Notice of successful implementation: After successful attendance and temperature measurement, the system will push the data to the Server to transfer to Google Sheets. A message will be displayed on the LCD when the data is successfully uploaded.

Function menu button: The menu button will be used for selection, change, and other operations. This reduces the complexity of use.

Transferring student list

To transfer the list of students, the faculty must create an Excel file containing the student's name and number.

1) Importing Excel files or fill them directly in Google Sheets

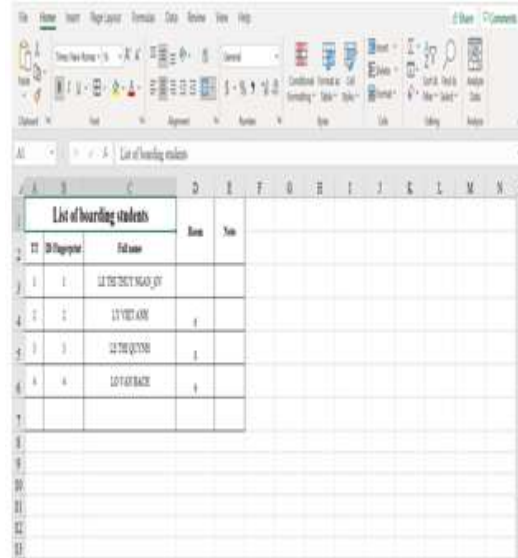


Figure 6. Importing Excel files

2) Send the list to backup to Device: After successful connection notification, the software can be used to send information lesson to the device. After submitting the list, the lecturer can bring the device to the classroom to register.



Figure 7. Device prototype model

V. RESULTS AND DESCRIPTION

Google Sheets contains themed sheets as shown in Figure 4 and a report sheet as shown in Figure 5 containing percentages. Each time attendance is marked on the device, it is updated in the respective sheets. Figure 4 contains the UIDs (unique IDs) of all students of the particular batch. The columns are the date of the lecture. The blank part of the student's UID for a specific date indicates

that the student was absent that day. Every time a student's presence is confirmed by the sensor, a 'p' (short for current word) is marked before the student's id. Whenever one runs the reporting function in the Google Script editor, the attendance percentage is updated and emails are sent to students whose attendance rate is less than 75%. Figure 5 contains attendance reports for each subject for all students in the batch. Whenever a teacher has to refer to a attendance report, a separate sheet is created when the reporting function in the Google Script editor is run.

VI. ACKNOWLEDGEMENTS

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