Designing a Football Experience for a Mobile Device

Greger Wikstrand, Staffan Eriksson & Frida Östberg

Umeå University, Umeå, Sweden

greger@cs.umu.se

Abstract: Watching sports is a favorite pastime of many consumers. A more nomadic life style makes the traditional spectating venues unavailable. Designing a sports spectator experience using mobile devices poses design and technological challenges in order to achieve a good experience at an acceptable cost. Combining animations, which have higher understandability and lower cost, with video, which has a higher emotional value, might provide that experience. The authors used a combination of a formal experiment with a focus group study to evaluate and refine successive design sketches. The result was a design proposal that will be implemented as a commercial product.

Keywords: Mobile communications, animation, cognitive psychology, experience design

1 Introduction

Watching sports is a favourite pastime. Although huge arenas have been built the majority of spectators are still remote, TV-viewers (Bryant and Raney, 2000). The ongoing nomadic revolution, enabled by mobile technology, could mean that sports fans will want to follow their favourite sports events while on the move, e.g. through their mobile phones. Small displays, noisy environments, and high costs all conspire to make the experience very different from watching the game on TV.

This paper describes the process and outcome of a research and design project called Bastard, conducted at Umeå University. The project was formulated in co-operation between Ericsson and the Umeå Centre for Interaction Technology (UCIT) (www.ucit.umu.se). The purpose of the project was to investigate the best ways to visualize a match through video and animations, and how to enhance the user experience further through interactivity. The two main design objectives were to minimize the cost of the service and maximize the user experience.

A five person team was assembled consisting of a mobile applications expert cum project manager, a cognitive psychologist, an interaction designer, a football expert cum behavioural scientist, and a mobile video expert. Project duration was set to one year from February 1st 2002 to January 31st 2003 - the first iteration between February and June and the second iteration between June and January.

2 Process

Project work was based on the spiral model (Boehm, 1988). Two iterations were completed as illustrated in Figure 1. Both iterations consisted of four phases: i) idea generation, ii) development, iii) testing, and iv) analysis. The first iteration was about finding out if the concept worked; the second iteration focused on putting it all together to form a total user experience.
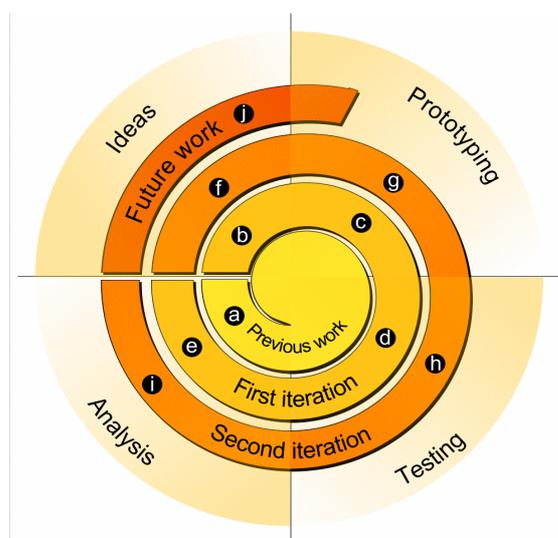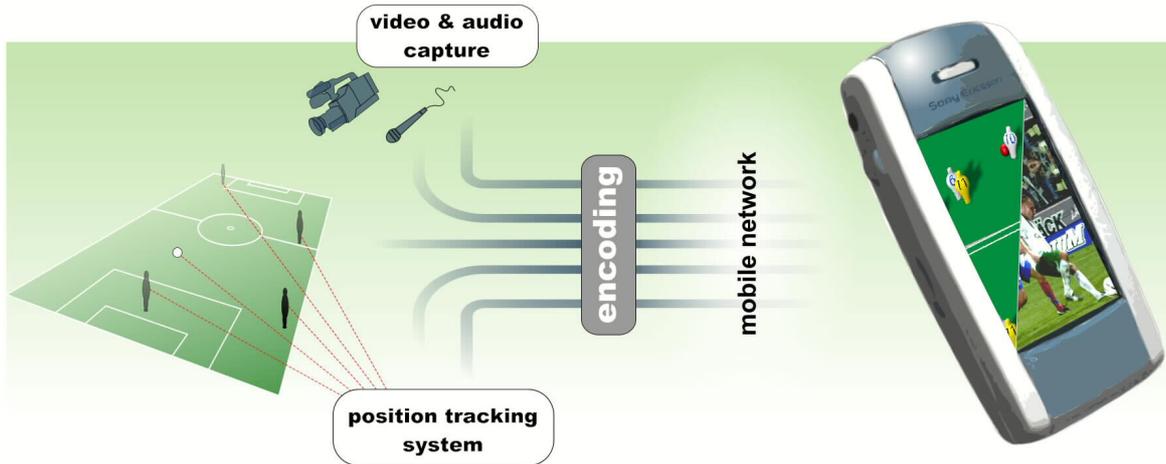
Figure 2: An overview of the complete system. Audio, video and positions are captured, encoded, streamed and finally displayed in a mobile terminal.

Figure 1: Spiral model of the research project.

In the Arena research project and in a development project at Ericsson an "electronic match program" was developed (www.cdt.luth.se/-projects/arena/). The match program presented static, e.g. team descriptions, and dynamic, e.g. reruns, information about the match. The product was aimed at users on and off the site. They would access it through PDA:s with WLAN (on-site) or mobile phones using WAP/GPRS (off-site). It became apparent that individualized live video would not be technically (on-site) or economically (off-site) feasible in the foreseeable future.

Figure 3: Animation and low-bandwidth video of the same situation in the game.

Transmitting positions would require much less bandwidth than video - 0,2 kbps compared to 20 kbps (cf. Figure 3). Replacing the video with animated graphics, supported by a positioning system, was considered as a solution to the problem. Simple design sketches were created to visualize ice hockey, rally and trotting. They were targeted at mobile devices, such as PDAs. The entire system is illustrated in Figure 2. The Ice Hockey demo allowed the user to interact with the interface, mostly manipulating display settings, but it also showed an example of multi layering, to combine the animation with

video. Ericsson presented the demo, which is also shown in Figure 4, at the 3GSM World Congress in 2001.

2.1 First iteration

The design sketches had received favorable attention and animations were considered superior to video in terms of cost for the user. The purpose of the first iteration was to find out how they compared in terms of the user experience. The animations, as illustrated in Figure 3, were intended to enhance and clarify the game without adding things that could not be reliably known. The players were simplified to skittle like figures without arms and legs, or even direction, since the positioning system wouldn't be able to keep track of such details. Colors were minimized: players got their teams colors and the field was uniformly green with white markings.

An experiment was used to compare animations to video. Participants were presented with several short clips from a football match. The clips were

Figure 4: An early prototype of the system. The yellow team has just scored a goal against the blue team.
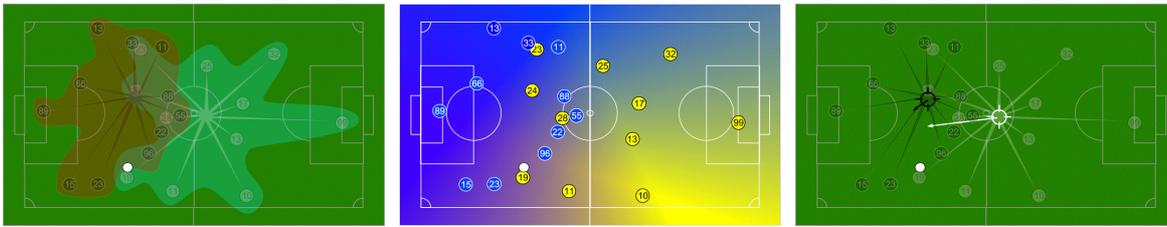
Figure 5: Some ideas from the workshop. The potential range of each team is shown (left). Different colors show which team has spent most time at each point in the field (middle). The centre of mass of each team is shown as a star (right).

encoded either as animations, low bandwidth video, or high bandwidth video. After viewing the clips the participants rated their mental workload, their quality impression, their willingness to pay, and their enjoyment and comprehension of the clip. Their comprehension was also tested with a quiz. The high quality video was always preferred to the low quality video and the animations. Low quality video was more enjoyable and the animations were more understandable. More knowledgeable participants preferred the bad video to the animations while less identified fans preferred the animations.

2.2 Second iteration

A workshop with participants from the sponsors and from virtual reality and digital media researchers was held to find creative ways to proceed with the second iteration based on the results from the first iteration. The workshop produced several ideas based on making hidden things more visible, e.g. statistics about the players. This might allow visualizations that would help users understand the game and convey the atmosphere of the arena. Another idea considered was a surrealistic presentation of the game, e.g. a non-uniform scale could be used. Some of the ideas were illustrated and can be seen in Figure 5.

During the summer, two Interaction Design students from the Institute of Design created a GUI demo. A number of new ideas came up. For instance the markers for the players could be changed dynamically e.g. to signal that a dangerous player was close to the goal. Alternatively, each player or position could have a fixed but unique shape to give a better overview when glancing at the display. The prototypes were tested in a focus group study. There were two groups in the study. One with medium identified fans and one with highly identified fans as measured with the Sports Spectator Identification Scale (Wann, Melnick, Russell and Pease, 2000). Group members were first allowed to explore the prototypes individually. Based on the feedback received minor adjustments were made. After that the groups met to explore and discuss the prototypes.

The focus groups produced a lot of negative feedback on the lack of completeness of the prototypes, this is consistent with other research where visually advanced but functionally basic prototypes created a dissonance to the users (Bryan-Kinns and Hamilton, 2002). The study also revealed that the users wanted a lot more interaction and data about the players.

3 Solution

The most recent prototype incorporates several of the results and ideas from the two iterations. The user can select a mix between video and animations to suit his or her willingness to pay and other preferences. Annotations are available to make the game more understandable. A screenshot from the prototype is presented in Figure 6.

3.1 Related systems

The French company BeTomorrow has presented a system for following a football game live. The system is based on transmitting player positions and animating them in mobile devices. Their display is based on semi-realistic graphics with players looking like small cartoon characters.
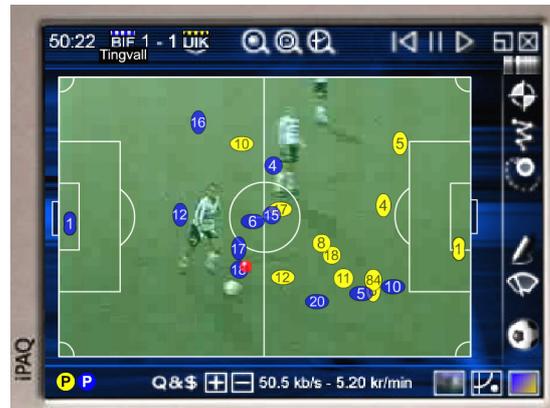

Figure 6: The latest demo. Video in the background is overlaid with an animation. The animation can be annotated with team centre of mass, defense line and a ball trace by using the controls on the right. The controls in the bottom right corner allow the user to select a mix between video and animation. "5.20" is the current per minute price for this level of detail.

(www.betomorrow.-com/products.html; Pinon, 2002) Fox sports OFL football allows the user to immerse as a football player in a mobile, multi-user football simulator. (sorrent.com/games/-on_field_live/index.jsp) Several companies offer live SMS updates on the standings in a football game. (www.bethelp.com/Live-Score/LiveMobile.htm)

4 Conclusion

In the first iteration we had clearly defined problems, a proven methodology and measurable results. We had expected that either the animations or the video would be better. It turned out that each had its own advantages and disadvantages so we were faced with new challenges but we did not get many new ideas from the iteration. In the second iteration where we wanted to find ways to make the animations more enjoyable, we did not know why they were not enjoyable. Instead we tried to come up with a lot of innovative ideas to test and evaluate, hoping to find a solution. We used brainstorms and conceptual student projects to gather a variety of ideas. The ideas were tested in user groups to find out if we were heading in the right direction.

More ideas, especially from televised sports and computer games, should be gathered. Those ideas and the results from the project should be used to build a commercial prototype. The prototype should be able to receive streaming video and position data, as well as displaying this data in a way that the user prefers. We are currently negotiating this with subsystem suppliers.

6 References

Boehm, B W. (1988), A spiral model of software development and enhancement in *Computer*, vol 21 (5) pp 61-72.

Bryan-Kinns, N. and Hamilton, F. (2002) One for all and all for one? Cases studies of using prototypes in commercial projects. In *Proceedings of the second Nordic conference on human-computer interaction*. ACM Press.

Bryant, J. and Raney, A.A. (2000) Sports on the Screen. in *Media Entertainment - The Psychology of its Appeal*. Edited by Zillman, D. and Vorderer, P. pp 153-174. Lawrence Erlbaum Associates, Publishers, Mahwah, New Jersey, USA.

Pinon, B. (2002) *BeTomorrow and Symah Vision launch LIVE FOOT*, Press release

Wann, D.L., Melnick, M.J., Russell, G.W., and Pease, D.G. (2000) *Sport fans: the psychology and social impact of spectators*. Routledge, New York, NY, USA.