"One-Ticket-For-All" commuting system based on mobile devices

ONE TICEKT for all

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1. Project Background

With current economic development, the diversification of travel means and the pursuit of time efficiency have caused serious traffic congestion and environmental pollution. In order to promote green travel and cultivate the concept of environmental protection, various localities have promulgated policies such as "transit priority", and strictly reduced the number of private car trips to effectively increase the proportion of public transportation in travel mode. On the other hand, how to reduce the time wasted on waiting and transfering in our fast-paced era has become the primary issue for improving travel comfort and work efficiency.

To reduce travel inefficiency and environmental pollution effectively, our focus can be shifted to combining big data with software development technology to integrate transportation resources, fully understanding and sharing the resources that the entire city can provide, and using technology to comprehensively match the time cost, money cost and environmental impact of passengers' travel. Consequently, we can develop seamless, safe, comfortable and convenient travel services for travelers. In addition, increasing the proportion of public transportation in the travel plan can achieve the goal of environmental protection and green travel.

2. Main Goals

- To comprehensively apply Object–Oriented, combine the content learned in *the system analysis and design* course with the aim of making reasonable plans for the system;

- To realize the "one-ticket" travel system through the construction of the mobile terminal framework in order to provide convenient residents services;

- To delimit the system and clarify every physical object during the design process;

- To reach unification with the transportation companies so that a profit distribution relationship can be determined.

# 3. Main Functions and Characteristics

3.1 Functions Overviews

- The system can integrate data from various sources, as well as using appropriate models and methods to arrange, store, analyze and design the data;

- The system can highly integrate various transportation methods and payment platforms through the comprehensive integration and sharing of data;

- The system can achieve the minimization for five aspects:

  - travel preparation

  - response time consumption

  - system response time consumption

  - transportaion switching time consumption

  - enviromental pollution

- The system can provide the government with big data for traveling, so as to make corresponding adjustment in traffic design;

- The system can enable users to get high-quality services in the shortest time and simplify payment methods;

- The system also supports a variety of terminals, which makes it convenient for users to use this system for route planning and one-click payment on various terminals.

3.2 Characteristics Overviews

- This system adopts OO thinking (short for object-oriented thinking), including

  - Object-oriented Analysis

  - Object-oriented Design

  - Object-oriented Programming

- Based on users' experience, we carries out the design of the system by simplifying the payment method and planning the route reasonably;

- The system is analyzed and processed with the help of UML and improved based on consideration of the user layer.

4. Expected Users and Key Usability Goals
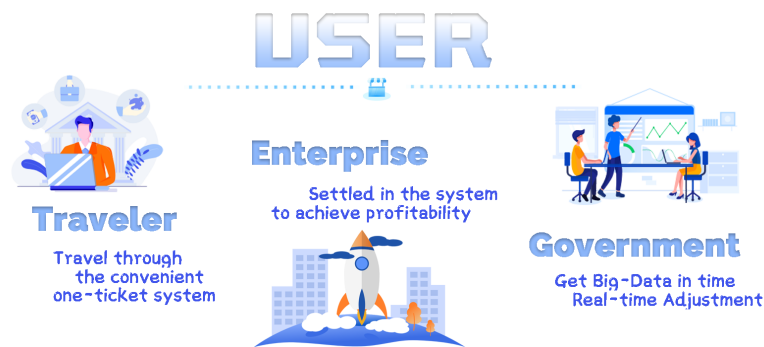
- Traveler: travel around with only one ticket without purchasing multiple tickets.

- Transportation platform: put its transportation service into the one-ticket travel system and gain profit by adjusting ticket price.

- Government: obtain big data of travel information so as to make corresponding adjustments to various travel fares in a timely manner and reduce the emission of pollution under the treatment of the system.

5. Analysis of Existing Similar Products

Nowadays, there are well-equipped transportation network and relatively complete mobile travel systems to support user travel, which are represented by the information query and ticketing service systems for city's single public transportation mode(for example, Metro Metropolis, an internet service platform with Shanghai Metro as its service interface), as well as nationwide real-time travel information query systems covering all kinds of transportation information based on digital maps(such as GAODE A-map and Baidu A-map). To be sure, China's existing travel system has made epoch-making progress in commuting information and digital transportation. However, the existing travel systems still have difficuties in data sharing between multiple transportaion service platforms. Meanwhile, the users' travel route may include transfering between multiple modes of transportation and ticket fees payment for different platforms. As a result, users still need to pay seperativly for different transportaion service during their commuting, causing troublesome inconveniences.

6. Novelty and Enhancements

As our project theme has proposed, the "one-ticket" travel system allows users to settle public travel services from the start to the end with only one payment, which will improve the situation where multiple payments are made to multiple public platforms during travel and make public travel more portable.

In addition, the system also relies on satellite information to obtain the traffic conditions of each road section in a timely manner so as to plan a reasonable route for the user.

7. Potential for Further Development

- This system breaks through the information isolation of travel destination data and realizes the integration of reservations, payment of fees, as well as the reduction of waiting time. Through collection and analysis of the destination data, it can further provide "travel + medical treatment", "travel + catering", "travel + entertainment" and other extended services;

- Through the gradual establishment of multi-modal access mechanisms, subsidy control policies, and active demand guidance strategies, it can also provide a better policy environment for the one-ticket travel system;

- The travel network planning can be optimized in combination with the user's personal preferences, regional traffic conditions and other factors;

- The government can use the large data of users' travel to make more reasonable planning for the transportation system.

8. Project Challenges

DIFFICULTY IN INFORMATION INTEGRATION

The high coordination of multiple travel modes is inseparable from the integration of information services between different travel modes. How to highly integrate various modes of transportation to provide the public with seamless, safe, convenient, comfortable and environmentally friendly full-chain travel services still needs to be carefully discussed;

BRIDGING MULTIPLE ENTITIES

Complicated interest relationships have been formed between the transportation operators of small, medium and large capacity. Therefore, how to balance the interests of each operator needs to be carefully considered;

INFORMATION SECURITY GUARANTEE

The process of realizing the integration of data and payment requires data processing of public and private data, data packaging and data disclosure. Therefore, in this process, it is necessary to pay attention to the protection of user information security and provide a safe and green payment environment;

MULTI-TERMINAL SUPPORT

Since this system needs to provide services and supports for travelers, government departments, and transportation platforms at the same time, it is necessary to consider how to implement multiple terminals to facilitate the use of different users.

9. Related Technologies

- Map navigation and route planning algorithms: consider travel modes and travel routes based on users' different travel needs (time and price) and current road conditions;

- Large-scale database system: save the user's travel mode, real-time road condition vehicles, travel proportions of various transportation modes, etc;

- Multi-terminal development: supports multi-platform data synchronization update through account login;

- UML modeling of travel system.

10. Project Experience

From this project, we can gain experiences as follows:

PROJECT MANAGEMENT PRACTICE

Investigate the concept of the project system before developing the software, analyze the current market demand for the system, study the advantages and unfinished functions of other software in the same period, quickly master knowledge and business in other fields, and integrate software development with reality;

TECHNOLOGY KNOWLEDGE ACQUIREMENT

Learn knowledge about UML to model system software and standardize software development process standards;

TEAMWORK EXPERIENCE

Exercise team development skills, improve communication skills in docking work, and cultivate the ability of description and expression;

Survey   Learn   Cooperate

References

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