

Weather Forecast System for Mobile Devices

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Abstract

In the 21st century, the Internet has developed rapidly, and its technology has reached an unprecedented level. In the 21st century, many personal computers appeared in daily life, and people began to be familiar with obtaining the required information through the Internet. Subsequently, as mobile development technology became increasingly popular and rapidly occupied the Internet market, the development of mobile terminals also made a breakthrough. At present, Android and iOS platforms dominate mobile platforms. Most applications are developed based on a single platform, and the development efficiency is not ideal. Therefore, cross platform technology has gradually entered the vision of developers, easing the problem of cross platform development. It provides opportunities to meet people's needs for real-time, accurate and diverse weather information. The development of such applications should focus on the design of interfaces and the realization of key functions.

Keywords: healthcare, mobile app, mobile application

1. Introduction

We are now in an era where technology is changing our lives. How to better meet the needs of users has always been an important topic of mobile platform development, and the eternal theme of weather has naturally become a center. After all, weather information plays an important role in people's daily travel, agriculture, industry and other important fields [1]. The project selected is based on the functions realized, taking weather as the theme and weather query as the purpose to find, mine and process appropriate data sources, and finally obtain data to provide real-time weather query [2].

2. Literature Review

In these papers, we have made a lot of analysis on the selection of the system arrangement framework. First of all, native development is a topic that cannot be bypassed across platforms. Native development comes first and then cross platforms. Native development refers to the development of applications in a specific operating system, mainly using the SDK provided by the

corresponding platform. For example, the Android platform uses Java or Kotlin to call the API (application programming interface) provided by the SDK to develop Android applications. Similarly, the iOS platform uses Swift or Objective-C to call the API to develop Apple applications. The developed finished applications can only be used on specific operating systems they can only be put on the market on specific platforms.

2.1. Cross Platform Development

Cross platform technology means that the software development process does not depend on a certain hardware environment or operating system, and it can be applied to different operating systems or platforms through one-time development without modification or minor modification [3].

At present, many high-level program languages can be cross platform, such as C++, Python and other development languages. Take Python for example, in Linux or Windows environments, you only need to configure the script provided by Python and then install

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it to compile and run the same Python file (but the libraries in the code may support different platforms). On the basis of language cross platform, developers will classify and deploy the resources of different platform systems to encapsulate them into a new cross platform library, providing an interface for more upper layer work, step by step from bottom to top, and finally achieving the realization of cross platform framework. Developers use cross platform frameworks to develop cross platform applications, and then compile them from top to bottom to generate executable applications on different platforms. This is a simple cross platform application generation process.

2.2. Vue+SpringBoot platform

Before development, we need to set up an environment, that is, Vue's environment and SpringBoot's environment. Vue environment setting: the development environment of Vue3 is selected. There is an image interface available in Vue3, which is convenient. Spring Boot development preparation: The IDEA development environment is used, so there is already a Spring Boot shortcut development method in the IDEA. The busy classes do not need to be deployed.

2.3. Status Management

State management is an eternal topic in responsive programming. The idea of discussing and solving state management problems in a framework that supports responsive programming is consistent [4]. This section mainly introduces vuex, which is specially designed for vue.js application development state management mode. It uses centralized storage to manage the state of all components of the application and uses corresponding rules to ensure that the state changes in a predictable way [4]. Vuex is also integrated into the official debugging tool devtools extension, which is also the state management mode used in this project.

2.4. Asynchronous Requests

The core operation of Spring Boot+Vue's front and rear end separation is to complete data synchronization through asynchronous requests, which can be divided into many different situations, such as GET requests or POST requests, whether the parameters are ordinary variables or JSON, and how to operate based on RESTful architecture. Asynchronous requests in Vue are completed using the axis component. Axis is an HTTP client based on Promise for browsers and nodejs, which can be used in browsers and node.js.

2.5. Database

The background data of this project is realized through Request and connection to MySQL. MySQL is mainly used as the database, which is a mainstream choice. It is excellent in terms of performance and volume. Of course, there are also some disadvantages. However, the database is not the focus of our discussion here, and it can be used temporarily. Most of the data of this project is obtained through Request request using the API provided by related websites. The data obtained through the Request API are all in the json string format. JavaScript provides the function of converting json to dictionary type. After converting json to dictionary type, we created a variety of model classes to facilitate the use of the required data, and extracted and used data in the model class format. The database used on the mobile platform is mainly SQLite, which is a lightweight database embedded in our mobile client. However, due to the functional requirements, a large amount of data should be stored in the remote database. SQLite is not suitable for remote connection, so MySQL was finally selected. Similarly, when reading the database data, we will eventually convert it to the Model class format for the supplier to use.

3. Results

Opening the software for the first time requires permission as shown in Fig.1. Entering the software page without location permission is shown in Fig.2, but you can still search for the specified city. There is an animation effect when loading, which enhances the smoothness of software use, as shown in Fig.3.



Fig.1. Authority application

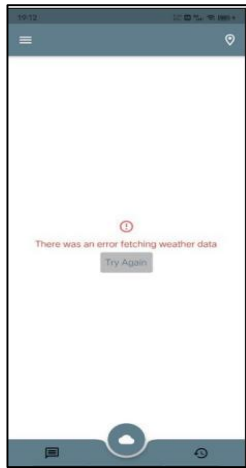


Fig.2. Permission failed

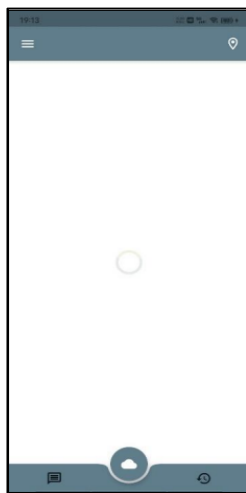


Fig.3. Loading page

After obtaining permission to use the location, enter the software, and the home page will display the city's name, weather conditions, real-time temperature, maximum and minimum temperatures of the day, hourly weather in the next 24 hours, body temperature and other indexes. As shown in Fig.4 Sliding the upper middle area can convert the module, so that the upper middle area can be converted into a weather line chart for the next 7 days. Similarly, sliding the 24-hour weather module can be viewed horizontally, as shown in Fig.5.

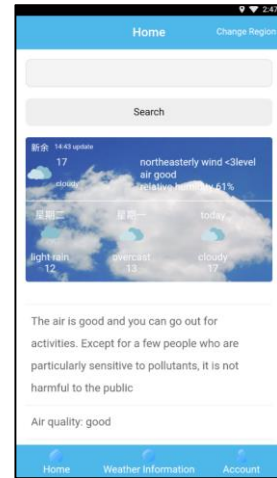


Fig.4. Main page 1

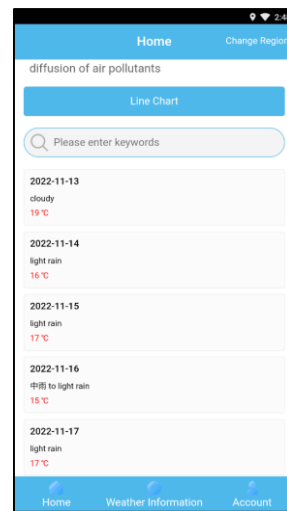


Fig.5. Main page 2

Click the button on the top right to open the city modification interface. This interface includes city modification and city positioning. The city modification will conduct a fuzzy search according to the entered city, and automatically select the city that best matches the search city name. The interface is shown in Fig.6, and the selection results are shown in Fig.7. The positioning effect has been tested when entering the software.



Fig.6. City change



Fig.8. City management



Fig.7. Result page

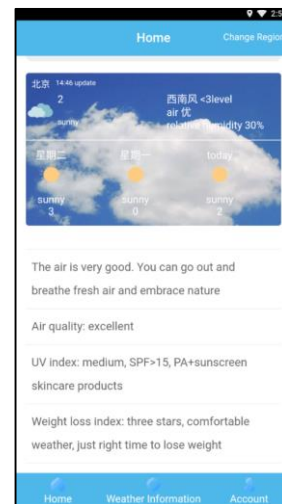


Fig.9. Result of picking up

Click the button on the top right to open the city management interface. This interface contains a list of visited cities. We can complete the city switch by clicking the specified city, or long press the specified city to remove the target city information. After visiting several cities, open the city management interface as shown in Fig.8. After selecting Beijing City, the interface will jump as shown in Fig.9. We can remove some cities that are no longer in common use according to the needs. After long pressing the three cities, the removal results are shown in Fig.10.



Fig.10. Result of removing

- Click the button at the bottom right of the software to jump to the historical weather page, which displays the historical weather information of the currently selected city in the form of line chart and table, as shown in Fig.11. Due to the limited size of the mobile terminal equipment, some areas are not enough for display. The software allows users to read the data completely through the sliding screen, as shown in Fig.12, or visually read the data in the horizontal axis direction through the horizontal screen.



Fig.11. History weather page 1



Fig.12. History weather page 2

4. Conclusion

Based on cross platform technology, this paper uses Vue+spring boot front and rear end separation framework to finally design a weather forecast application that can truly face the mobile intelligent platform. Through the introduction and comparison of various cross platform technologies, the advantages of Vue+spring boot framework are clearly pointed out. At present, the Vue+spring boot framework is still on the rise, and developers are actively trying to adapt to this front and back separation framework. Due to the limited technology, this article only gives a brief opinion on Vue+spring boot framework and makes a simple practice. In the development process, Vue+spring boot framework fully reflects its efficiency, whether it is convenient to write code or fast to debug programs. It is believed that as technology continues to flourish, developers will build a more excellent and huge ecological community. However, when we are exposed to new technologies, we need to spend twice as much time to learn. Developers who have experienced these technologies understand the extra burden of using new technologies [5].

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Authors Introduction

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She received her PhD from the School of Computer Sciences, Universiti Sains Malaysia in 2020. She is currently an Assistant Professor in UCSI University, Malaysia. Her research interest areas are Data Mining in Healthcare and Health Informatics.

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She is an Associate Professor at Institute of Computer Science and Digital Innovation, UCSI University. Her research interests include IT Innovation in solving real-life problem. She has received three research grants from UCSI University Malaysia as Principal Investigator for projects entitled 'Android-based Time Tracker for Shuttle Bus', 'iOS Time and Location Tracker for Shuttle Bus' and 'Mobile Car App for Travel Agency'. These projects are fully copyrighted by Intellectual Property Corporation of Malaysia (MyIPO). In 2021, Thong was awarded the "Product Innovation and Commercialization Award" by the university.