Mobile Health Guidance System

Group numbers: 12

Group members:

赖华溢 20213802071

刘茵宜 20213801035

郑沛浜 20213803060

麦伯楠 20213802045

Introduction:

This app is a hospital intelligent navigation system created by Android, which can provide medical guidance to patients through graphic text.

Address: SCNU

Date of submission: Mar 30

一、 Details of the Group

Project manager：Peibang Zheng

As the internal communication link between the customer side and the company, the project manager will monitor the project process and be responsible for the progress and quality of the project. A product manager should be an expert in the software engineering field, but not necessarily in the business area. Basic product manager activities include developing plans, coordinating resources, monitoring and controlling plan schedules, and controlling customer expectations. Controlling customer expectations is particularly important in engineering projects.

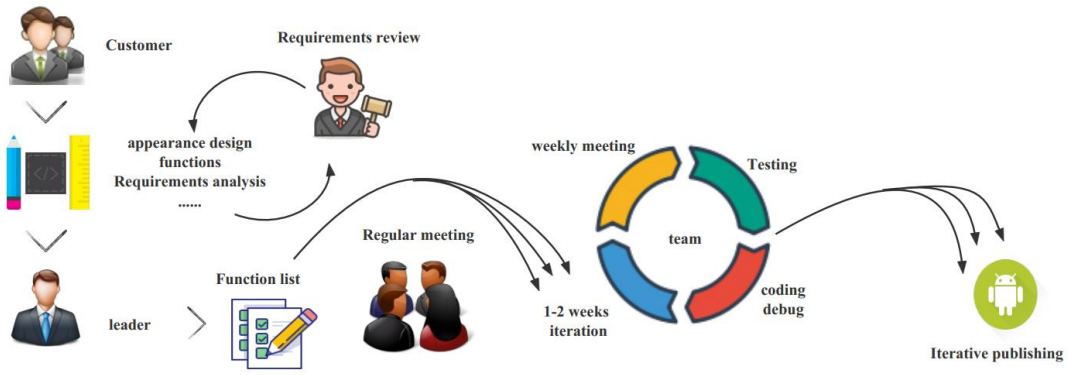
Senior manager：Huayi Lai

The specific time to participate in the project or product is not much, but it plays a crucial role in the success or failure of the project. Usually, the senior manager participates in the activities of each key link in the project process, pays attention to the progress of product development, and makes decisions on risk control and resource provision.

Developer：Yinyi Liu, Bonan Mai

Usually, developers are led by a team leader to conduct the development activities. The development team leader is composed of the better technical and operational members of the team. The team leader is usually also responsible for the detailed design and inspection of the team member code. Considering that the team leader requires detailed design, documentation, and communication with team members, a team leader's development task cannot exceed the average task volume of the developers.

Developers must have the basic technologies and skills required for product development, such as programming voice and database application development experience. If it is found that the developer does not fully possess these skills, the development managers and project managers should provide the necessary internal or external, training to equip the developer with these necessary skills.



This figure welly describes our procedure of working. In our work, Peibang Zheng and Huayi Lai are the main leaders who control the whole situation and schedule while Linyi Liu and Bonan Mai are the main operators. Specifically, Linyi Liu response supported ideas about UI and others. Bonan Mai is in charge of coding.

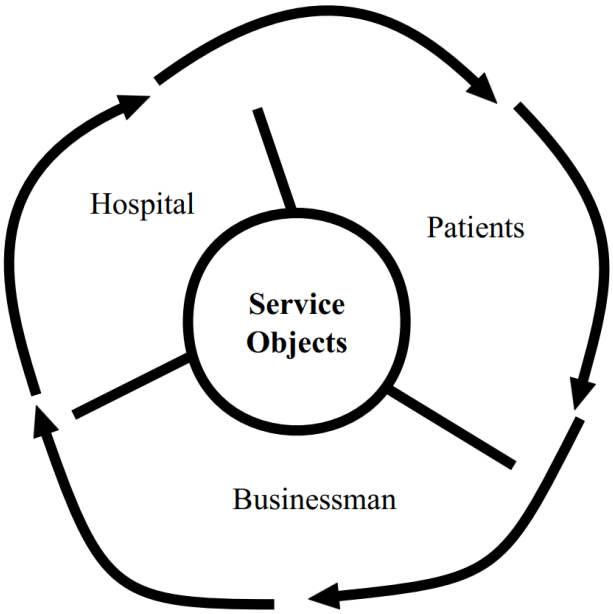
二、 The Business

2.1 Description of the Business

In this part, the description of the business will be talk.

When illness strikes and people are away from home, it can be an overwhelming and isolating experience. People cannot find assistance immediately especially just arriving in a new city. People would seek help from their relatives or friends when they encounter difficulties. However, how they can do when they cannot seek assistance from their acquaintance?

This paper will talk about the business in three parts: for the patient, the businessmen that earn money from helping the patient, and some information given from the hospital.



For many patients, finding the right healthcare provider and understanding the healthcare system can be a daunting task. This is especially true when they are in a new city and are not familiar with the area or the local healthcare providers. The stress of being sick can be compounded by the stress of not knowing where to turn for help.

We believe that many people have encountered this plight before. It is really a painful process, especially for a freshman who first left home and went to a new city to study. Additionally, it would be more challenging if this student comes from another country. He needs to overcome the difficulty of language under his bad physical condition.

For businessmen that earn money from helping patients, it is a good way to assist patients while earning money. They support help collecting information for you, sorting your identity information, and lining for you to pay and take medicine. They can give a hand to the patient when they need help. Most of the information in this hospital is recognized

by them so they are good at logically arranging everything for the patient.

Whereas there are some shortcomings in asking for help from these people. First and foremost, we cannot always find this assistance every time. The resource is limited and uncertain. Some first-tier cities like Shenzhen or Guangzhou may have some business while other cities may completely not have an opportunity for this occupation. What's more, the payment for hiring these people may be high because they are earning in the process by using their knowledge about this hospital and their time and energy.

For the information hospital give to help patients, it is useful and convenient for patients to acknowledge some relevant announcements. This information must be true and helpful because it is released by officials. Workers who are responsible for this official account in this hospital would regularly check the news and post the newest information to the public.

However, many people who go to this hospital for the first time do not know how to access this key material when they do not know anything about this strange city. They need someone who knows how to get this information to tell them.

Fortunately, many big hospitals have 24-hour on-duty staff. They always can tell patients what they need and guide them on how to do it. Indeed, people truly can ask for help in the inquiry station, but this station only exists in the internal of the hospital, which means patients need to arrive there to get information. In this way, some procedure like registration previously is hard to do.

In other aspects, according to Chen Yingxia [1], lacking human resource, needing to improve the whole quality of medical guide service personnel, and needing specific working standard is the main problems in the hospital. It means the hospital guide work needs to be highly improved

in the future.

There has business.

After considering these problems, we decide to manufacture an application to solve this problem. We imagine that we can produce a simple app to improve conditions for patients and hospitals. This hospital can reduce the work of hospital guide staff and give convenience to patients by giving patients information about what they need.

People can seek help in our app by just clicking some button or searching for content that they need. After clicking the relevant content, guidance that has a to-do list, some specific pictures, and some illustrated explanations will occur on the screen. This content is uploaded by the hospital staff and users can give get guidance and give feedback after seeing the guidance. Next, the hospital can modify this content on the basis of the user's feedback.

We believe that everyone should have access to quality healthcare, regardless of where they are in the world. Our app is designed to make seeking medical care in a new city as easy and stress-free as possible.

Our app provides users with a comprehensive guide to the local healthcare system, including information on the nearest hospitals and clinics, their specialties, and their hours of operation. Additionally, our app includes a list of required documents and items to bring with you when seeking medical care.

In summary, our app is the perfect solution for students and working individuals who find themselves in a new city without a support system. With our comprehensive guide to the local healthcare system, users can navigate the daunting experience of seeking medical care with confidence and ease.

2.2 Industry Analysis

In the industry analysis, we first use porter’s competitive forces model to analysis.

Porter's Five Forces analysis is a framework for analyzing the competitive forces that shape an industry, market or sector. Here's how it applies to your app:

1. Threat of new entrants.

The threat of new entrants to the hospital navigation app market is relatively low, as the barriers to entry are quite high. Developing a robust and reliable app requires a significant investment of time, money, and expertise. Additionally, there are likely to be several established players in the market that have already gained a foothold. In China, some medical guide system like the system of Seventh Affiliated Hospital, Sun Yat-sen University do a great job in these aspects. In other country, Media Map is a good way to guide people how to ask doctors.

2. Bargaining power of suppliers.

In the case of your hospital navigation app, the suppliers would be the hospitals themselves. The bargaining power of suppliers is relatively high, as they are the ones who control the data and information that our app relies on. We will need to establish strong partnerships with hospitals to gain access to their data and ensure that they are willing to collaborate with your app.

3. Bargaining power of buyers.

The bargaining power of buyers, in this case, would be the patients and visitors who use your app. This power is relatively low, as they have limited choices in terms of hospital navigation apps. However, you will need to ensure that your app meets their needs and provides a superior user experience, or they may switch to a competitor.

4. Threat of substitutes.

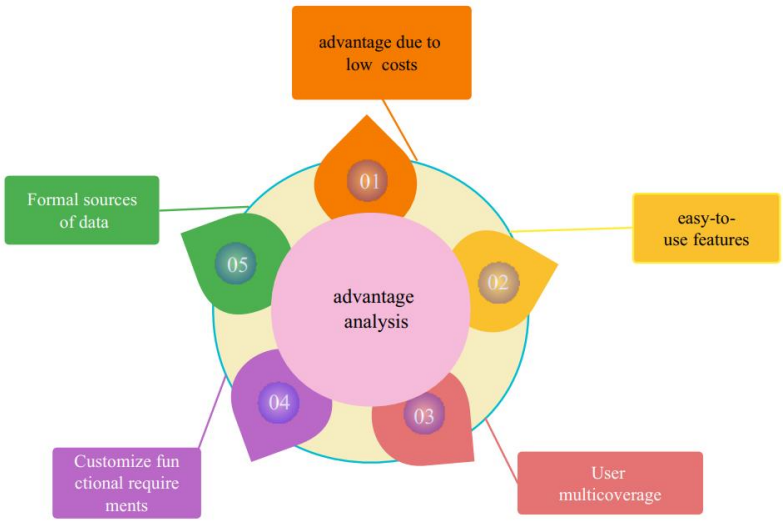
The threat of substitutes for our hospital navigation app is relatively low, as there are few other options available to patients and visitors. However, there are other ways to navigate hospitals, such as asking for directions or consulting paper maps, so we will need to ensure that your app offers a clear advantage over these traditional methods.

5. Competitive rivalry.

The competitive rivalry in the hospital navigation app market is likely to be moderate to high, as there are likely to be several established players in the market. We will need to differentiate your app from competitors by offering unique features or a superior user experience.

Overall, the hospital navigation app market is relatively challenging, but there is room for a well-designed and well-executed app to succeed.

Our analysis is completed, it is time to implement a strategy to expand our competitive advantages. To that end, Porter identified three generic strategies that can be implemented in any industry (and by companies of any size.)



1. Cost leadership

Some hospitals have indeed developed and manufactured a well-done system to support their service whereas it needs lots of capital and human

resource and only a few hospitals can do that. According to Rang Fei Peng [2], the design of a 3D panoramic medical virtual tour system can be realized now. It doesn't have to be stated, it needs a lot of investment and technical support.

What we can do to compete with them is that manufacture a simple application but cover some hospitals in a region rather like a university town than just a big hospital. Brilliant systems developed by large hospitals need a lot of money and technical personnel to maintain. In this way, they cannot easily share this system with other hospitals.

2. Differentiation

To distinguish our application with other product, we plan to crate the following features to realize it.

- Ease of use: Our apps focus on providing a simple, intuitive, and easy-to-use user interface and navigation features. Improve user experience and satisfaction by reducing the difficulty and time it takes for users to use your app.
- Comprehensive coverage: Our app provides extensive hospital coverage, covering hospitals and medical facilities in different regions, including private and public hospitals. In this way, users can easily access different hospitals using the same app.
- Customized functions: Our applications can provide customized functions to meet the needs of different users. For example, our apps offer personalized path planning and navigation to meet the needs of people with disabilities and seniors. Apps can also provide special features such as online appointments, medical advice, and medical feedback to increase user loyalty and satisfaction.
- Reliable data sources: Our applications can provide reliable data

and information to increase user trust and reliability. Our team works with hospitals to obtain real-time data on hospitals and medical facilities to ensure users have the most accurate navigation information.

- Support for multiple languages: To attract more users and expand your app's audience, our app supports multiple languages. This will help attract users from different ethnic and cultural backgrounds, such as international tourists and international students.
- Provide community interactions: Community interactions allow users to communicate with each other and share hospital experiences and medical advice. This will help build user communities and increase user engagement.

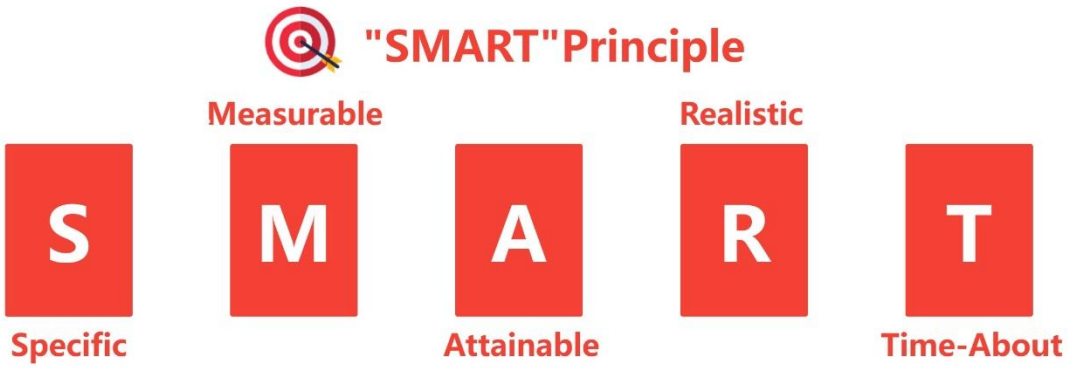
Overall evaluation: Through these different characteristics, our application can achieve differentiation and stand out in the hospital guide application market, attract more users and improve user satisfaction.

3. Focus

Region: Nan Hai District, Foshan City, Guangdong Province.

Target users: Students in this region, especially for universities students.

2.3 Business Objective



In this part, we use SMART model to analyze our objective.

The SMART model is a tool for setting goals and is often considered an effective way to clarify goals and make them measurable, achievable, relevant, and time bound. The Smart principal divides goals into five dimensions: specific, measurable, attainable, relevant, and time-based.

i. Specific Goals:

After analyzing the phenomenon of patients getting lost in hospitals, we decided to develop a simple navigation system for hospitals using Android Studio. In our system, patients can get guidance from near hospitals just clicking the button.

ii. Measurable Goals:

Our ultimate goal is to create a lightweight and user-friendly navigation system that provides route guidance to users within 2 seconds of their request. We will measure the performance of the system using metrics such as response time, accuracy, and user satisfaction.

iii. Attainable Goals:

Our project is based on Android Studio and Kotlin programming, and we have access to abundant learning resources both in school and online platforms like Bili Bili and GitHub. We aim to keep the project simple and

lightweight, which will reduce the amount of code required and make the development process more manageable.

iv. Relevant Goals:

Every small goal we set during the development process contributes to achieving our ultimate goal of creating a user-friendly navigation system. Each phase builds upon the previous one, creating a coherent and integrated development process.

v. Time-Based Goals:

We have set clear deadlines for each phase of the project, in addition, each small goal has a fixed timeline. We aim to complete the development process within a set timeframe and deliver a functional and user-friendly navigation system to our clients.

三、 Business Operation

3.1 Marketing Mix

1. Product/Service:

Our software provides patient-oriented hospital visit guidance services. It uses location recognition through pictures to plan a reasonable and efficient route according to the starting point and destination input by the patient, so that the patient can reach the consultation room faster.

2. Price:

Our product is in line with the service principle of "convenience for the people", and it only charges the hospital for the the software usage and the inventing of the software, so that it can be promoted in a comprehensive and multi-directional way with a low fee model. Due to the base number of hospitals, the social value of the software and the convenience significance, the economic benefits of the product could be substantial.

3. Place:

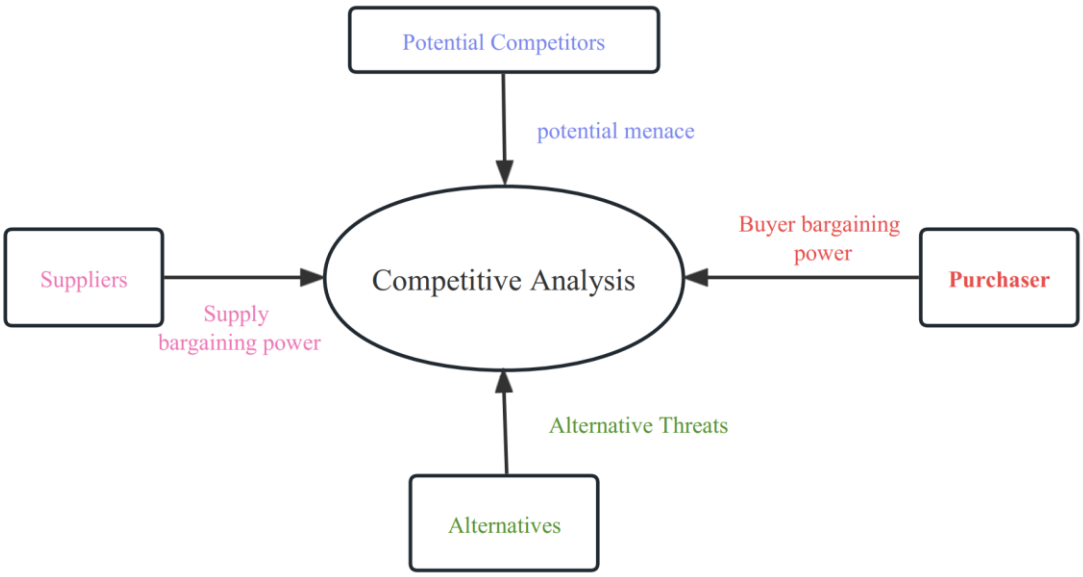
The application of this product is mostly in places with large demand such as medical institutions. Because the patients in the hospital come from all over the world, it is difficult for non-local patients to find their own consulting room in an unfamiliar environment.

4. Promotion:

Of course, we still have a lot of room for improvement in this product. For example, whether the image recognition completely requires the display of the whole consulting room, whether the requirements for obstacles are too rigorous (whether the location of the picture cannot be identified due to the occlusion of several characters), for the hospital is very dense, it is almost impossible to take a picture without obstacles.

3.2 Competitive Analysis

In this part of competitive analysis, we plan to use Porter's five-force model for analysis. Porter's five-force analysis model is an analytical model for competitive strategy proposed by Michael Porter in the 1980s. In the modified model, Porter proposed that the competition in an industry is not only carried out among the original competitors, but there are five basic competitive forces, and the comprehensive strength of the five basic competitive forces determines the industry competition. Intensity, which determines the ultimate profit potential in the industry and the degree of capital flow to the industry. The five competitive forces determine the profitability of the industry and point out that the core of the corporate strategy should be in the right industry and the most attractive competitive position in the industry. The changes in different combinations of the five forces will ultimately affect the changes in the industry's profit potential.

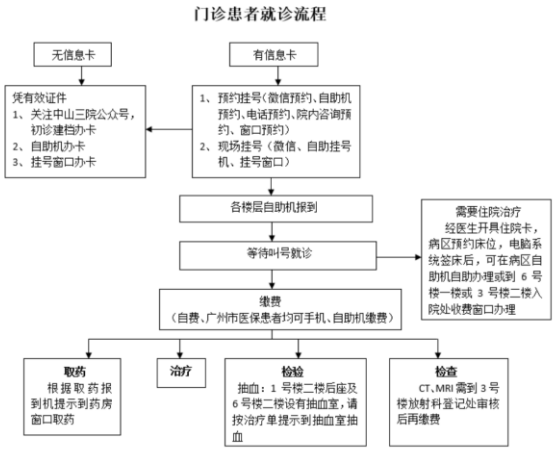


succedaneum analysis（替代品分析）

Through a series of market investigation, as well as a number of hospitals' official websites, WeChat mini programs and other information release platforms is common to be used in medical program. The main possible succedaneum of our project is **small programs** in hospitals.

Although many hospitals have provided route guidance for patients through WeChat mini programs, hospital transportation guidance for patients through mini programs and so on, this is in spite of this. Guidelines for how patients are treated in hospitals are still missing.

Here are the screenshots of the WeChat mini program service platform and the official website of the two most authoritative and top Grade A hospitals in Guangzhou. It can be seen that none of these hospitals provide guidance to patients in a direct and clear way.



The above pictures shows the patient treatment process provided by the official websites of the two hospitals

It is not difficult to see that although the hospital is still committed to providing corresponding outpatient medical guidance for patients, due to the management problems of the hospital, it is unable to provide detailed medical treatment process guidance for different patients

Rivalry （同业竞争者分析）

In most hospitals, it is essential to have manual guidance. Usually these employed nurses will sit in a conspicuous position to guide patients to register and wait for checkups. For emergency, critically ill, elderly, frail and unaccompanied patients, they are quickly taken to the relevant departments with a flat cart (wheelchair) or assisted, while accompanying the patient throughout the consultation and helping him/her to pay for the card and take medication. For patients in acute danger carried on a stretcher, they should be immediately assisted to the resuscitation room for treatment. And guide patients to find the correct consultation room in accordance with the correct map signs, in addition, most hospital guides will have more tedious work, for example, responsible for the patient in and out of the welcome, show guide style, always keep the role state, so that patients unconsciously sense the cultural characteristics of the hospital. Or also

responsible for the patient in and out of the welcome, show guide style, always keep the role state, so that patients unconsciously sense the cultural characteristics of the hospital.

But with the development of the Internet, artificial intelligence and embedded robots have been able to gradually replace this position, the manual guide is gradually reduced, the future will no longer have a manual guide, similar - work will be replaced by artificial intelligence robot.

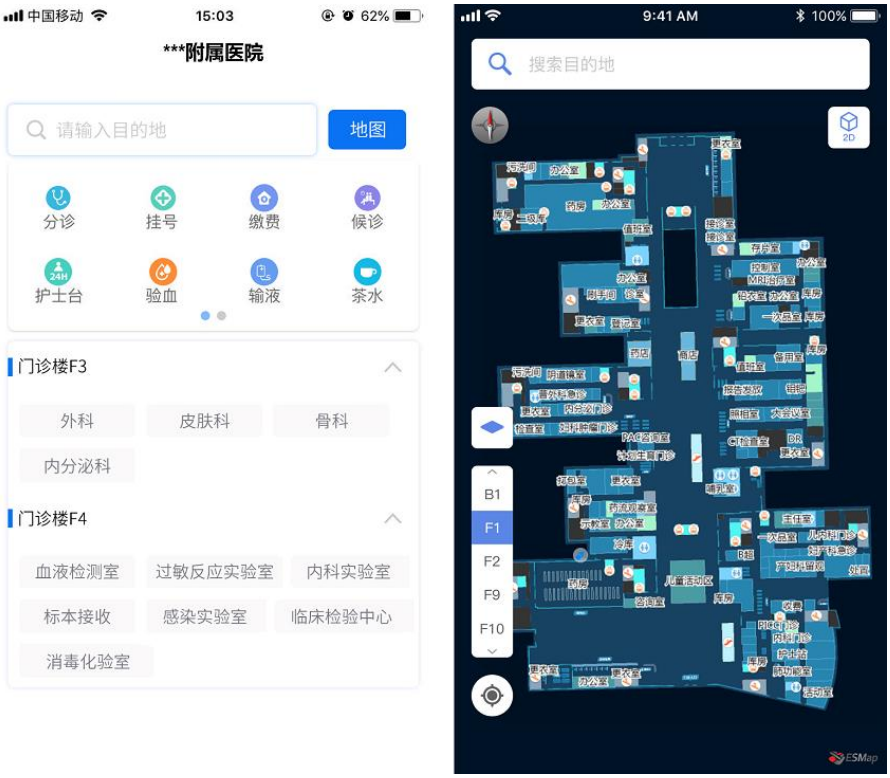
Thread of new entrants(新进入者威胁分析）

Those net entrants are mainly the smart hospital navigation systems developed by various Internet companies. Most of these navigation systems have the same functions, and these functions are as follows.

1. Visualized Hospital

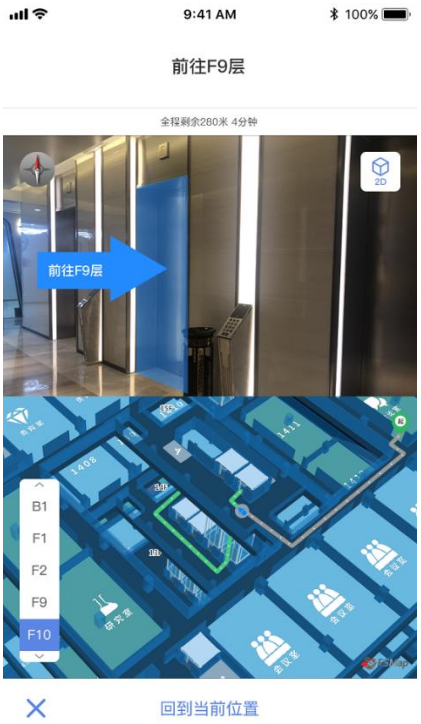
The system is based on the Easy View 3D map engine to realize the visualization of indoor and outdoor scenes of the hospital 3D map construction, the map has the characteristics of light weight, high accuracy, support cross-platform use, etc., while supporting three model loading, scaling, rotation, click and other operational events, in line with the user's operating habits. Through the 3D map, users can quickly understand the hospital layout and the location distribution of related departments. According to the on-site personnel flow data, the map supports real-time visualization of hospital flow density, which facilitates users to seek

medical consultation and improve efficiency.



2. Real-time navigation

Based on the positioning equipment deployed at the site, EJING Smart Hospital System's high-precision indoor and outdoor integrated hospital positioning and navigation services support users' path planning and real-time hospital navigation based on any hospital destination. Combined with the user's hospital visit information, it can provide users with automatic guidance services in the process of queuing for registration, examination, payment and medication collection, so as to say goodbye to the trouble of getting lost and asking for directions in the complex hospital environment.



3. Self-service medical consultation

On the basis of providing users with hospital visualization services and real-time positioning and navigation services, the system supports the rapid access and connection of hospital data to realize various services such as online appointment registration, intelligent consultation guide and laboratory result inquiry, providing users with fast, intelligent and humanized medical services. It improves patient satisfaction, eases doctor-patient relationship and enhances hospital image.

As a whole, in this business environment, competition among companies is very intense, and the interests of most companies in the industry are closely linked to each other, and the goal of each company's competitive strategy, which is part of the overall corporate strategy, is to make their own companies gain an advantage over their competitors, so that conflicts and confrontations are bound to arise in the implementation, and these conflicts and confrontations constitute These conflicts and confrontations constitute the competition among existing enterprises. The competition between existing companies is often expressed in terms of price, advertising, product introduction, after-sales service, etc. The intensity of competition is related to many factors. In order to build on our strengths and avoid our weaknesses, our APP will not have various complex and comprehensive functions similar to those companies. We hope to help the elderly and children who lack experience in using smartphones to complete the process of seeing a doctor in the hospital through a simple and clean interface, to improve the APP's reputation by favoring the disadvantaged groups, and then to develop more functions without forgetting the original intention.

Bargaining power of suppliers(供应商的议价能力分析)

At present, the competitive strategies of all hospitals can be divided into two kinds. One is "membership drainage", which is mainly used in maternity and child health centers, private dental clinics and other hospitals with high average consumption level. By opening membership cards and other ways, the hospitals provide discounts for users, so as to attract users. The other is the "word-of-mouth drainage", which is usually applied to the top three first-class hospitals around the country. These hospitals tend to have a very high daily flow of people, but also bear most of the local medical pressure. The consumer group of this hospital is widely distributed, no matter the individual economic status is poor or rich.

As a patient service platform, our cooperation target is the hospital with "word-of-mouth drainage". Considering that high-consumption medical service institutions such as private clinics can provide customers with good service experience through a large number of human resources recruitment, this situation is not feasible for most third-class first-class hospitals, and third-class first-class hospitals are always lacking in human resources management. This means that the existing problems cannot be solved by increasing the expenditure on human resource management while ensuring the quality of medical services does not decline. Therefore, a hospital navigation guide APP can provide guidance for patients who have less access to medical resources, such as the elderly, left-behind children, and so on, so as to help patients better seek medical treatment.

After the launch of our APP, the hospital may make the following strategies: 1. If the launch of the APP can help the hospital to provide staff

guidance and relieve the pressure of staff guidance, the hospital should consider upgrading the APP in the future to add more functions, such as floor location intelligent navigation, AR virtual reality positioning and so on. To further provide better user experience for patients.

The hospital guidance function APP developed based on Android has multiple advantages, which reduces the quality of unit value and affects the profitability and product competitiveness of competitors.

1. Apps developed based on Android have a high degree of adaptability to the population. In 2021, 89.6% of Chinese Internet users' smartphone operating systems use Android. Most of the elderly and children in China also use Android phones. In venues that cover people of all ages

2. The Android APP developed by us abandons the strategy of using complex algorithms for virtual reality technology guidance while providing easy and convenient service functions, and then reduces the average profit of the product through low-cost and high-efficiency methods, thereby increasing the APP's profit and product competitiveness

Bargaining power of shoppers(买家的议价能力分析)

In a large hospital, most of the hospital funds will be used for medical drugs, purchase of medical equipment, salary payment of medical staff, etc. For a hospital, it is necessary to spend a lot of money to build a service centered on the Internet for the hospital. The system is very difficult, and Internet applications can only be used as an auxiliary tool for traditional medical structures to improve the operational efficiency of hospitals. The medical guide Android APP developed by us has many advantages in this respect.

1. The research and development cost are low, and the product can be sold to more hospitals through the method of small profits but quick

turnover, and the reputation of the product can be improved within the scope of ensuring reasonable pricing

2. It is easier for hospitals to realize backward integration and propose more personalized hospital customization functions for APP research and development. In the future, hospitals can jointly acquire our company, and further optimize the functions of APP to make APP More popular and universal.

Risks and challenges

Due to the shortage and shortage of medical resources, the combination of Internet technology and medical system is an efficient solution to alleviate medical problems. Therefore, more and more medical guidance apps will appear in the market in the future. Faced with the above situation, we will combine the needs of patients in different hospitals to launch more user interaction functions. Provide more and more convenient guidance functions for users.

3.3 Technological Foundations

In the development process of this APP, we need to master the following technical foundation.

1. Mobile application design

Android APP needs to run on mobile devices, so it needs to be familiar with the basics of mobile application design. We need to master programming languages such as Java or Kotlin and be familiar with using Android Studio for application development. Understanding the characteristics of mobile devices and the differences between devices of different sizes and OS versions is also a must.

2. User interface design

The user interface is an important part of the application that interacts

with the user. When designing the user interface, we need to consider different user needs and usage situations. A hospital tour application needs to provide a clear, concise, and easy-to-navigate interface. You need to be familiar with writing user interfaces using XML and have basic design skills in terms of layout, colors, fonts and graphics.

3. Database design

The hospital tour application needs to store data such as hospital information, map data, and individual patient account inquiries. We need to be familiar with using the MySQL database system for data storage and management and designing the database structure to support the functions of the application.

4. Security and privacy protection

The hospital tour application needs to ensure the security and privacy of user information and data. We need to master the basics of security and privacy protection in application development, including using HTTPS protocol for communication, encrypting sensitive data, using user permission control, etc.

5. Testing and debugging

Testing and debugging is an essential part of the application development process. We need to master the debugging tools provided by Android Studio to debug the application and understand the basic methods of unit testing and integration testing using JUnit and other testing frameworks.

四、 Reference List

[1] Chen Ying Xia. (2008). Reflections on the current situation and development of hospital guidance services. Hebei Medical Science (03),348-350.

[2] Rang Fei Peng, Nie Qing, Zhu Zhi Ming & Man Wang. (2021). Design of three-dimensional panoramic hospital virtual tour system. Journal of Xiamen Institute of Technology (03),43-48. doi: 10.19697/j.cnki.1673-4432.202103007.