

WorldCupinion: Experiences with an Android App for Real-Time Opinion Sharing during World Cup Soccer Games

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ABSTRACT

Mobile devices are increasingly used in social networking applications. So far, there is little work on real-time emotion and opinion sharing in large loosely-coupled user communities. We present an Android app for giving real-time feedback during soccer games and to create ad hoc fan groups. We discuss our experiences with deploying this app over four weeks during 2010 soccer world cup. We highlight challenges and opportunities we faced and give recommendations for future work in this area.

Author Keywords Mobile applications, mobile social networking, opinion sharing, real-time feedback, sports.

ACM Classification Keywords H5.2 [Information Interfaces and Presentation]: User Interfaces.

General Terms Design, Experimentation, Human Factors

INTRODUCTION

Mobile devices are increasingly used for mobile social networking. One explanation for this development is that mobile devices are almost always with their users, have continuous wireless connectivity, and feature increasingly capable user interfaces. They can thus serve as ubiquitous input devices and sensors for user reactions, emotional responses, and opinions around large public events [1].

The goal of the work presented here is to investigate mobile social software for large user communities. The project focuses on usage patterns and usability questions related to interfaces that can scale to an extremely large number of simultaneous users. We picked the soccer world cup 2010 as a use case for this research, because it is an event with extremely high public attention in many parts of the world and many people have a high emotional involvement to (at least some of) the matches. The matches are also synchronized in time with many simultaneous viewers and thus many potential users. We focus on exchanging spontaneous emotional feedback between users who are part of a virtual fan block.

The particular test application, World Cupinion, is an Android application that lets soccer fans express their emotions about events and moments in soccer matches during the matches. Through this application users can support their favorite teams and share their opinions with other fans. The design is focused on scalability to a large

number of users, on simplicity, as we expected that the users' focus of attention is on match itself, and on short bursts of usage, with the application serving as an ambient display most of the time and short interactions occurring when interesting events happen.

Acquiring, managing, and distributing user data in large user communities in real-time is a challenge that systems and user interfaces need to address. In the long run, we envision applications of this type being used by hundreds or thousands of users simultaneously, loosely linked by temporary shared interests and preferences, thus forming ad-hoc virtual communities.

This work addresses the following aspects and research questions:

- How to design mobile social networking applications supporting the connectedness of peers in a large loosely coupled community?
- How can experiences effectively be shared in real-time across a large number of devices?
- How can we design for awareness of community opinion? How can information related to shared experiences be visualized?
- How can user attention be managed in cross-media applications that combine television or public events with mobile device usage?

In the following sections we discuss the concept of real-time emotion sharing, give an overview of the design and system architecture of our test application, discuss the distribution and publication channels for the application, and report on the experiences we made with the public prototype. We conclude with recommendations for research in the large and with giving ideas for future work.

Real-Time Emotion Sharing

Taking a closer look at what information the audience/watchers of sport broadcasting actually wish to share with their friends or fan group, it turns out to be mostly the preliminary evaluation mixed with the personal emotional impact of specific events during the game, much less a "cold" rational assessment of the ongoing maneuvers on the field. This is no surprise, as emotions are known to have a strong social component [4] and probably even developed to provide a fast and immediate way to

communicate the momentary state of an organism to the environment [3].

The sudden onset and strong expressive component of emotions make them an ideal candidate for mobile communication as it allows the user to somehow extend his/her reach beyond the usual radius of face-to-face communication. On the other hand, these properties also impose a number of requirements for any application: feedback should be quick and if possible “analogous,” i.e. non-verbal to avoid the necessity of lengthy formulation to describe a simple and transient affective rush. Emoticons appear to be an appropriate way to communicate these states [2]. In addition, the provided rating scheme should contain domain-specific labels (e.g. “yellow card”) as well as domain-independent features (e.g. “like-dislike”) [5].

APP DESIGN

As mentioned above, the design criteria included simplicity, since the user’s focus of attention is on the match itself, and short-term usage, since situations arise quickly an interaction might just involve stating one’s opinion about the current event. Moreover one aspect was to visualize the aggregated opinion of a potentially large number of users and to use the screen as an ambient display. The latter feature gives the user the opportunity to observe how the fan aggregated opinion evolves even though he or she is not actively interacting and probably react to it by rating again.

The app is structured in three screens (Figures 1 and 2). The first screen (Figure 1, left) shows the list of upcoming matches with their starting times and dates in the user’s local timezone. The timezone played an important role here, since we intended to deploy the app in the Android Market for worldwide distribution. The game selection could have been automatized, except for parallel games during the first phase of the tournament, but we decided to keep the list in order to allow users to plan their viewing times in advance of the games.

After selecting a game the user would enter the “arena” for that game (Figure 1, right). That screen allows the user to give feedback during the game and to see the aggregated opinions of the fans of the own and the other team. Initially the rating buttons are disabled and the user has to select the team he or she wants to support in order to activate the interface. This design decision means that users have to be fan of a particular team in order to provide input. The input buttons cover most of the display area to be easy and quick to press. Below each button there is a horizontal bar that indicates the average opinion regarding that input category. For example, if the bar below the “thumbs up” button is half filled that means that 50% of the fans have pressed that button during the last 30s.

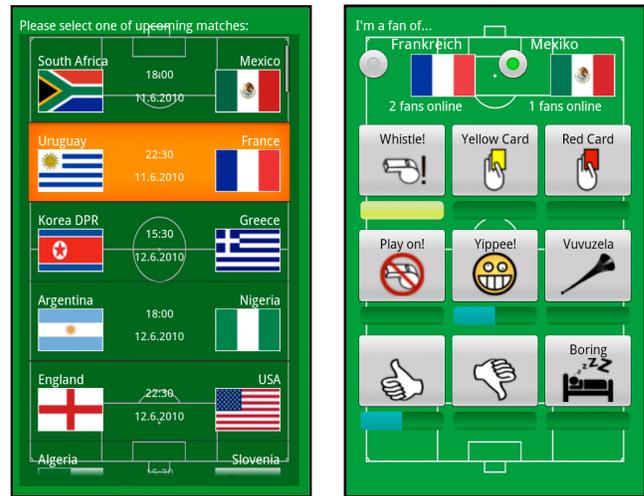


Figure 1. WorldCupinion screens: Initial screen (left) showing the match list and main screen (right) used during a game.

A feature that was added one week after publishing the game is to see the aggregated opinions of the fans of the other team as well: The statistics of the own fans are shown in green, the statistics of the other team in blue, the blue bar is located behind the green one, and the green screen is not fully opaque to see the blue one behind it.

Another change to the main screen (Figure 1, right) was the replacement of an “offside” icon with a “yippee!” icon (Figure 1, right, center icon). We made this change after we realized that the “offside” icon was rarely used. On the other hand the app lacked a way to express strongly positive emotions, e.g. when the own team scored a goal. Adding the “yippee!” icon provided a way to express that kind of emotional feedback [6].

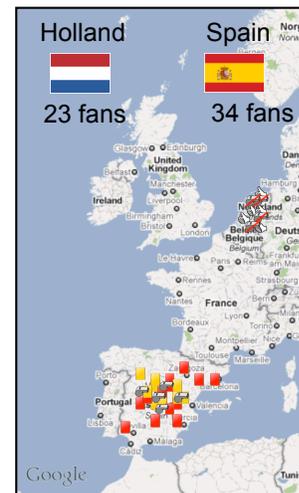


Figure 2. Geographic distribution of fan opinions.

The third screen, “world opinion” (Figure 2), shows the geographical distribution of fan opinions of both teams on the map. The underlying idea is that this visualization shows geographical clusters of users having opposing opinions. The map view is based on the standard Google

Maps APIs with icon overlays for the feedback that was given at a particular location. Using Google Maps APIs allows interactive panning and zooming of the map. However, we restricted the maximum zoom level for privacy reasons.

SYSTEM ARCHITECTURE

World Cupinion is implemented as a client-server architecture. The World Cupinion mobile application sends two basic request types to the server, update requests and input requests. Update requests are used to poll the state of the mobile application's user interface, and input requests are used to send user opinions to the server, as soon as an opinion button has been pressed. The map view sends a further request type, to which the server generates a response containing the user inputs of the last 5 minutes.

The server logs all inputs to a SQLite database and maintains statistics of the user opinions received in the last 30s. These 30s statistics are sent to the mobile clients in response to update requests.

We initially used UDP datagrams for communication, as our protocol does not require an active connection. UDP also imposes a lower load on the server, which is beneficial if there are many simultaneous server requests. However, it soon appeared that certain network firewalls and also mobile network providers may block UDP packets that have non-standard destination ports. To remedy this, our mobile application has a fallback mechanism that automatically switches to HTTP requests if UDP communication is unsuccessful. User input events are always sent via HTTP to ensure that they do not get lost.

Supporting HTTP requests has the further advantage of enabling the implementation of platform-independent web interfaces. Although we did not originally plan to use a web interface, we implemented one for evaluation purposes. It turned out that this was useful, as our statistics show that about 13% of opinions originated from the web interface.

A further important issue of the application is energy consumption. Over the 90 minutes of a game (plus the 15 minute break and an optional 30 minute extension), the application continuously communicates with the server via the mobile phone network or via WiFi. There is a tradeoff between the update rate of the interface and energy consumption. In pilot tests we found that one update every 3s is sufficient. A significant contribution to energy consumption comes from continuously using the device as an ambient display for the opinion state. Even if the user is not interacting with the device the community opinion is updated and shown. This is technically implemented with a "wake lock" that prevents the display from switching off completely. Usually, a NexusOne mobile phone that is fully charged at the start of the game has a battery level of about 50% at the end of a game.

DISTRIBUTION AND PUBLICITY

Distribution via the Android Market

World Cupinion can be downloaded for free from the Android Market. An advantage of using the Android Market as a distribution platform over Apple's iTunes AppStore, for instance, is that published applications appear almost instantly for download, and are not subject to a lengthy reviewing process with the risk of rejection of the application.

The ability to rapidly push new releases of the application to the Android Market allowed us to publish weekly updates containing bug fixes or new features during the actual soccer world cup.

Public Relations

It of course does not suffice to simply release a new application into the wild. Potential users need to be informed of the application's existence in order for them to download it.

We used a number of channels to make the application known to potential users. In addition to press releases made by the Deutsche Telekom Laboratories and the TU Berlin, we tried to promote the application in internal events (summer party, weekly lab meeting) and external events (lab open house) of the Deutsche Telekom Laboratories. At these events we distributed flyers advertising the app, containing a QR code linking to the app on the Android Market. We also created a website (www.worldcupinion.com), and actively used social media (Twitter and Facebook) and forum entries to reach as large an audience as possible. Finally, we sent it to a number of mailing lists in our lectures, posted a message about it on an Android developer forum.

Considering that we only released our application one week before the soccer world cup, our publicity measures were relatively successful. At the end of the World Cup, we had registered a total of **1645** downloads and **448** "active" installations (=29% of all downloads). The number of active installations denotes the number of users that still have the app installed on their devices.

We were surprised to what extent users apparently download and install an application without actually using it for a longer time. It appears that the abundance of available mobile phone applications let mobile applications become a disposable article like promotional gifts, a tendency much less pronounced for traditional software.

Updates

The Android Market allows to easily publish updates. We took advantage of this feature several times. If a long-term study is conducted it allows to carry out several design iterations while keeping the user base of the app. Besides bug fixes, the changes and updates related to (1) removing the "offside" icon and replacing it by the "yippee" icon, (2) adding group-generated sounds, (3) showing the opinion of the opposing fans, (4) sending notifications when a game

starts (and restarts after the break), and (5) the addition of an in-application questionnaire displayed after the conclusion of the World Cup. These changes were not obvious from the start and reflected insights gained from application usage and user comments. The update mechanism provides a convenient way to do these changes. On the other hand, one has to be careful not to confuse users when features change. If some users do not update the application there might be inconsistencies between deployed application versions, e.g. some users might still have the “offside” icon in the place where users of the updated app have the “yippee” icon. We expected that most users will update their app, and for us having the flexibility to try out different versions was more important than version consistency. Unfortunately, the server protocol did not include the version number, so we could not track the percentage of users connecting to the server with outdated application versions. This is something we will clearly consider in the future when deploying similar apps.

EXPERIENCES

The first people using the app during an actual game were friends, colleagues and students who were made aware of it by our public relations activity. Here the focus was in part more some kind of 'beta testing' and providing feedback to the developers than using it for rating per se. However, the Vuvuzela functionality was quickly used to emphasize important moments or echo the sound coming from the TV, which then led to a more comprehensive usage of the app to comment the ongoing game. We were well aware that there were several other “vuvuzela apps” available, but still we thought that this feature might serve as some kind of door opener to attract the user's attention initially, and our observations within our peer group confirmed that assumption. Probably also other research projects might benefit from this approach. However, there is one caveat when adapting popular "recreational apps" or functionalities for research applications: we found that users expect running software and will give low ratings if an app is not polished or crashes during usage. There were occasional crashes of the map view in our app, which only affected the map view and not the other parts of the application. Users were very critical about this, as is documented by one user comment mentioning this issue. Moreover, a few handset types had problems. Even though platform fragmentation is much less of a problem for Android than for other systems, this issue appeared. Of course, providing an industry-strength app as a research prototype is not feasible for most research labs as it requires more development resources than are typically available.

CONCLUSION

Evaluating essential usability aspects of mobile social networking apps relies on a critical mass of users. We tried to gain a large number of users for a mobile app for sharing opinions in large user communities in real-time, by picking a popular topic in which people have emotional involvement and simultaneously follow a shared event. The

2010 soccer world cup provided an ideal setting for this research, because it is quite popular in many parts of the world and extends over four weeks, which allowed us to do several design iterations. We tried to gain as much user attention as possible by publishing the app on the Android Market and by using a number of measures to make it known to potential users. The market update facility allowed us to very simply try out design modifications and to improve the prototype based on usage statistics and user feedback.

We have not yet finished to fully evaluate the database logs and the in-application questionnaire yet. To give the reader an impression of usage statistics, on average 28.6 (+/- 19.1) users were active during all games. The average participation lasted 681 (+/- 1316.2) seconds during which 17.6 (+/-33.6) actions, i.e. button presses were performed. The large standard deviations already indicate that an overall analysis might be of limited informative value and characteristics of the particular game have to be taken into account here, which we are currently working on.

As future work we intend a better integration with social media platforms, such as Facebook and Twitter. We also intend to do an analysis that could give us further insight into the question to what extent user input correlates with the actual soccer match. We hope that this analysis can also tell us about typical patterns of behavior. Finally, we envision other types of content, such as talk shows or political debates, in which user responses to broadcast content might be helpful.

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