The Huaxia Visitor Access Management System

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Abstract: *The Huaxia Visitor Access Management System is developed based on the construction of micro-service framework, cloud database and cloud server. The system architecture is carried out from the four perspectives of physical architecture, front-end and back-end technical framework and logical architecture. It combines WeChat public platform, smart access control system, visitor management and SMS platform to realize the visit. Fully automatic closed-loop management of guest application, approval, visit and departure, that is, visitors apply online in advance, and independent verification of offline admission to school, which not only makes travel convenient and fast, but also improves management efficiency. This management system model can be used and promoted in different scenarios, which is of practical significance and has certain application value for the digitalization and intelligent construction of "smart city" and "smart campus".*

Keywords: *WeChat applet, Visitor Appointment System, SpringCloud, vue*

1. Introduction

The 14th Five-Year Plan proposes to accelerate the development of digitalization. Develop the digital economy, promote digital industrialization and industrial digitalization, promote the deep integration of the digital economy and the real economy, strengthen the construction of digital society and digital government, and improve the level of digital intelligence such as public services and social governance.[1] Strengthen the protection of personal information, improve national digital skills, and achieve full coverage of information services. Actively participate in the formulation of international rules and standards in the digital field. In response to the proposal of smart cities, combined with digital development, it is unstoppable. [2]The Central Committee of the Communist Party of China and the State Council proposed to build an intelligent campus, coordinate the construction of an integrated and intelligent teaching, management and service platform, and improve the new education service supervision system. Smart campus security is also a part of a smart city. Due to the large number of people, miscellaneous personnel and large scope, it is easy for criminals to sneak into the flow of people and enter the school, posing a certain threat to students' personal safety, property safety and public safety.

2. Physical Architecture

The deployment method adopts the combination of WeChat applet reservation, PC management, intelligent access and self-service access, supports online appointment review, supports cloud service deployment, and connects PC management with WeChat official account and applet.Administrator users log in to the web page management on the PC .The platform can maintain the normal operation of the system without Install the client.Visitors apply through the WeChat applet on the mobile terminal, and the information is transmitted to the system platform server of the campus intranet through the Internet. After passing the review, the results will be fed back and sent to the visiting users.

3. Technical Architecture

3.1. Back-end

3.1.1. Framework: SpringCloud

Spring Cloud is a set of microservice governance framework. Spring Cloud provides microservice governance capabilities such as service discovery, configuration management, message bus, load

balancing, circuit breaker, link tracking, data monitoring, etc., so that microservice clusters can be comprehensively managed and combined. At the same time, the components of Spring Cloud are based on Spring Boot, which can be achieved through the simple configuration of Spring Boot.[3]

3.1.2. Technology: Mybatis-Plus+Mysql+Redis+Swagger

(1) Mybatis-Plus

MyBatis is a data mapping framework used to simplify the use of relational databases in object-oriented application development. MyBatis is a "semi-automated" ORM implementation. Compared with the complexity of the former, MyBatis is easier to get started and master.0.Mybatis-Plus (MP) is an enhancement of Mybatis.Tools, which support Lambda invocation and a variety of data Library, support for automatic primary key generation, support for XML hot loading, built-in Code generator, built-in paging plug-in, the foundation of Mybatis Only do enhancements without changes, in order to simplify development and improve efficiency.[4]

(2) Mysql

Mysql is an extensible relational database, which stores student information, class information, department information, etc. in"The Huaxia visitor pass" ensuring the high reliability and high availability of the visitor pass system for data management.

(3) Redis

Redis is a Key-Value memory database product, whose full name is REmote DIctionary Server. At the same time, Redis supports more data types, including string and linked list, ordered set, hash, etc. Redis data is cached in memory, but compared with Memcache, which is only used for caching, Redis has more scenarios and can be directly used for data storage services.[5]

(4) Swagger

Swagger is an interface document generation tool that provides auxiliary functions for interface test calls. Swagger can generate client SDK code for a variety of different platforms, and files can be automatically generated from code comments on many different platforms. It shows resources, parameters, requests, and responses, but it will not provide any other details of how your API works.[6]

3.2. Front-end

3.2.1. Framework

(1) Front-end client: uni-app

Uni-app is developed using Vue.js application framework, developers write a set of code, which can be released to iOS, Android, Web, and various applets and other platforms. Uni-app is also a better applet development framework, a better APP cross-platform framework, and a more convenient H5 development framework.[7]

(2) Front-end management terminal: vue

Vue is used to build user pages.Front-end framework. When the data changes, the view is automatically updated. The characteristics of the vue framework mainly reflect two aspects:Data-drivenViewBinding with two-way data. The working principle of data-driven view is Changes in data lead to the update of the page.The working principle of two-way data binding is Changes in js data will be automatically rendered to the page,When the data collected by the form on the page changes, it will be automatically obtained by vue and updated to js data.Vue can carry out component development, dataSeparate from the structure to reduce the amount of code, thus improving the development efficiency.

3.2.2. Technology: axios+node.js

(1) axios

Axios is used for the HTTP client of browsers and nodejs, and is essentially a encapsulation of native XHR, but it is an implementation version of Promise, which conforms to the latest ES specification and has the following characteristics: 1 Create XMLHttp Requests from the browser. 2 Create an http request from node.js. 3 Support Promise API. 4 Intercept requests and responses. 5 Convert request data and response data. 6 Cancellation request. 7 Automatically convert JSON data. 8

clients support defense XSRF7.[7]

(2) node.js

Node adopts an architecture called "event loop", which makes it easy and safe to write servers with high scalability. Node chose one that can improve both performance and reduce development.ComplexityThe architecture.Node uses a series of "non-blocking" libraries to support event loops, which is essentially forFile systemSomeoneThe resources of the database provide interfaces. When sending a request to the file system, there is no need to wait for the hard disk (addressing and retrieve files), and the hard disk is ready. The non-blocking interface will notify Node.[8]

4. Logical Architecture

The logical architecture of "The Huaxia visitor pass" Connect is divided into three parts: data interaction layer, application service layer and user layer .

4.1. Data Interaction Layer

The data interaction layer is the application of the database, which will obtain data information from the application service layer for query, storage, calculation, collation and distribution, and display it at the user layer. It is mainly reflected in the interaction of user information and campus server information.

4.2. Application Service Layer

The application service layer realizes the user's needs step by step. It is located between the data interaction layer and the user layer. It not only obtains data information from the bottom, but also outputs data information up, which plays the role of connecting the top and the bottom and complementing each other. It realizes the logical business management between the visitor communication system and the WeChat applet. At the same time, it has map, WeChat applet, authorized login, access appointment, appointment review, QR code scanning, information prompt, data information management and other functions.

4.3. User layer

The user layer is a system interface directly presented to the user for operation. It mainly includes mobile WeChat applet and PC management.

WeChat applet terminal mainly has visitor appointment module, visitor review management, visitor pass, visitor navigation, student leave module, student registration, leave review management, leave list and other functional modules, in which the information filling includes personal name, mobile phone number, ID card, personal photo, The entry time, reasons, accompanying personnel, etc., the information is filled in and submitted to the designated personnel for review. The visitor is approved by the second-level approval. The primary approval is approved by the manager of the interviewee or the visitor filled in by the visitor, and then reviewed by each second-level unit . Who is responsible for the approval, and there is evidence to check afterwards, and the information upload system forms a fast and convenient query. At the same time, you can also view your own appointment records and manage and save the information.

PC management mainly has a statistical module for the number of visitors on leave, department management module, class management module, visitor administrator module, counselor management module, leadership management module, and student approval module. The PC management terminal is used by internal managers and is mainly used for appointment information notification and appointment review. It enables the query and management of data information to be safer, more complete, continuous and traceable, providing better services under the premise of protecting user privacy, making it easier and safer for the campus to manage personnel.

5. Functional Architecture

Adopting a tree-like hierarchical management structure, it sets different roles based on departmental positions, colleges, departments, classes, etc., and gives different permissions to different roles. By assigning personnel to different roles, it carries out relevant management and audits to effectively manage the access of personnel in relevant areas. The main functions of the system are as follows:

(1) Visit appointment: Before entering the campus, they need to complete real-name certification through the WeChat Mini Program, find the department to visit and the relevant person in charge, and then register the visit time, location, relevant personnel, and reasons for the visit for online appointment. After waiting for the management personnel to review and approve, they can show the pass. The guard will verify their identity through the photo and personal information before allowing them to enter the campus.

(2) QR code scanning: After the request for appointment submission and review is successful, scan the QR code, and the administrator will receive the user's entry and exit notification information.

(3) PC management: It is convenient to manage and inquire about visiting appointments, information review, and data statistics. They can obtain information about relevant classes in relevant departments, and can also visualize the visiting data of various departments, colleges, classes and other sections, which is convenient for recording, querying and reviewing.

(4) Campus map: In order to familiarize users with the campus faster, after passing the review, you can query the approximate map route of the campus and save time.

(5) Stay reminder: After making an appointment in the WeChat applet, the relevant prompts will be sent to WeChat before the appointment time and end time, and the overtime stay personnel will be checked and notified at the same time. "The Huaxia Visitor Access Management System" function module is shown in Figure 1.
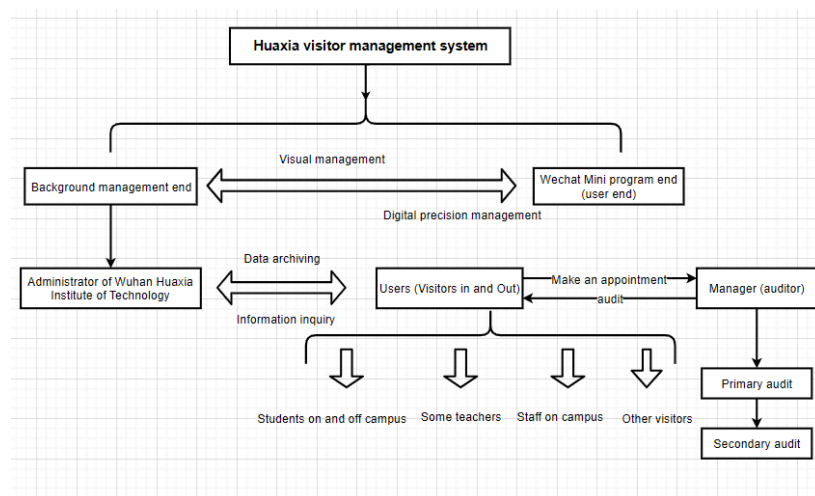

Figure 1: Visitor Pass Function Module

6. Some application examples

6.1. PC management (used by administrators)

6.1.1. Homepage

Home page, this function is mainly used to record and manage the number of leave and the number of visitors in the "The Huaxia visitor pass", including the daily number of leave, the number of monthly leave, the number of daily visitors and the number of monthly visitors. It also includes the data display of various colleges, using data and images for visual management records, which is more convenient, clear and easy.

6.1.2. Departmental management

Department management, this function is mainly used to record and manage the list of school

departments in the "The Huaxia visitor pass". You can add, query, edit and delete relevant information of the department, including department name, creation time, etc.

6.1.3. Class management

Class management, this function is mainly used to record and manage the school class list in "The Huaxia visitor pass". You can add, query, edit and delete relevant information about the class, including grade, college, class, counselor, leader, etc.

6.1.4. Visitor Administrator

Visitor administrator, this function is mainly used to record and manage the list of visitor administrators in "The Huaxia visitor pass". You can add, query, edit and delete relevant information about visitor administrators, including name, mobile phone number, department, etc.

6.1.5. Counselor Management

Counselor management. This function is mainly used to record and manage the list of school counselors in "The Huaxia visitor pass". You can add, query, edit and delete the relevant information of the counselor, including the name of the counselor, the phone number of the counselor, the management class, etc.

6.1.6. Leadership management

Leadership management, this function is mainly used to record and manage the school leader list in "The Huaxia visitor pass". You can add, edit and delete the relevant information of the department, including the leader's name, phone number, etc.

6.2. Mini Program

6.2.1. Visitor appointment

Visitor reservation, this function is mainly used for users to apply for visitor appointment in "The Huaxia visitor pass". Users need to fill in the relevant information of the visitor's application, including the type of application, basic personal information, the reason for the application, the health status of individuals and accompanying personnel, health code screenshots, itinerary code screenshots, accompanying personnel, and accompanying vehicles. Vehicle, I promise, etc., the content with * is required, and you can submit the application after filling it out. Click "Visitor Appointment" to enter the operation page. The specific operation interface is shown in the following Figure 2.
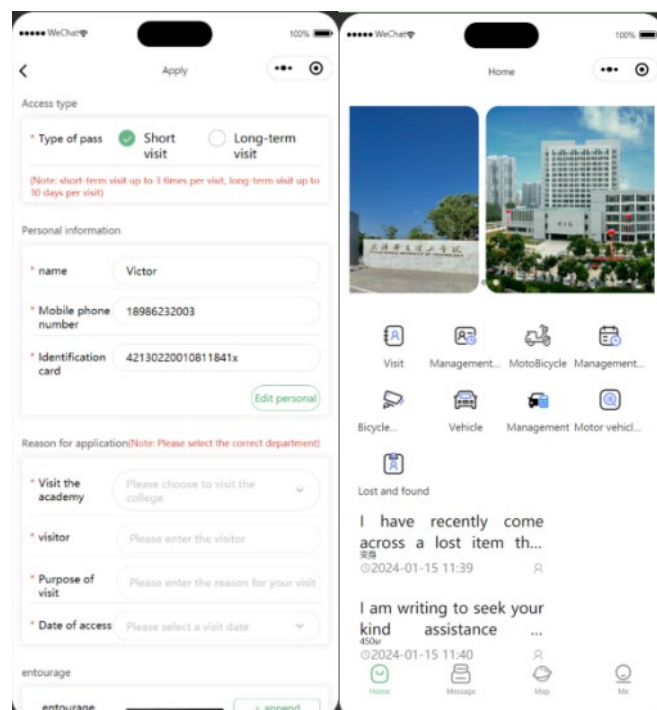

Figure 2: Visitor appointment

Figure 3: Student Registratio

6.2.2. Student Registration

Student registration, this function is mainly used for user registration information in "The Huaxia visitor pass", including name, student number, professional class, mobile phone number, ID card, photo and other information. Click "Student Registration" to enter the operation page. The specific operation interface is shown in Figure 3.

6.2.3. Visitor Pass

Visitor pass, this function is mainly used for the "The Huaxia visitor pass" to record and manage the user's pass voucher information, including pass, pending review, and invalid passage. After the user submits the visitor application to be done, he can check here as a sign for the doorman to judge the passage, which is convenient for the management of access personnel. Click "Visitor Pass" to enter the operation page. The specific operation interface is shown in Figure 4.

Figure 4: Visitor Pass

6.2.4. Visitor navigation (map)

Visitor navigation (map), this function is mainly used to record the campus map. When users enter the campus, they can click here for navigation, which can reach the destination more accurately and conveniently. Click "Visitor Navigation (Map)" to enter the operation page.

7. Summary and Outlook

The joint development of the visitor management system and WeChat applet can make users more convenient in daily use, so that the system not only has sound and flexible functions, but also down-to-earth. "The Huaxia Visitor Access Management System" is simple and clear, the logic is clear, and easy to get started. It is more automated, intelligent and information-safe for the management of personnel inside and outside the school. At the same time, the data sharing on the network also implements paperless office, which not only greatly saves human, material and financial resources, but also contributes to the protection of the ecological environment.

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