The BlueGame Project: Ad-hoc Multilayer Mobile Game with Social Dimension

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ABSTRACT

The paper presents the BlueGame project – an ad-hoc multiplayer mobile game based on the Dungeons&Dragons board game. The main idea lies in the adoption of Bluetooth Piconet configuration and direct face to face contact of players in real environments.

Keywords

Ad-hoc network, wireless communication, social network

1. INTRODUCTION

At the beginning, mobile (cell) phones were a simple communication devices with limited computation and communication (by means of throughput) capabilities. As the time moved on, mobile phones have evolved in computationally "rich" devices with high color displays and a real operation systems, thereby having attracted *mobile game* developers.

The evolution of mobile games has been very similar to the evolution of computer games. At first, mobile games were simple single player games with limited graphics and artificial intelligence (AI) of opponents. With progress in HW, games became not only graphically rich applications, but also wide bandwidth multiplayer mobile games [1].

Even though many contemporary multiplayer mobile games support only two players (e.g. Panzer Tactics, Requiem of Hell, Rifts world, Pet Gen, One, Hammer and Sickle), there are many supporting from 4 (High Seize, Worms, High Seize, Operation Shadow, Ashen, Glimmerati), 6 (Pathway to Glory - Ikusa Islands) up to 16 (Pirates of Caribbian) players

The paper presents a pure ad-hoc mobile game with social aspects together with power consumption issues in Bluetooth communication.

CoNEXT'07, December 10-13, 2007, New York, NY, U.S.A.
CoNEXT '07 Columbia University New York, NY, USA

Figure 1: Examples of images for different genders and professions.

2. THE BLUEGAME PROJECT

The main motivation of *BlueGame* is to enable creation and management of player hero via a mobile phone. In addition, players should be able to challenge heroes of the other players while roaming through a city or on prepared meetings through their mobile phones.

BlueGame achieved this goal through three main layers:

- **Bluetooth layer**. This layer is entirely focused on establishing the connection and data transfer between two and more mobile devices via Bluetooth. The current version of *BlueGame* supports connection of up to 8 devices (piconet)[3].
- **GUI layer**. This layer provides a clear and simple interface for management of the player's hero. For optimization purposes, *BlueGame* uses 8 bit *png* graphics with resolution 200x200 pixels (Figure 1).
- **Game logic layer**.The game logic layer realizes a combat system based on the Dungeons&Dragons board game. The layer realizes computation of results of combats, improvements and maintenance of character attributes.

The implementation uses Java Micro Edition (J2ME)[4] with CLDC 1.1 [4] configuration and JSR-82 [4] additional package.

2.1 Playing BlueGame

The most important aspect of the game is the ability to challenge heroes of the others via the Bluetooth layer.

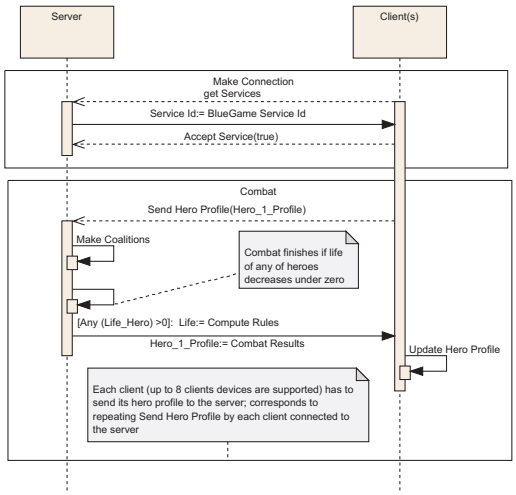

Figure 2: *BlueGame* combat system; the server offers BlueGame service to the clients. If the client found suitable service, it connects and sends its profile to the server and the combat begins. Having the combat results, the server sends to the client the final profile.

The combat system (shown in Figure 2) is realized on the server (players can choose between running the server or the client). At first, the client gets connected by searching and accepting the *BlueGame* service. Once connected, clients send their profiles to the server, where an algorithm computing strength and defense according to attributes runs in cycles until any of characters has life attributed negative. After the combat, the server sends the result of the combat to the clients. The clients gain attributes of experience and money for their heroes.

2.2 On Energy Consumption

One the most severe limitations of the current mobile devices (not just mobile phones, but also laptops, PDA, etc.) is their limited battery capacity. Therefore, we have done several experiments with energy consumption of Bluetooth as a function of data size and packet type. It has direct impact on the *BlueGame* project, while the packet type can be changed in the *BlueGame* on the fly, thus reducing the power consumption.

Figure 3 shows measurements of energy consumption in environments with and without obstacles (the obstacle was a 50 cm brick wall and the distance between communicating devices was 125 cm). This distance was limited by the fact that devices were unable to create connection for distances larger that 130 cm containing 50 cm of the brick wall. From the graphs it follows that for transmission of 10B data Data-Medium [2] rate packet type (DM) 1 is the most appropriate. DM 5 was the worst from the energy consumption point of view. With the increasing size of data advantages of DM 3 (50B), DM 5 (100B) respectively became more evident, thus recommended for *BlueGame*.

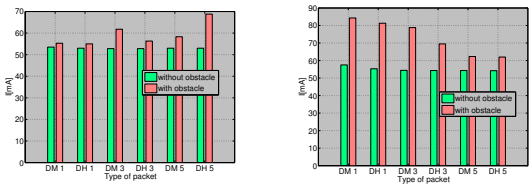

Figure 3: The graphs show dependencies between data types Data-High Rate (DH) and Data-Medium Rate (DM) and the size of packets. In the left figure data packets contain 10 byte and the right figure shows dependencies for 100 byte data. The figures show that change of data packet type can influence the power consumption of the mobile phones, thereby extending gaming time.

2.3 BlueGame Social Aspects

One of the most interesting features of the *BlueGame* is the social aspect. With limited Bluetooth communication range human players roaming through a city or gathering at an arranged meeting are in face to face contact. *BlueGame* improved the social aspect by implementing a system of attributes of heroes, where religion and belief enable creation of more powerful coalitions.

3. CONCLUSIONS

BlueGame is a multiplayer game with social dimension and novel game style – *BlueGame* is not short-term entertainment but rather a new type of long-term social game where players manage their heroes, combat or make coalitions with the other human players.

Our next intention will be at triggering a virtual *BlueGame* community in the academic field enhancing the social potential of the game. This will go side by side with improvements of the Bluetooth layer (Scatternet configuration) and enhancements in the game system.

4. ACKNOWLEDGMENTS

The work was supported by the project 1ET100300419 of the Program Information Society (of the Thematic Program II of the National Research Program of the Czech Republic) “Intelligent Models, Algorithms, Methods and Tools for the Semantic Web Realization”.

5. REFERENCES

[1] C. Baber and O. Westmancott. Social networks and mobile games: The use of bluetooth for a multiplayer card game. *Mobile Human-Computer Interaction MobileHCI 2004*, 3160/2004, 2004.

[2] Bluetooth.com. Bluetooth specification documents. *http://www.bluetooth.com/*, 2007.

[3] A. Flaxman, A. Frieze, and E. Upfal. Efficient communication in an ad-hoc network. *Elsevier*, 2004.

[4] Sun-Developer-Network. Sun-developer-network. *http://java.sun.com/*, 2007.