# Instrument Map

1. **Introduction to Instrument Map**

Instrument Map is based on big data, with mall maps as the main body, and is dedicated to solving the problem of finding favorite and emergency goods offline. As most customers who purchase musical instruments focus on product quality, they tend to go to offline physical stores to check the quality of their products and then make on-site purchases rather than online shopping. However, currently commonly used map software still does not have much implementation in terms of product visualization in the musical instrument industry. Therefore, Instrument Map is a software dedicated to solving the problem of finding desirable and emergency products offline, integrating product information, and visualizing stores. This software focuses on combining offline users with the physical musical instrument industry, mainly filling the needs of the general public for purchasing offline musical instrument products under specific circumstances.

1. **Characteristics of Instrument Map**
   1. Innovation:

(1) Innovation in store type and user audience: The main store type is not a gourmet or convenience store that is currently available on takeaway platforms, but rather a tool music store with a large number of offline users. The functions and methods are different from online delivery platforms such as Meituan and Taobao. Unlike online transactions, it provides users with the service of searching for goods from nearby stores, conducting offline trials and purchases.

(2) Integrate resources. Through online connectivity, products from various stores can be displayed in front of users. Make effective use of store resources, combine store and warehouse functions, and allow users to receive their desired goods faster. In shops with poor location, those limited musical instrument resources can also receive more traffic and have more opportunities to be sold.

* 1. Uniqueness:

Integrate offline product information of merchants, visualize their maps, and enable users to query enough reliable information online, including but not limited to: instrument store positioning, instrument prices, and their details. To save users' time, facilitate their offline trial and purchase, and promote the development of the real economy. Create software that can quickly search for products with corresponding needs based on the offline experience of products and the convenience of purchasing nearby.

* 1. Landing:

Mainly for online resource integration, offline material search is not difficult, and the content is also easy to understand. Overall, implementation is less difficult and close to daily life; High user acceptance can effectively address user needs. The number of development and management personnel is small, and the labor cost is low.

1. **Market Analysis**

3.1 Industry Status

3.1.1 Map industry

In the era of mobile internet, electronic maps can generate many previously unforeseen applications in the fields of e-commerce, positioning and navigation, social networking, entertainment, and so on. Electronic maps have developed rapidly in China and have penetrated into all aspects of people's lives. In the second quarter of 2020, the overall active user scale of the mobile phone map market was 893 million, with a year-on-year growth rate exceeding 10%, respectively 10.9% and 11.7%.

With the popularization of mobile internet and the improvement of people's living standards, traditional maps are gradually transforming to the Internet model; Mobile travel is favored by more people, and the scale of mobile map users will continue to grow. Currently, the functions of mobile phone maps used by users mainly focus on basic functions such as location query, route planning, and navigation. Baidu Maps and Gaode Maps can provide basic navigation and positioning functions, while both maps have also introduced features in terms of user experience, such as indoor maps and waterlogging maps of Gaode Maps; Baidu Maps features life services such as cycling navigation, panoramic maps, and violation inquiries. The map industry has complete functions and broad development prospects. (From Mai Shichang, Xie Xiaoyan. On the Future Development Direction of Mobile Phone Map Products - Based on Gaode Map and Baidu Map [J]. China New Communications, 2016,18 (24): 92-93.)

Since the first version of online map service was launched in the 1990s, with the vigorous development of the Internet, especially the mobile Internet, mobile map has gradually upgraded from a primitive interface and single function to a necessary tool and service software for billions of users to travel. Before the popularization of the Internet, companies in the traditional map field basically focused on B-end users and achieved high profits. Until the Internet transformed various traditional industries one by one, map products also changed from a combination of traditional software and hardware to Internet software services. (From Lin Anxuan. Research on the Development of Internet Map Business Models from the Perspective of Map Service Providers. 2019)

3.1.2 E-commerce platform industry

In recent years, e-commerce platforms such as Meituan and Hunger Mall have flourished, and their functions have also been continuously improved. They have now become the main online consumption platform for young people. The main characteristics are as follows: diversified and differentiated delivery products, focusing on safety and quality. After these years of development, in addition to food delivery services, the products within the APP platform have become increasingly diverse. A lot of content has been added to the original cuisine, including fruits, medicines, supermarkets, etc; At the same time, it is becoming more and more finely divided. In addition to delicious food, there are also varieties such as desserts, drinks, afternoon tea, and night snacks. (From Hu Jing, Xu Bin, He Shuangjiang. Research on the current situation and future development trend of Meituan takeout [J]. Marketing Circles, 2020 (05): 32-34.)

However, it is worth noting that the major businesses that have entered various map APPs are mainly distributed in the food and beauty, leisure and entertainment industries, and only those in these industries have updated detailed product information on the map. Merchants cooperating with e-commerce platforms are also mainly distributed in the daily consumption industry. Therefore, people can only find ordinary daily goods and their travel destinations on the map app, such as rich food scenery, business areas suitable for entertainment and leisure, and goods. In the current social development, people are very enthusiastic about this function. As long as you use the search engine on the map, you can find the goods or destinations you need, and then jump to other e-commerce platforms such as Meituan to purchase goods. However, for emergency goods or customers mainly coming from offline industries such as hardware stores, tool stores, furniture stores, pharmacies, and luxury brand stores, although merchants in these industries have also settled in various map APPs, their product information is not comprehensive, and there are issues such as long-term information updates that are not timely. Therefore, map users or product customers cannot find the products they need in a timely manner, which to some extent affects the user experience.

3.2 Market Prospect

Currently, more and more families are cultivating their children's artistic literacy from an early age, greatly increasing the demand for musical instruments. In order to purchase the desired musical instrument and ensure its sound quality and quality itself, it is usually necessary for consumers to purchase musical instruments offline in person. However, the vast majority of musical instrument stores do not complete the uploading and updating of product information, adding to the purchasing burden for consumers.

Therefore, the timely introduction or implementation of relevant policies and measures to strengthen information sharing for offline physical consumption stores is necessary. And it is also conducive to filling the gaps in such businesses on maps and e-commerce platforms. This project conducts APP development for this demand defect, and integrates product information and visualizes stores based on big data and mall maps.

3.3 Competitive Analysis

Instrument Map has unique research directions and fewer competitors. The research and development of the APP in this project mainly focuses on filling the needs of the general public for offline goods under specific circumstances. Currently, there is no research related to this aspect, and the competitiveness is relatively low.

Nowadays, the relevant apps or web pages available on the market are basically designed for a single instrumental music store. For example, there is a software on Apple's App Store - Haishang Qin Hang, which is a dedicated app for a Shanghai instrumental music store. At present, this type of software can only serve users around a single device, with a small service range. And the products in the app are not rich enough because the supply volume of a single store is too small.

And the software we make can perfectly solve these problems. We can contact more merchants to expand the scope of services and increase the variety of products. When our software reaches a certain level, it is hopeful to serve users nationwide and even globally.

Compared to traditional e-commerce, our products can provide users with a better purchasing experience and achieve integrated online and offline services. Users can visit various stores in the field and receive desired products faster.

Our research direction is unique, with fewer competitors. The research and development of the APP in this project mainly focus on filling the needs of the general public for offline goods under specific circumstances. Currently, there is no research related to this aspect, and the competitiveness is relatively low.

1. **Development process**

4.1 Stage

Due to human and material constraints, this software development mainly uses the waterfall development model. The development process is mainly divided into three stages. We adhere to the focus on user experience and strive to make software that satisfies users.

(1) The first stage is a user demand survey. At this stage, we will prepare relevant questionnaires and search for different groups of people to fill in. From the results obtained, we will clarify the specific needs of various types of users when purchasing musical instruments. This can make the goals and requirements of our development process clearer.

(2) Secondly, in the second stage, we will conduct real software development, which is divided into two parts. The first part is to build and model of the software conceptual model, and the second part is to convert the conceptual software into real software. The second part is divided into eight steps:

① Project analysis and determination of development, that is, discussing with the demanders to determine the goals and specific requirements of the demanders’ software development.

② Demand analysis, a detailed analysis of the software functions that customers need to achieve. Then consider possible changes in the development process, develop a requirements change plan, and respond to special situations at any time to ensure the smooth progress of the software development process.

③ Design, conduct overall design and detailed design.

④ Use unified and standardized procedures for programming, including unit, assembly, and system testing.

⑤ Software testing consists of three stages of testing: unit, assembly, and system testing.

⑥ Software delivery, actual operation and running test.

⑦ After achieving satisfactory results, the user performs acceptance.

⑧ Maintain and provide after-sales service.

(3) In the final third part, we will invite some students to use our software as users, and based on their experience and feedback, we will make final adjustments and improvements.

4.2 Method and technology

(1) Programming in the small

(2) Object Oriented Design

(3) Agile development

(4) After the software is initially formed, we will test the software to find bugs, such as using white box testing

(5) Debugging code using debugging tools such as JDK

4.3 Software

Use Android Studio as the main platform for development, use the commonly used functions of the Maps SDK for Android and the Google Maps Android API to build maps. At last, mainly the kotlin language is going to be used for programming.