

Comparison and Research on Enterprise Personnel Attendance Management System

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Abstract

Attendance is an effective means for employers to manage employees. Effective attendance methods affect the efficiency and fairness of enterprises. This paper investigates the attendance methods, introduces the attendance methods under different technical backgrounds, and focuses on the attendance methods based on mobile application. The attendance method based on mobile application has the characteristics of paperless, hardware free, convenient operation and low cost. This study can provide reference for enterprises or schools.

Keywords

Attendance; Paperless; Hardware Free.

1. Introduction

Attendance [1] is an effective means to maintain the normal working order of the enterprise, improve work efficiency and seriously enforce enterprise discipline. It makes employees consciously abide by working hours and labor discipline. In the early days, the attendance method was usually to sign a name on the record book with a pen. Later, with the development of technology, biometrics and access card swiping were usually used for attendance. Some companies also use a special fingerprint attendance machine, which can generate attendance logs for printing and viewing. With the increasing awareness of environmental protection, paperless and hardware free program attendance has become the main development direction of attendance. This paper investigates the attendance system based on mobile application, compares its advantages with traditional attendance means, and introduces the common interfaces of attendance system based on mobile application.

2. Paper Punch

Manual check-in is the most original attendance method of enterprises. Few enterprises use it now. Its advantage is that it has low cost and does not need to purchase any equipment. It can only print a form. Its shortcomings need special personnel to take care of in order to avoid cheating.

Later, paper punch in machine appeared, which is a semi electronic punch in method, which can accurately record attendance time. Each employee needs to have his own card punching paper. Put a piece of paper into a machine, and the machine will record the clock punching time on the card punching paper. They are generally in the shape of clocks and watches, and some are called electronic clocks. You can adjust the time manually. You can't change it at will after punch in. However, people often punch in for others. Some employees give their card printing paper to other employees to punch in on their behalf.

3. Punch in with Software and Hardware

With the development of hardware technology, there are IC punch in machine, fingerprint punch in machine and face recognition punch in machine. IC punch in machine, generally it can be connected with access control and combined with security system. Moreover, one card can be used for multiple purposes. The data obtained from IC card attendance is processed automatically by computer, saving time and effort. However, the biggest disadvantage of IC card punching machine is that it may punch in for others.

With the maturity of fingerprint, face and eye rainbow recognition technology, fingerprint punching and face recognition punching have become the mainstream punching methods. They have a common feature, that is, they need employees to be present, which solves the problem of punching in for others.

4. Attendance System based on Mobile Application

With the popularity of smart phones, attendance methods begin to be based on the functions of mobile phones or mobile applications. For example, DingDing under Alibaba group and WeChat mini apps under Tencent group, the attendance system can complete the identification by calling the positioning, fingerprint identification or avatar identification functions of the mobile phone through DingDing or WeChat. In fact, the mobile phone is used as attendance hardware, and enterprises do not need to buy hardware equipment.

4.1. WeChat Mini App Attendance System

WeChat mini app is an application that can be used without downloading and installing. It realizes the dream of "within reach" of the application. Users can open the application by scanning or searching. If WeChat is regarded as an operating system, WeChat mini app is an application on the operating system.

WeChat mini app is widely favored by developers because of its convenience and lightweight experience. Its application prospect is extremely wide. Now there are many areas that WeChat mini app has not touched, and college classroom attendance is one of them. Some researchers have developed a wechat applet for smart apartment door lock control based on ble (Bluetooth low energy) technology [2], which is simple and easy to use, easy to obtain, strong scalability and high security, filling the gap in the smart door lock Market Based on WeChat mini app. There are also many developers engaged in the application development of Bluetooth module of wechat applet on GitHub. Some developers package the Bluetooth application programming interface provided by WeChat mini app platform into open source modules, which greatly facilitates the Bluetooth development of latecomers' applet. Some developers use the received signal strength indication of the transmitted signal of the Bluetooth device to develop the Bluetooth ranging method combined with the calculation formula. In the application development of face recognition, many AI service providers have opened the application programming interface of face recognition, which greatly reduces the threshold of application development based on face recognition.

The key technologies used in the attendance system based on wechat applet are shown in Table 1:

In order to save and view attendance data, the system [3] must also build a back-end. The commonly used back-end database can be MySQL database, and the back-end development technology can adopt Java based on spring boot framework technology.

Table 1. Technical interface and description

Technical interface	Description
wxContext.OPENID	Get the unique ID of the user
wx.getLocation()	Get the user's geographic location
wx.checkIsSoterEnrolledInDevice()	Call the fingerprint recognition and face recognition functions of WeChat
startBluetoothDevicesDiscovery()	Search for Bluetooth signals from surrounding devices
Wx.request()	Call the third-party interface

4.2. DingDing Attendance

[3,4] studied DingDing attendance. Compared with wechat applet attendance, nailing attendance has a huge advantage that it does not need to develop applications, but only needs to do some related configuration. First, the boss needs to establish a nail group, and then he can initiate attendance activities. Nailing attendance can also be clocked in by geographical location and face recognition. The boss can view the attendance results.

4.3. Advantage Analysis of Attendance System based on Mobile Application

The attendance system based on mobile application has great advantages over the traditional attendance system, which is summarized in Table 2.

Table 2. Comparison of characteristics between attendance system based on mobile application and hardware equipment

Comparison items	attendance system based on hardware equipment	Attendance system based on mobile application
Hardware support	Special hardware equipment is required	Without special equipment, employees use mobile phones to participate in attendance
Attendance method	Three or more attendance methods are rarely supported	Geographic location, Bluetooth, face recognition and fingerprint recognition can appear in the same attendance system
Statistical data	Inconvenient to analyze and view	Easy to analyze and view
Cost	commonly	No purchase cost for attendance based on DingDing, and the attendance system based on WeChat mini app needs to develop app

5. Conclusion

Different attendance methods depend on different technologies and hardware, and their advantages and disadvantages are also different. The attendance method based on mobile application makes full use of the functions of mobile phone positioning, fingerprint recognition and face recognition. It has the advantages of paperless and hardware free. At the same time, it also has the characteristics of low development cost. It is the mainstream direction of future development.

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