Development and Implementation of Java Game Engine Based on Network Information Technology

Xiaorui Yue1,*

1Hubei Urban Constuction Vocational and Technological College, Hubei, China, 430205

*Corresponding author e-mail: yuexiaorui@hbucvc.edu.cn

Abstract. With the development of computer technology and network technology, various digital learning methods have seriously impacted the traditional education and teaching mode, among which gameplay learning represented by teaching games has attracted wide attention of educators. It is considered to be the most effective way to stimulate learners' learning motivation. Mobile game is an important part of mobile phone value-added service. The research of mobile game engine has extremely important application value for the development of mobile phone game. This paper mainly studies how to realize a high-performance mobile game engine. Through the analysis of mobile phone operating system, mobile game market, mobile phone game user needs, the technology selection and main function modules of the engine are determined. Through the research of java technology, the technical architecture of engine server and client is determined. Performance and algorithm optimization are the focus of this paper, because performance issues are the biggest bottleneck in developing games on java phones.

Keywords: Java, Game Engine, Network, Model

1. Introduction

China Internet Network Information Center in January 2006 released the "17th China Internet Network Development Statistics Report ".

The report shows, as at 31 December 2005, China's total number of Internet users exceeded 1 billion, Of 110 million people. Among them, students account for 35.1% of the total number of Internet users. The report also shows, 32.2 per cent of users chose online games as a regular form of online service. This represents an increase of 16 percentage points over 2004. China's online gaming industry has reached 1 billion yuan in 2005. An increase of 51 per cent over 2004. Mobile games. It has developed rapidly in recent years. Mobile games, compared to other game products, the biggest feature is its portability, you can play almost anywhere. Second, current mainstream mobile games are casual games, easy to operate, low complexity, suitable people range from teenagers to people in their sixties. Mobile games have their own characteristics, it will promote its good development potential. java mobile hardware is growing fast, K from 64 to nearly 10 M. The speed of operation is also greatly accelerated [1]. With China Mobile GPRS and China Unicom network mature, China mobile
This year, Domestic TD.SCDMA are in full swing. The establishment of 3G network will make the development of mobile phone game industry —— an important part of mobile phone value-added service. The industry is expected to reach 14.3 billion yuan by 2010. Based on the above statistics, with the change of times and the rapid development of network technology, online games have become Internet users. Especially young students, one of the main purposes of online entertainment. Because computer games have human-computer dialogue, players can participate and act in person, nervous, intense, immersive feelings make the players love, I'm not tired of playing. Play computer games properly, can adjust the tension, eliminate fatigue, and relieve learning pressure.

2. Java language

Java is a portable "small C shake ", virtual machine mechanism, garbage collection and pointer-free feature originally designed by Sun for embedding programs, which enables it to quickly and easily write reliable programs that are not crashable and do not cause memory leaks.

Java mobile game is also commonly referred to as a MIDP (Mobile Information Device Profile) program. MIDP application, refers to applications developed following MIDP specifications. A complete MIDP application consists of two files: the application body and the application description file. The deployment of MIDP applications can be divided into OTA and non-OTA. OTA download the MIDP application to the device via a wireless communication network [2]. A lot of OTA methods, such as transmission lines, infrared, bluetooth, etc. Macroscopically. A java mobile game, frame-driven, in frames, the program has at least one main loop. Every loop is a frame, usually only at the end of the game, the main loop ends. Response to user buttons, mainly by two steps. First, the system thread receives the key message and modifies the identity, then in the main cycle for specific treatment. For the advantages of java, there are the following points : (1) the speed of execution is increasing. The new version of the program is running at a speed close to C and C++, even at some point beyond them. Meanwhile, as computer hardware improves, the speed of implementation will also be weakened. (2) Platform independence [3]. Platform independence means that java can run on different platforms. Java introduces virtual machine principles, java virtual machines are built on hardware and operating systems, and it is used to implement the interpretation execution function of java binary code. Rich java game development API.

3. Development model of modern manufacturing industry

Developing a mobile game requires multiple components, from game design, art, program development, testing, to quality assessment and project management. The program is divided into original development and transplant development. The mobile game engine studied in this paper refers to the core of the original design part of the program.

If the idea of game design is the appearance and appearance of a game, which determines the playability of the game, then the physical and rendering part of the game is the skeleton of a game, which determines the performance and stability of the game. Here, we divide the mobile game engine into two parts: physical engine and rendering engine. The relationship between them is: together constitute the main body of the mobile phone game engine, the former inside, the latter outside, the physical engine is responsible for the background calculation, the rendering engine according to the calculation results of the physical engine, the corresponding animation, pictures and text update to the screen. There are theoretical models, logical models, mathematical models and so on. The model is the simplification of the real world. In order to understand the reality, the model must pay attention to the key variables and ignore the unimportant information in order to obtain the abstraction and digitization of the real world [4]. The establishment of the model is actually to express the relationship between phenomena with words, logic, quantitative relations, so that people can use this to guide the individual.

The game model is a general structure and framework. The logically discusses the main components of the game system and the relationship between them. It has important guiding significance for the creation of games. Because of the different types of games, their model division is different, we take
the network-based RPG game as an example, its model is shown in figure 1:

![Figure 1. Web-based RPG general game model.](image)

3.1. Main functional modules and hardware development of the game model

The demand of graphics mobile phone online games is relatively high, and the current mobile phone products can not fully meet the requirements of mobile phone online games. However, the promotion and application of 3G and the development trend of mobile phone PC have paved the way for the development of mobile phone online games.

3G is an abbreviation for English 3rdGeneration, refers to the third generation mobile communication technology. Relative to first-generation analog phones (1G) and second-generation GSM、TDMA (2G), the third generation mobile phone is a new generation mobile communication system which combines wireless communication with multimedia communication such as Internet. The game script system includes game script design and explanation execution during game running. The design of the game script requires the first teaching design, And according to the teaching object, the teaching content, the teaching goal different design game script. RPG teaching games should have a storyline throughout, so that the whole teaching process can be coherent, and it is easier to attract learners to a continuous game learning process. Meanwhile, in the course of the game, we should divide the sub-task according to the teaching content, each child can correspond to a different subject. We can also correspond to different chapters of different subjects. Each child can be divided into smaller sub-tasks according to teaching needs, by completing a sub-task, to master the teaching content, complete the teaching goal. Its structure is shown in figure 2. 3G technology compared to the first two generations of wireless transmission technology, upgraded primarily in the speed of sound and data transmission. It's better able to achieve seamless roaming globally, and processing images,
Music, video streaming and other media forms [5]. 3G bring wireless broadband innovation to wireless Internet, capable of supporting transmission speeds of at least 2 megabits/per second), 384 kbps (kilobits/per second) and 144 kbps (kilobits/per second) in indoor, outdoor and driving environments, respectively, G two networks 9.6 kbps. There has been a great change. Mobile communication technology network transmission rate control data as shown in table 1.

![Figure 2. Game task structure.](image)

**Table 1.** Comparison of transmission rates of mobile communication technologies networks.

| Mobile communications technology | Technical standards | Transmission rate (KBps) |
|----------------------------------|---------------------|-------------------------|
| Unlimited broadband              | 3G                  | 2M                      |
| Unlimited narrow width           | G 2.75              | EDGE 384               |
|                                  | 2.5 G               | GPRS 115.2             |
|                                  | 2G                  | GSM 9.6                |

3.2. Java development platform

Java development platform aims at the research of game engine. The engine of the game can be compared to the racing engine. The engine is the heart of the car, which determines the performance and stability of the car. The speed and sense of control of the car are all based on the engine [6]. The same is true of the game, players experience the plot, level, art, music, operation and other content is directly controlled by the engine of the game, it plays the role of the midfield engine, all the elements in the game are tied together. In the background command of them at the same time, orderly work. A pre-auditor is attached to the development package of some platforms, and in addition to the work done by the inspector, there is an additional job —— lighten the burden of virtual machines on the target platform. SunMicrosystems company distinguishes four different java platforms according to the basic types supported, as well as the support procedures for
these core class libraries and extended class libraries, as shown in figure 3. In short, the engine is the main program used to control all game functions, from calculating the relative position of collisions, physical systems and objects, to receive input from players, and output sound at the correct volume, and so on.

![Diagram of Java platforms]

**Figure 3.** Division of Java platforms.

4. **Java networking technology and physical models**

In most computer simulations and computer games using physical models, some physical movements and forces need to be simulated, which are based on standard Newtonian physics. Because of the limitation of small memory space and low computing performance, the physical engine of mobile game usually uses a very similar method to deal with the motion of objects. The traditional way for Java platforms to handle operations is usually also blocking operations: When a method needs to handle related transactions, the method is immediately set to a waiting state java the virtual machine until the operation is complete. The current thread is suspended before the blocking call result returns. The function returns only after the result is obtained. First, introduce some basic physical motion program implementation; then, explain how to describe physical collision detection and collision reaction, as well as computational optimization in the game; then, complete implementation of a high-precision 2D billiards game physical engine part; finally, the overall implementation of the physical engine.

5. **Conclusion**

With the development of mobile phone hardware and external bandwidth, mobile phone graphics online games are a new type of mobile phone entertainment applications. More and more enterprises begin to dabble in this field. Enterprises that master the development engine technology of mobile online games will control costs more easily in the fierce market competition. Improving product quality to seize the market opportunity. The server side of the engine, by fully utilizing the NIO's non-blocking properties, through multithreading, solve the traditional mobile phone network game server side processing efficiency problem. The whole engine design includes the map system, the role system, the task system, the trading system and the social system necessary for the mobile network game, covers the basic needs of players. Java mobile game development is a new industry which started after 2000 years abroad. With the rapid upgrading of mobile hardware, and the development of mobile communication
networks. It plays a very important role in the field of mobile communication value-added services. At the 2006 China Mobile Communications Industry Summit Forum, points out including mobile games, will become the upcoming 3G era "the most potential" value-added business. The industry has been growing in China for a short time.

References
[1] CAO Dai. Research and Application of Intelligent Digital Puzzle Algorithm [D]. Wuxi: Jiangnan University,2017.
[2] Sun Wei. Teaching Reform and Practice of Java Programming Course [J]. Computer Age,2016(11):84-86.
[3] Dark horse programmer.Java basic entry [M]. 2nd edn. Beijing: Tsinghua University Press,2018.
[4] Zhang Wei. Design and Implementation of Web-based Students' Learning System after Class [D]. Hebei Normal University,2014.
[5] Jiao Hua, Xie Chaodong. From "Number of Daffodils" to Goldbach's Conjecture -- Root Search and Extension of Programming [J]. Modern Computers,2017(12):11-14.
[6] TANG Dashi.Java Program Design [M]. 2nd Ed. Beijing: Beijing Jiaotong University Press,2015.