

# ATTENDANCE MANAGEMENT DATABASE SYSTEM USING FINGERPRINT READER

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## Abstract

**Basically, database is a collection of data that it is a place to store data. In this system, data or many facts can be create and store. A database allows easy and efficient storage, retrieval and modification of data, regardless of the amount of data being manipulated, essentially, database is a computerized record keeping system. Attendance system V 3.0.35 can solve enterprise personnel information management and staff attendance. This software can support fingerprint machine and support Microsoft Office Access and SQL server. In this system, database system using fingerprint reader is described to display attendance record. This database system can be used in many places such as banking, universities, railway reservation, airlines, telecommunication and sales to be faster response time and better performance. Nowadays, people widely used database system to save time and paper. This system mainly consists of fingerprint machine (C-26), router, switch, PC and TCP/IP (cat-6).**

**Keyword: Fingerprint Reader, Router, Switch and PC**

## 1.INTRODUCTION

Database technology has been an active research topic since the 1960s, both in academia and in the research and development groups of companies. Small database can be maintained on personal-computer systems and may be used by individuals at home. A database is stored as a file or a set of files on magnetic disk or tape, optical disk, or some other secondary storage devices. This system is a collection of data using fingerprint reader. Database was constructed to store all system information.

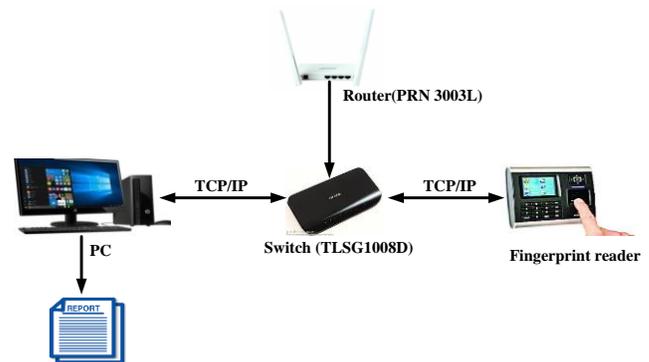


Figure 1. Block Diagram of Attendance Management Database System

The components of this system are fingerprint reader (C-26, 5V, 1A), router (PRN 3003L), switch (TP link), PC and TCP/IP (Category 6 cable). Fingerprint is very high accuracy, easy to use and small storage space required for the biometric template. Category 6 cables can be forward and reverse data between PC and fingerprint reader through the router and switch. Switch and router are used as interface in database system. The PC is used to display user's information and print user's reports. This is as shown in Fig. 1.

## 2. MAJOR COMPONENTS OF THE SYSTEM

Major components used in this system are:

- Fingerprint reader (C-26, 5V, 1A),
- Router (PRN 3003L),
- Switch (TP link),
- PC ,
- TCP/IP (Category 6 cable)

In this system, database system is performed by using fingerprint reader to get accurately and quickly user's information. The database system used five network devices as shown in fig.2. Firstly, all these devices is assigned IP number such as fingerprint reader is 192.168.1.198, Switch IP is 192.168.1.254, router IP is 192.168.1.254 and PC's IP is 192.168.1.199.

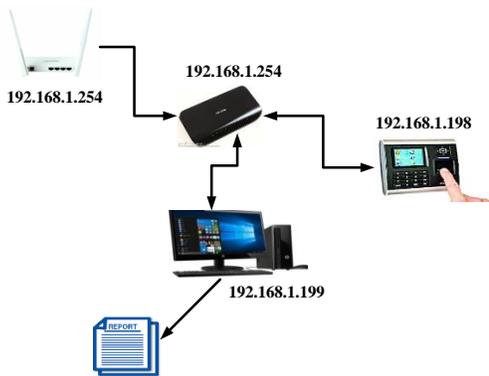


Figure 2. Network Design of the System

### 3. Data Collection and Matching Process

The collection of fingerprint is achieved by some image processing steps. These steps can easily be understood by the algorithm below. Fig.3 shows the flow chart of data collection and matching process.

Input: Insert the two user's fingerprint into the device.  
Output: Verify the fingerprint image using minutiae matching.

- Step 1: Power supply to the device.
- Step 2: Press the first finger three times on the green scan area and the second finger is the same.
- Step 3: The device scan capture fingerprint.
- Step 4: User registration: Name, ID number, Address and Phone number.
- Step 5: Access the user's data.
- Step 6: Store user's data to a large amount of storage space.
- Step 7: Collection of data into the database.
- Step 8: End of the data collection process.

The matching of fingerprint is achieved by some image processing steps. These step can easily be understand by the algorithm below:

- Step 1: Power supply to the device.
- Step 2: Fingerprint sensor module captures finger's print image.

Step 3: Matching of capture fingerprint's image and reference database.

Step 4: Match the two images are computed. If the two images are mismatched the result is No and return to the step two. If the two images are matched, the result is Yes and continue next step.

Step 5: The user can get the update attendance.

Step 6: The result display on the PC.

Step 7: End the system process.

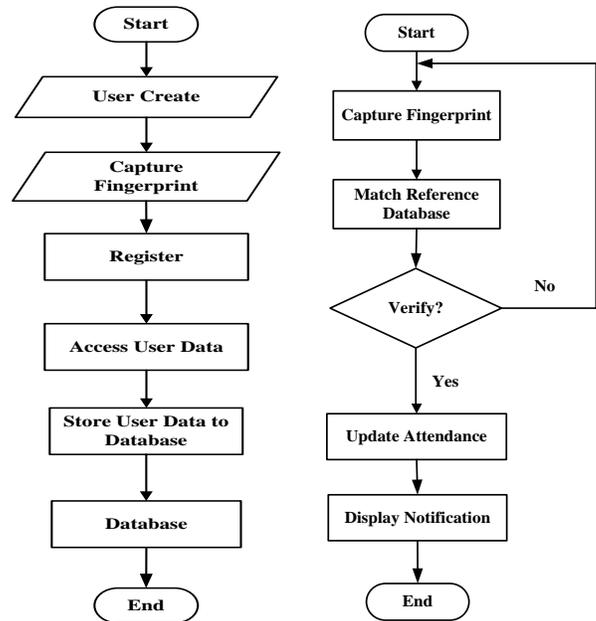


Figure 3. Flow Chart of Data Collection and Matching Process

## 4. FINGERPRINT READER AND SOFTWARE RESULTS

### 4.1. Fingerprint Registration

The information of fingerprint for employees can register the following operation steps:

1. In user interface, select "New" then press "OK" or press "1", next select "Finger" then press "OK" or press "1" can start the fingerprint registration;
2. The first enter the work number and name, the default work number is 1;
3. Place the finger on the green scan area to scan the fingerprint, it need to scan 3 times to complete the registration;

- If need to backed up the second fingerprint press "OK", if complete the registration press "ESC";



Figure 4. Fingerprint Registration

#### 4.2. Device Settings

In advanced settings menu, select "Device" then press "OK" or press "1" can enter device setting. Set the device No., language (only English), total number of managers, Prompt volume(0-10), authentication, screen return time ,screen saver time, auto shutdown, open delay and alarms setting.



Figure 5. Device Settings for Fingerprint Reader

#### 4.3. Connection Information of the Device

To set up a communication for attendance machine, method of enter connection information: in "Setting" menu select "Network" press "OK" or press "4" enter the connections setting.( settings machine number, IP address, Subnet Mask, Default Gateway, Port number, Connection password, Server IP address, Server Port,

settings whether to send a message and only for LAN can use this function).



Figure 6. Network Connections for Fingerprint Reader

#### 4.4. Software System

For decades, companies have been using the traditional paper timesheet to monitor employee attendance and track what work is completed. However, leading organizations are now turning to more sophisticated time attendance software for higher accuracy and efficiency. Attendance software is a type of technology which allows to track and monitor when teachers and students IN/OUT time. The advantage of attendance software is that it gives user much higher efficiency than traditional paper-based timesheets. Fig.7 shows the attendance software v3.0.35.

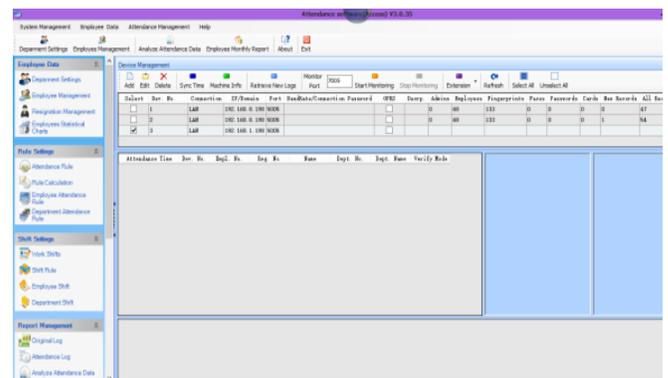


Figure 7. Attendance Software

#### 4.5. Device Management for IP Address

Before downloading or uploading data from the Device with software, ensure that the communication between Device and PC has established. So connect the device to the system firstly, input the related parameter. And then, adding the IP address to connect the fingerprint reader and PC. This is as shown in Fig. 8.



Figure 8. Adding IP Address

#### 4.6. Testing for Devices Connection

After the adding IP address, the two machines must test the machine connection. This is as shown in Fig. 9. If the machine connected, uploading or downloading data is available.



Figure 9. Result for Machine Connection

#### 4.7. Download Register Data

The user's fingerprint can get downloading from fingerprint reader. And then, the user's information can display the Attendance Software V3.0.35 on PC. Fig.10 shows the downloading register data from device.

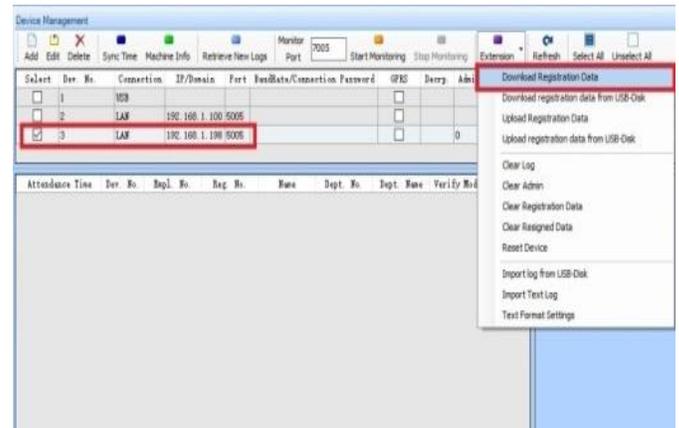


Figure 10. Downloading Register Data

#### 4.8. Retrieve New Logs

The capture fingerprint to display the PC, must click the Retrieve New Logs. And then, all users' records can receive new records from device. Fig.11 shows the receiving new records from device.

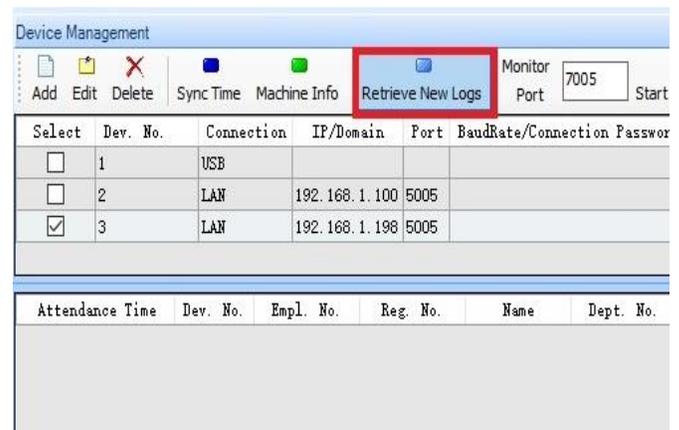


Figure 11. Receiving New Records

#### 4.9. Analyze Attendance Data

User can choose start time, end time, all employee and select employee on the operation screen. Analyze Attendance of data that it downloads from device. Fig.12 shows the downloading analyze attendance data from device.



Figure 12. Downloading Analyze Attendance Data

## 5. HARDWARE DESIGN OF THE SYSTEM

Fig.13 shows the hardware design of the router which is forward data packet between network devices using Category 6 cable. Fig.14 shows the hardware design of the switch installation which based on MAC addresses and determines how to transmit frame. Fig.15 shows the hardware design of database system.



Figure 13. Hardware Design of Router Installation



Figure 14. Hardware Design of Switch Installation



Figure 15. Hardware Design of the System

## 6. CONCLUSION AND DISCUSSIONS

A database system makes it possible for end users to create, read, update and delete data in a database. The database system provides storage not only for the data, but also for related data entry forms or screen definitions, report definitions, data validation rules, procedural code, picture formats, and so on. This system created provides concurrency, security, data integrity

and uniform administration procedures. Database system is a powerful tool in current and future business. So, database system is a good data manager till today. Database software is designed to create databases and to store, manage, change, search and extract the information contained within them. Some project can used fingerprint Module and Arduino to take and keep attendance data and record.

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