

Enhanced Experience of Sport Events

Josef Hallberg, Sara Svensson and Kåre Synnes

Luleå University of Technology

Department of Computer Science & Electrical Engineering

Division of Media Technology

SE-971 87 Luleå, Sweden

{Josef.Hallberg, Sara.Svensson, Kare.Synnes}@ltu.se

ABSTRACT

This paper describes a system where Internet-enabled sensor technology was integrated into a context information platform to give viewers of sport events an enriched media experience. The system was developed as a proof of concept and was evaluated during real-life use at the Vasaloppet cross-country ski event. Using Bluetooth wireless ad-hoc networking and GPRS technology, sensor data was transmitted from contestants to a context information platform, which in turn presented the sport event viewer with a personalized, context-aware view.

INTRODUCTION

During the last decade, the usefulness of context-aware applications has been shown in a number of scenarios [3, 4]. One area which has received less attention is sporting events, although some work has been conducted in this area as well [1]. In today's sport-events, information on contestants is often very sparse and typically limited to name, age, country, and, if applicable, place and elapsed time. By equipping the competitors with sensors from which additional information, e.g. pulse and location, can be retrieved, the viewer can get an enriched experience. With the help of location information from participants, an application could also enable the viewers to follow the participant of their choice, e.g. a brother, or a friend, rather than being forced to only follow the contestants who are in the lead, which is often the case in traditional broadcasting media.

One way of accomplishing such an experience would be to incorporate the new information and possibilities of choice into a regular television broadcast with a possible addition of interactive television. Another, and more easily deployable way, would be to implement a web application which viewers can access. We have built a web application as a proof of concept, where the location, pulse, and speed of cross-country skiers could be followed.

To test the application, we deployed the system during the

Vasaloppet week Feb 28 until Mar 7, 2004. The Vasaloppet week is the world's largest skiing arrangement and is held annually in Sweden [2]. Three professors from Luleå University of Technology participated in the testing, by taking part in one or both of two of the cross-country skiing events during the week equipped with sensors. One of them can be seen practicing cross-country skiing in figure 1.



Figure 1: Cross-country skiing (photo: Per Pettersson)

APPLICATION

The application is implemented as a Java applet and its purpose is to show the advancement and status information of participants in Vasaloppet. The monitored skiers were equipped with Internet-enabled sensors [5] measuring pulse, position (including altitude), and speed. The sensors use Bluetooth wireless ad-hoc networking and GPRS technology to transmit data from contestants to the platform (see figure 2).

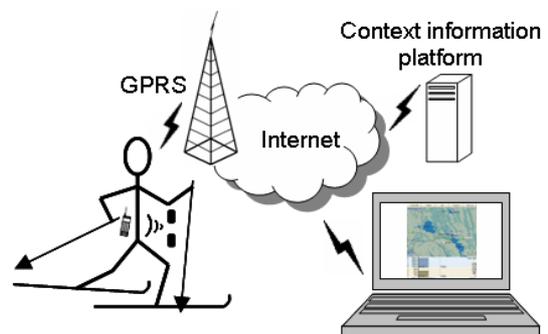


Figure 2: Communication overview

The applet extracts the most recent data from the platform's database at regular time intervals and displays them. The skiers' locations are drawn on a map which the user is able to zoom and pan. The map can also be centred on one or all of the skiers' locations by pressing one of the top buttons shown in figure 3 below. Pulse and altitude are drawn in diagrams related to the distance each skier has covered. The diagrams scroll horizontally according to the current distance covered. At the top-right corner of each diagram a digital counter is placed. In the altitude diagram the counter displays the skier's speed in kilometres per hour and in the pulse diagram, the current value of the skier's pulse is shown, which also can be seen in figure 3.

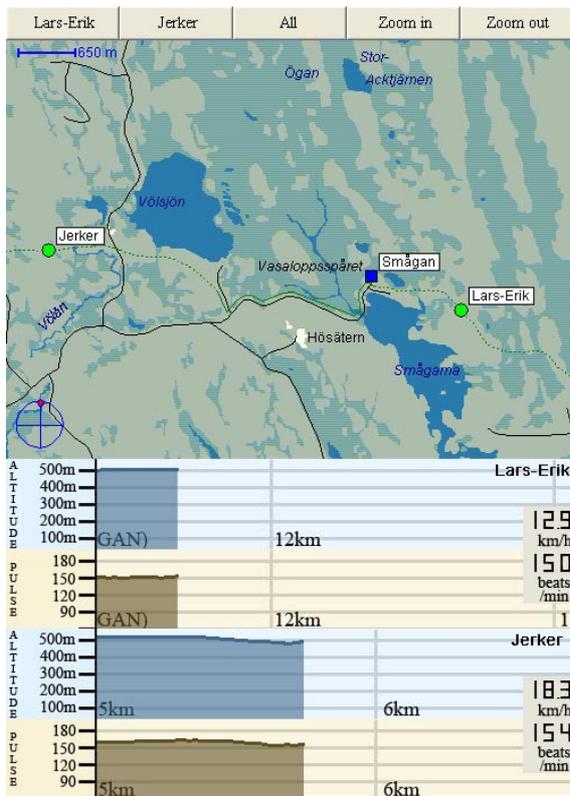


Figure 3: The Vasaloppet applet

A survey was conducted among users of the Vasaloppet applet. The results indicate that the application and its uses enhance the user experience, in particular among those with interest in sports.

VISIONS AND FUTURE WORK

One of the future visions includes the possibility to view any contest participant with complete information at any time during the contest. With several cameras positioned along the track and by utilizing location-awareness an onlooker could select to automatically switch to a camera currently filming a certain contestant. This kind of system could be developed for both Internet and television by using new technology in digital television.

A project, under the name of LIVEStat, has been created in order to present the information not only on the Internet but

also together with live television broadcasting. Using this media channel has proven to offer a way to further increase the versatility of the graphics presented and also to cover more conceptual areas.

The main focus for the LIVEStat project is towards sport events, however the system could be used in other areas as well. The different contexts used in the application which was used during the Vasaloppet race has proven to be interesting, however there is yet another context that could be of interest: the time displacement. The concept of time displacement could work as to compare contestants with different starting times on a geographical map. The benefit of time displacement is well displayed in orienteering as seen in figure 4 where the different approaches to the stations are shown with regards to their start time.



Figure 4: A time displacement map

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