Proceedings of the 8th International Conference on Applied Informatics
Eger, Hungary, January 27–30, 2010. Vol. 1. pp. 405–412.

Open Source Mobile Games for Education

Norbert Bátfai

University of Debrecen, Department of Information Technology
e-mail: batfai.norbert@inf.unideb.hu

Abstract

The purpose of this paper is to present and analyse the further developments of Eurosmobil's open source Java ME mobile games (a fishing, a soccer and an esoteric game). We discuss the Socceral Force Applet 11 for Football(er) Simulation Markup Language. These are specific further development of the soccer game. These open source games in question are MIDP 2.0 / CLDC 1.0 and 1.1 applications that were created within the framework of business activities by a Hungarian mobile game developer company, called Eurosmobil. At the present time, in the framework of a project TAMOP granted by the Hungarian National Office for Research and Technology, we are working on a lecture notebook to ensure that education could use these open source games successfully. The opportunities for further developments are also detailed in that book.

Keywords: Mobile games, Java ME, mobile game-based learning, simulation of football, Football World Cup.

MSC: 94-04 Explicit machine computation and programs, 97R80 Recreational computing

1. Introduction

It is not a well known fact that Minix was a precursor of the open source movement [1], in the sense that it was the first software which was released in the form of source code [2]. Since then, the open source development model has become a paradigm. For example, Gartner said in its prediction [3] that the majority of the commercial software programs will contain open source parts in the near future. It is already a revolution in which either of us can participate. All we simply have to do is release our work under an appropriate open license. In the framework of the author's PhD dissertation [5], we were going to open the source of some mobile games of Eurosmobil, we were about to join this revolution.

But some difficulties and confusion have been experienced regarding the usage of open source in education. For example, when teaching the Operating System in

the University of Debrecen, we are using the famous book [1] mentioned above. We have several examples and tasks [4] where we have modified the macro `CopyMess` in the `kernel/proc.c`. The detailed description of this macro can be found in the book on page 178-182. But in the actual kernel tree there is already no `CopyMess` macro. There are many similar difficulties which impede students from completing their home tasks. The reason for this is that open source codes are changing perpetually. Ultimately, this is compounded by the nature of the open source itself. If we want to teach based on open source programs, we need to face this problem.

According to the announcement on awards ceremony of *The IT trainer of the year*[1] the sources of games *110% Summer Capital OSE*, or in Hungarian *110% Nyári Kapitális NYFK*, *Soccer Game 4u OSE*, or in Hungarian *Focijáték Neked NYFK* and *Seventh Eye OSE*, or in Hungarian *Hetedik Szem NYFK* have been opened by Eurosmobil. In this work we briefly present and analyse these games, with particular stress on opportunities for further developments. Then we briefly introduce the *Footballer and Football Simulation Markup Language* (*Football(er) Simulation Markup Language or FerSML*). It is based on experience gathered with the game *Soccer Game 4u OSE*. Finally, we discuss in details the *Socceral Force Applet 11 for FerSML*. It is a specific further development of the *Soccer Game 4u OSE*.

(a) *110% Summer Capital OSE.* (b) *Soccer Game 4u OSE.* (c) *Seventh Eye OSE.*

Figure 1: Screenshots from the games of *Jávácska One*.

1.1. Previous Work

The open source games in question was presented at the conference ICAI 2010, the 8th International Conference on Applied Informatics. The games and plans for

[1]The Hungarian Chief Information Officers' Association: `http://www.mvisz.hu/angol/visz_dij.html`

introducing these into educational practice were presented in [6]. The open sourced games are released in three different places.

- The source codes in SourceForge (`https://sourceforge.net/projects/javacska/`) are the living codes which will be maintained continually.
- The source codes in the author's homepage (`http://www.inf.unideb.hu/~nbatfai/opensource/`) will be changed infrequently.
- The source codes enclosed with the lecture book [7] never will be modified.

1.1.1. The *Jávácska One* Project

The open source mobil games in question are maintained within the framework of the project called *Jávácska One*. The project pages can be found at the mentioned URL `https://sourceforge.net/projects/javacska/`. Screenshots from the games of *Jávácska One* are shown in Figure 1.

1.1.2. The FerSML Project

The FerSML project is a European football specific further development of the *Soccer Game 4u OSE* mobile game. The FerSML language itself is a new XML language designed to describe the players, coach and the game flow. The idea of FerSML was introduced in [8]. The results of the work we have made until recently in this project are presented in [9].

1.2. Related work

There is already a fast growing literature on the mobile game-based learning. Papers [11], [12], [14], [15] and [16] made have concentrated on this topic. For example, the Project mGBL [13] is closely related to our work. In the sense that the games of this wide project are also released in open source at SourceForge.net.

The connection between mathematics and sports has comparably large literature. In the case of European football to mention but a few examples: [17], [18].

2. Our Games in the Education

The open sourced games are successfully used in our own courses such as Operating systems or Mobile programming. Typically, the task of BSc Software Engineering students is to further develop the games and the task of porting the games to Google's Android platform is selected by BSc System Engineering students. We have developed a lecture notes book that helps them solving these tasks. At the present time, in the framework of a project TAMOP granted by the Hungarian National Office for Research and Technology, we have already finished the work on a lecture notes book to ensure that education could use our open source games successfully. The opportunities for further developments are also detailed in that

book. It will be available as soon as possible in the *Kempelen Farkas Student Digital Library* at `http://www.tankonyvtar.hu/`.

3. The Further Development of Our Open Source Games

We are working on several further developments of the open source mobile games. For example, our plan for a novel community portal is based on the mental fingerprints of consciousness introduced by the game *Seventh Eye OSE*. Now, we discuss a European football specific project called *Football(er) Simulation Markup Language*.

3.1. Football(er) Simulation Markup Language

The main purpose of the project FerSML is to create an expert system for decision making in European football. The initial development of the simulation environment is supported by applets contain our soccer simulation.

Figure 2: A screenshot of the *Socceral Force Applet 11 for FerSML*.

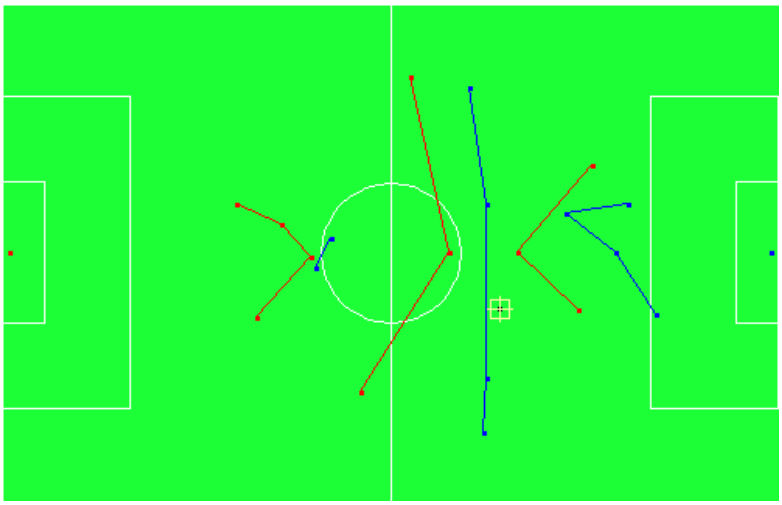

Figure 3: The away team (4-4-2) under attack in SFA-11.

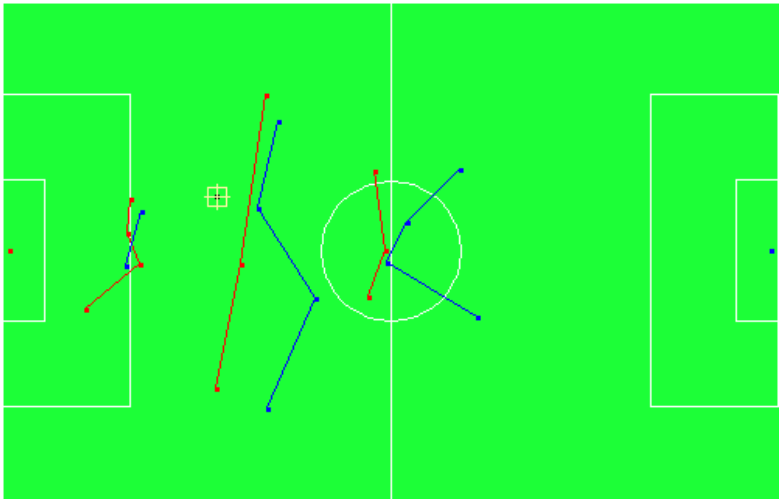

Figure 4: The home team (4-3-3) is under pressure.

3.1.1. Socceral Force Applet 11 for FerSML

The *Automated Soccer Applet for FerSML* (ASA) was already mentioned in [6] as a further development of the mobile soccer game. This precursor applet and the *Socceral Force Applet for FerSML* (SFA) were introduced in [9]. Figure 5 shows the class diagram of the ASA and a screenshot from the newest release of the simulation

applets is shown in Figure 2.

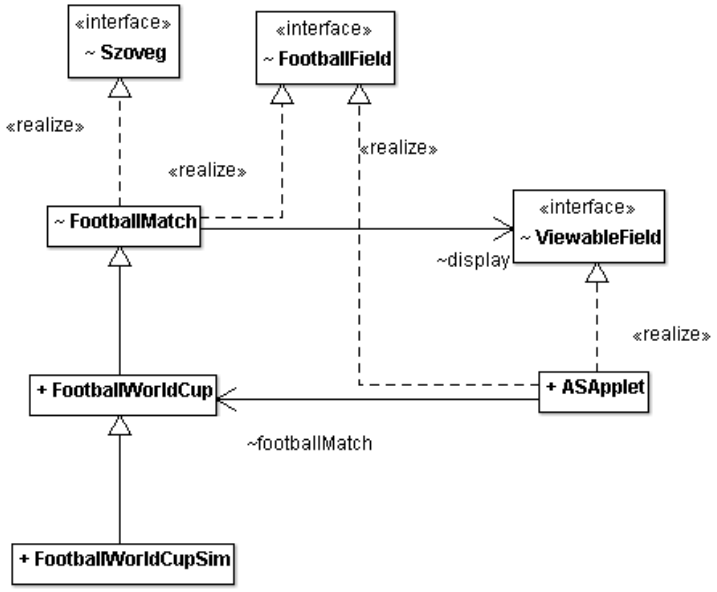

Figure 5: Class diagram of the *Automated Soccer Applet for FerSML*.

The main novelty of *Automated Soccer Applet 11 for FerSML* (SFA-11) concerns the number of players. It has already contained 11 footballers in a team. This seems simple, however it is a fundamental modification of the simulator, because it implies the changing of the playing systems. The using of ten player was a legacy of the mobile gaming environment. The bulk of the improved code can be found in source `FootballMatch.java` (see the Figure 5). The actual version knows four formations these are the following 4-4-2, 4-3-3, 4-3-2-1 and 3-4-3. The former two are shown in Figure 3 and 4.

4. Conclusion and further work

It is not enough just to open the sources of games, but to maintain the sources as well. At our university, we have created a developer community, called Debrecen Developer Network (DDN, [6]) in order that the education could use the games in question successfully. Mainly, the members of DDN are going to maintain the source codes and resources of these games.

The further developments of the games such as the FerSML or SFA-11 are maintained in SourceForge (at `https://sourceforge.net/projects/footballerml/`) that would be of wide international interest to these projects.

Acknowledgements. The author would like to thank Professor György Terdik for supplying literature on the analysis of football.

References

[1] Tanenbaum, Andrew S., Woodhull, Albert S., Operating Systems Design and Implementation (3rd Edition) (Prentice Hall Software Series), *Prentice Hall*, ISBN 0131429388, (2006), pp. 19.

[2] Tanenbaum, Andrew S., A UNIX clone with source code for operating systems courses, *SIGOPS Oper. Syst. Rev.*, Vol. 21, 1 (1987), 20–29.

[3] Gartner., Gartner Highlights Key Predictions for IT Organisations and Users in 2008 and Beyond, *Web page*, (2008), `http://www.gartner.com/it/page.jsp?id=593207`

[4] Bátfai, N., A MINIX kernel kiegészítése, *Web page*, (2010), `http://www.inf.unideb.hu/~nbatfai/os/DEIK_MIPPOS_2008tavasz_BN_KiemeltOttoni_OR168_38.pdf`

[5] Bátfai, N., Mobiltelefonos játékok tervezése és fejlesztése (Mobile Game Design and Development, hungarian), *PhD Dissertation and Thesis*, (2010), `http://www.inf.unideb.hu/~nbatfai/phd`

[6] Bátfai, N., Bátfai, E., Pšenáková, I., Jávácska One: Open Source Mobile Games to Revolutionize Education of Programming, *Teaching Mathematics and Computer Science*, submitted, (2010).

[7] Bátfai, Norbert Mobil programozás, Nehogy már megint a mobilod nyomkodjon Téged!, *Kempelen Farkas Student Digital Library*, for the present in manuscript, (2010).

[8] Bátfai, N. Footballer and Football Simulation Markup Language and related Simulation Software Development, *Journal of Computer Science and Control Systems*, accepted, (2010).

[9] Bátfai, N. The Socceral Force, *ArXiv e-prints*, (2010), `http://adsabs.harvard.edu/abs/2010arXiv1004.2003B`

[10] Koivisto, Elina M. I., Mobile games 2010, *Murdoch University*, CyberGames '06: Proceedings of the 2006 international conference on Game research and development, ISBN 86905-901-7, (2006), `http://research.nokia.com/files/NRC-TR-2007-011.pdf`

[11] Huizenga, J., Admiraal, W., Akkerman, S., Dam, G. Ten., Mobile game-based learning in secondary education: engagement, motivation and learning in a mobile city game, *Journal of Computer Assisted Learning*, Vol. 25/4, ISSN 0266-4909, (2009), 332–344, `http://dx.doi.org/10.1111/j.1365-2729.2009.00316.x`

[12] Sánchez, J., Salinas, A., Sáenz, M., Mobile Game-Based Methodology for Science Learning, *HCI (4)*, (2007), 322-331, http://dx.doi.org/10.1007/978-3-540-73111-5_37

[13] Project mGBL – mobile Game-Based Learning, *WWW page*, (2009), http://www.mg-bl.com

[14] Shiratuddin, N., Zaibon, S. B., Mobile game-based learning with local content and appealing characters, *International Journal of Mobile Learning and Organisation*, Vol. 4/1, (2010), 55–82, http://dx.doi.org/10.1504/IJMLO.2010.029954

[15] Paraskeva, F., Mysirlaki, S., Papagianni, A., Multiplayer online games as educational tools: Facing new challenges in learning, *Computers & Education*, Vol. 54/2, (2010), 498–505, http://dx.doi.org/10.1016/j.compedu.2009.09.001

[16] Gustafsson, A., Katzeff, C., Bang, M., Evaluation of a pervasive game for domestic energy engagement among teenagers, *Computers in Entertainment (CIE)*, Vol. 7/4, (2009), 1–19, http://doi.acm.org/10.1145/1658866.1658873

[17] Brillinger, David R., Soccer/World Footbal, *Preprints* (2009), http://www.stat.berkeley.edu/tech-reports/777.pdf

[18] Brillinger, David R., A potential function approach to the flow of play in soccer, *J. Quant. Anal. Sports*, Vol. 3/1, (2007), http://www.stat.berkeley.edu/~brill/Papers/jqas.pdf

Norbert Bátfai
Hungary, 4032 Debrecen, Egyetem tér 1