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Fingerprint Based Attendance System Using Atmega328P

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Abstract: ***In most schools and institutions, pupils' attendance is formally noted in duplicate on a piece of paper.They mark phoney student attendance using prohibited methods. The accuracy of the attendance is improved by fingerprint-based systems. The marking of attendance typically takes five minutes. The participation indicated following student identity. A fingerprint-based identification method is utilised to identify students. It is thought to be the quickest technique for biometric identification. Additionally, attendance rates are computed to create a distinct defaulter list, which is then periodically sent to students. The gadget differs from the others in that it is brief.***
Keywords: Biometrics, fingerprint recognition, MATLAB, security, automatic attendance system.

I. INTRODUCTION

We will create a fingerprint-based biometric attendance system in this project. To design the entire project, we will interface the fingerprint sensor with the Atmega, LCD Display, and RTC Module. For this project, we took and stored attendance data and records using the fingerprint module and Atmega. Students' academic progress at the institute is significantly influenced by their attendance record. This project's primary goal is to record each student's attendance. Therefore, colleges and universities do not manually keep attendance records. It commemorates the student's first appearance.

1) Optical fingerprint scanner module R307 R307 is a fingerprint module.R30X series made by Hangzhou Grow Technology Company Limited, a Chinese manufacturer. The R307 Fingerprint Module contains an optical fingerprint sensor, a fast DSP processor, steady performance, and a straightforward design with a fingerprint enter. There are two interfaces on the R307 fingerprint module:

TTL UART and USB 2.0

Fig. 1: The R307 fingerprint module



Fig 1: Fingerprint Module R307

2) DS3231 RTC Module

This module has an affordable design. The time and date are displayed on it. The minutes, seconds, and hourscan be tracked by the DS3231. It functions in either a 12 or 24 hour format. There are a total of 6 pins on this module.



Fig 2: RTC Module DS3231

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a) The 33K pin has a consistent output.
b) The SQW pin produces a pleasing square wave.
c) SCL pin: This pin serves as a serial clock.
d) SDA pin: This pin handles serial data.
e) VCC pin: This provides the module with electricity. 3.3V to 5.5V.It is a ground pin, designated as GND.

3) Atmega 328P

This high-performance chip is used. It is an 8-bit AVR microcontroller with minimal power consumption. The voltage range for this device is 1.8 to 5.5 volts. It is employed in autonomous systems when a straightforward, affordable microcontroller is required.

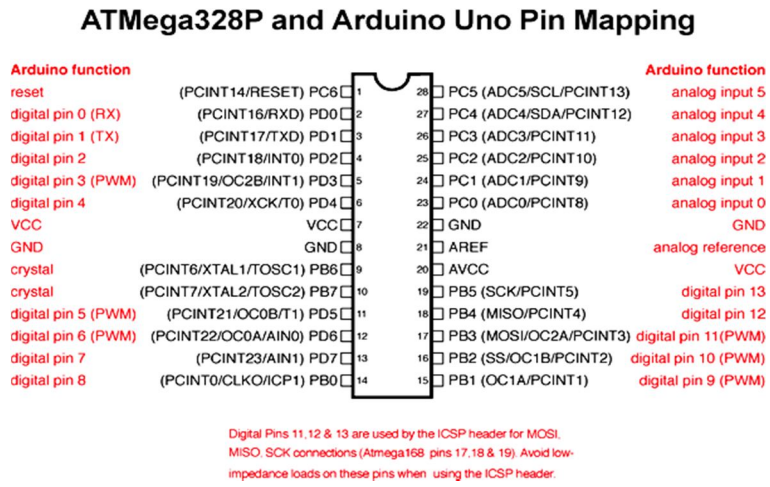


Fig 3: Atmega 328P

II. MODELING AND ANALYSIS

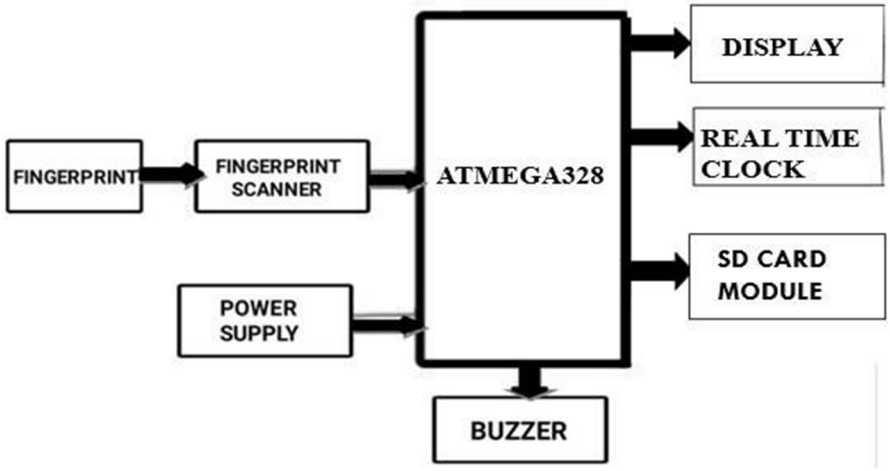


Fig 4: Block Diagram of Fingerprint Based Attendance System

1) Enrollment: By placing their finger on the fingerprint scanner, each person is required to enrol their fingerprint.
2) Verification procedure: The verification procedure is the second step. The stored enrollment templates that were previously present in the memory region where the enrollment procedure was carried out were compared when the user placed his finger on the fingerprint scanner. When a comparison is made, the results are displayed on the LCD.
3) Data Collection procedure: The data collection procedure is the final step. To track attendance of an individual or student, the fingerprint device's data was collected in the form of records.

III. CIRCUIT DIAGRAM

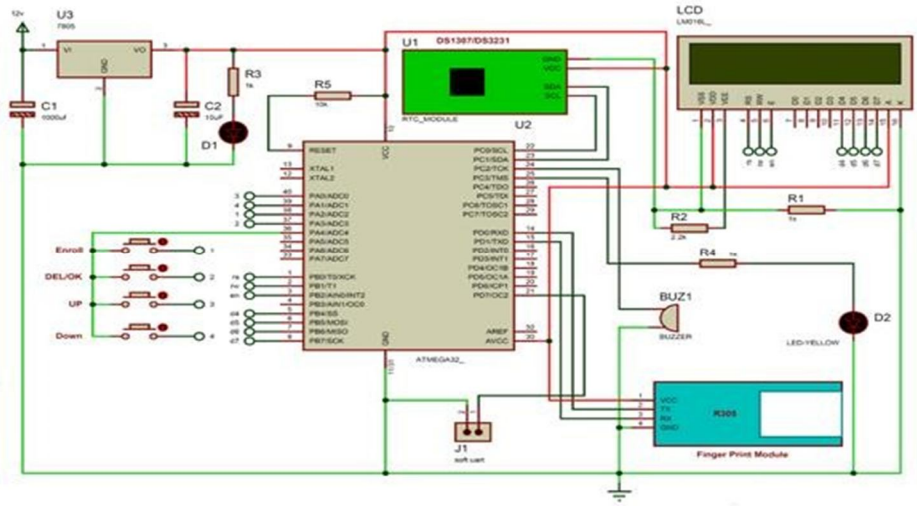


Fig.2 Circuit Diagram of System

A. Working Principle

1) Register/Back Button -- Used to register a new fingerprint and to go back or reverse the back process.

2) Delete/OK Button – This button is used to both delete previously stored fingerprint data and to authorise access when selectedas OK.

3) Selecting the memory location for saving or retrieving information requires pressing the forward button. 1. The Arduino board and the fingerprint sensor are connected.

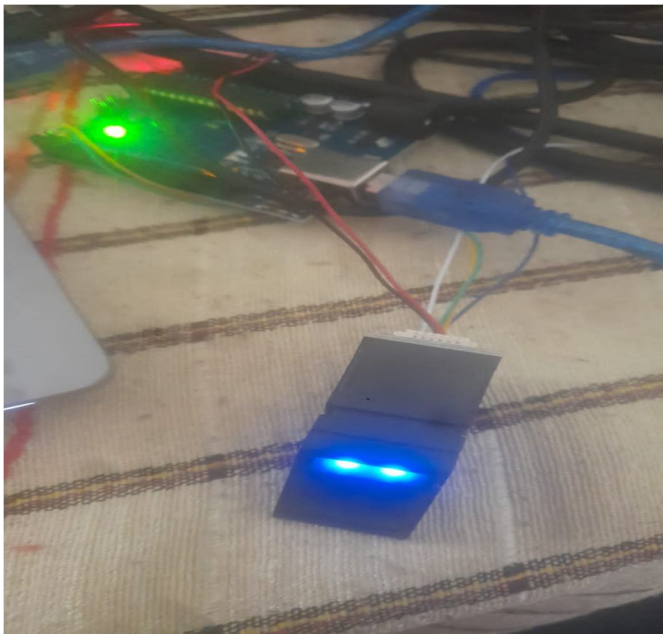
4) Your finger will be scanned initially by placing it on the scanner.

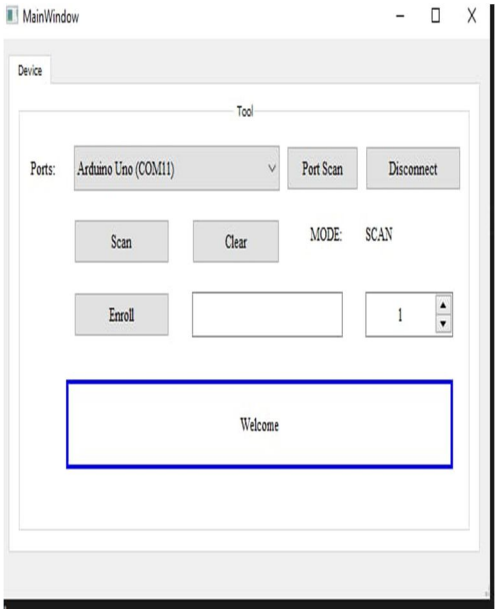
5) After scanning your finger, the scanner will create a template using an image processing technique that will be stored for comparison.

6) In a similar manner, all of the templates for various persons will be stored.

7) As a result, the scanner detects our finger when we do.

IV. HARDWARE



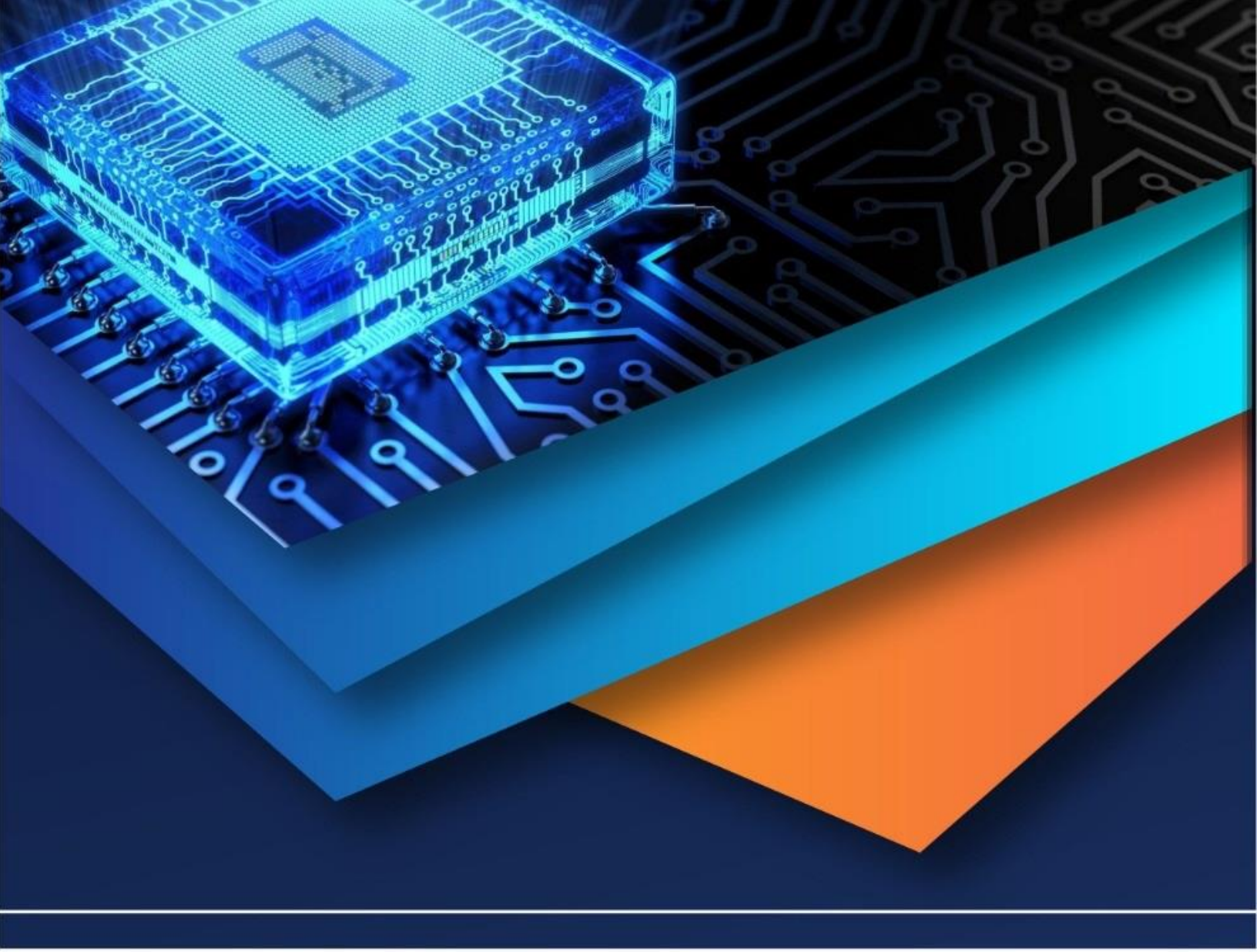


V. CONCLUSION

Here, we used the Atmega 328P to create a biometric fingerprint-based attendance system. We used the R307 fingerprint sensor in this project, which reads fingerprints and records them as digital data. This device is extremely dependable and completely user-friendly. As a result, it can be used in businesses or educational institutions.

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