Improving Games by SMS Through the MobileDeck Concept: A Quiz Game Proposal Focused on Emerging Markets

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***Abstract*—This paper describes a case study of a quiz game designed to be used using SMS technology; the study consists of monitoring the game adaption to the MobileDeck concept. In the MobileDeck concept, the SMSs are received and sent through an appropriate graphical user interface. System efficiency and game improvement will be analyzed and discussed in this paper, in order to infer that the use of this proposed model is beneficial to the ecosystem of games based on SMS. The integration of the cited game to MobileDeck concept was proved a success, providing a new way of playing games via SMS.**

Keywords-mobile game; emerging market service; mobile application; SMS (Short Message Service)

I. INTRODUCTION

Short Message Service (SMS) has long been established as the de facto standard for sending and receiving text messages on mobile phones. As one of the most widely adopted communications services, it has been successfully used for over a decade as a marketing and services channel [1][2].

According to [1], the success of SMS communication may be attributed to 3 main reasons: it is ubiquitous, it has near real time delivery and it follows the "store and forward" mechanism, with later retransmission in case of failure. Moreover, the communication service holds a huge active users base [3], and a high response rate [4].

In emerging markets, those characteristics are especially crucial when designing mobile services, considering that mobile Internet is still gaining momentum [5]. In this scenario, text messaging is the most viable way to reach larger audiences, albeit compromising a considerable portion of the engagement effect [6][7].

Coulton et al. [8] conclude that although developing cellular applications for entertainment can be very challenging, it is also highly rewarding in that it provides the opportunity to produce new and exciting entertainment applications. Hence this paper makes use of the MobileDeck [9] concept to try improving the usability of games based on SMS exchange. MobileDeck is a complete solution, designed to improve the user experience of services that make use of SMS, adding a Graphical User Interface (GUI) to better represents the service. Thus, this implementation allows text messaging to behave exactly like a data feed to a rich application. In this sense, it offers a new, user-friendly channel for several existent SMS services like news, horoscope, promotions, and so forth [9].

The MobileDeck solution was launched in the Brazilian market in 2009 with various services, such as, location, weather forecast, news, etc., and by mid-2011 it had over 600,000 active users.

The purpose of this paper is to present a feasibility study of adding a game as a service to the MobileDeck solution. The game to be studied is a simple game in which the players attempt to answer questions correctly, like a quiz. In this case, the questions and alternatives are sent to the player via SMS. The interaction occurs when the user chooses an alternative, and sends it via SMS. This described game should be adapted to the MobileDeck concept, building a GUI to facilitate the interaction between players and game. Besides the general description of the technology used to enable it, this paper also aims to demonstrate the acceptance by potential users, establishing if this idea is valid for games adaptation or not.

II. MOBILEDECK

To better understand this study, it is necessary to introduce the MobileDeck concept. The key idea behind MobileDeck is to provide an attractive front-end for requesting and receiving content via SMS. On the client side, it consists of a mobile application capable of displaying both textual information and graphics using predefined layouts that are accessed through instructions contained in a binary SMS. In other words, every time the user requests a service, the application sends an SMS that is received by a specific server, and the response is again redirected to the application. The returning SMS acts like a script that builds and feeds the next screen with the appropriate content.

This solution can be explained through the example in Figure 1. From the main menu, which is a grid of icons, the user can choose one of the services, e.g. horoscope. That procedure activates the service screen (in this example, another grid menu). Once the desired content is chosen, the application requests the data by sending an SMS to a predefined short code. That request is then processed, while the application displays a "receiving data" feedback. When the response is received by the application (binary SMS), a result screen is populated with the respective data.

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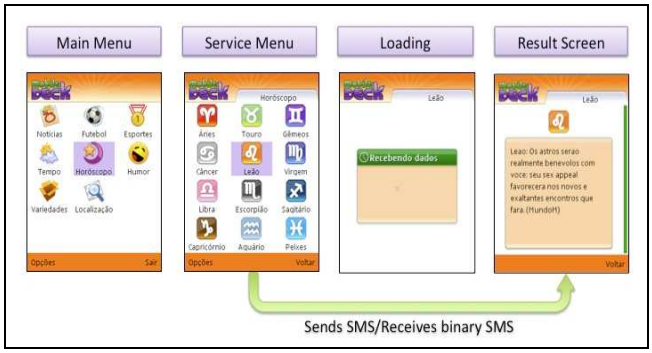

Figure 1. Example of a service being accessed (horoscope) [9]

All the SMS traffic involved in this data request/receive process is thus transparent to the user. The response time is usually just a few seconds, so that the whole experience is extremely close to accessing content directly from the web using a mobile device. From that perspective, it is important to stress that this solution was designed for emerging markets, where fast data networks are still inaccessible to the majority of the population.

III. MOBILEDECK ARCHITECTURE

MobileDeck is divided in four subsystems: a) a mobile client application, embedded into the mobile phone; b) a web based system, responsible for handling the requests and building a response message [10]; c) an aggregator that allows SMS traffic [11]; d) an information provider for each service.

The way each MobileDeck architecture component interacts is shown in Figure 2. This example illustrates the user requesting a service and receiving a response. First, an SMS is sent using the embedded application to a specific number using a standard protocol of the MobileDeck, then the SMS aggregator routes the message turning SMS into an HTTP request to the MobileDeck web server, which identifies the request and sends it to the appropriate information provider, which in turn returns the response content to it. The web server then builds a response using a security code and asks the aggregator to send a binary SMS with the return of service. At the end of the process the user receives the response from his service on the application embedded in his phone.

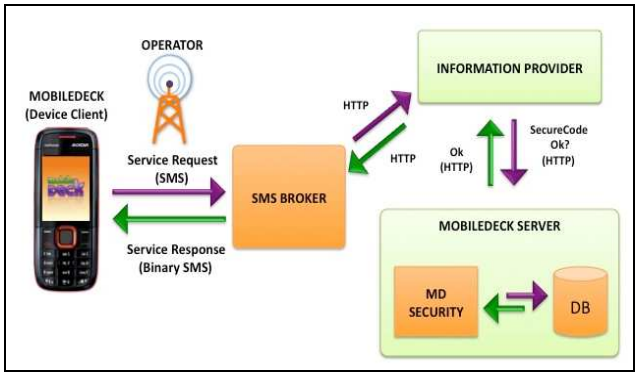

Figure 2. MobileDeck Architecture (high level design) [9]

The embedded application, designed for Nokia Series 40 and Series 60 devices, sends an SMS with a specified short code to achieve a determinate service. The service response is done by binary SMS, listing a predefined SMS port. The core programming language used to develop the mobile application was J2ME and its WMA 1.0 (Wireless Message API, JSR 120). The Series 60 version has a user interface developed with the Lightweight UI Toolkit (LWUIT), which is a free UI library and tool for creating richer and more portable Java ME user interfaces [12].

As MobileDeck sends protocol information inside a binary SMS body, a brief explanation of how it works is valid here. A binary SMS uses the port concept just like any Internet socket does. Thus, a message can be received in a given port that activates a specific service (in JME this is accomplished through the Push Registry API).

IV. INTEGRATING A QUIZ GAME INTO MOBILEDECK

This section covers the process of integrating a set of questions and answers into the MobileDeck concept, creating a Quiz game by SMS with a rich user interface (UI).

This game of questions and answers, like a Quiz, has a version designed to be played by exchanging SMSs, with a good acceptance in the Brazilian market.

The game consists of receiving, via SMS, a text in the mobile phone's inbox with a question and a list of alternatives. The player then sends by SMS what he believes to be the correct answer..

After receiving a positive feedback of the improved usability of SMS based services when they were adapted to the MobileDeck model, the decision was made to integrate and adapt the quiz game to the MobileDeck model, where the SMS exchanging is transparent to the user because he can interact with graphical elements that make up a representative screen of the service.

The first step was to add an icon to access the game in the main menu of MobileDeck.

The original game had to be adapted to the MobileDeck concept that offers the possibility of making the game more attractive to the user.

At the beginning of the game a list of categories from which the player can choose is displayed. The questions are based on the chosen category.

After choosing the category, the player chooses the name that will identify him/her in the game. The screen will contain a list of player names that have played using this application to facilitate the selection and an option to insert a new player name.

The name and category choice screens are illustrated in Figure 3(a) and (b), respectively.

After choosing the category and the player name a SMS with the data is sent that represents a request to start receiving questions, the SMS sending is transparent to the player and only messages like "sending request" and "waiting for question" are shown to the user.

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Figure 3. (a) Player name, and (b) Category choosing screen

The web server processes the sent question and, based on the category and player history, a binary SMS is sent following the "question screen" protocol, which contains all information to build properly the cited screen.

The embedded MobileDeck receives the binary SMS with all information needed to build a question screen, as illustrated in Figure 4. The question screen was designed to be used to choose an alternative and send the answer in a simple, intuitive and clear way.

When the player selects one of the alternatives on the question screen a SMS with the alternative chosen is sent to the web service which in turn processes it and defines a response depending on the fact if the player choose the right answer.

Together with the information about the last answer a new question is sent that is part of a set of questions to be answered by the player. At the end of the set, the score is shown as illustrated in Figure 5(a).

To make the game more attractive a ranking was created that displays the player names that have the highest score. Points are awarded to the player name every time he answers a question correctly. The ranking screen is shown in Figure 5(b).

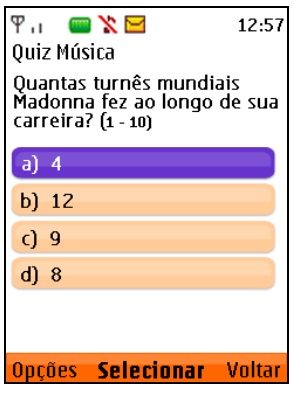

Figure 4. Question screen

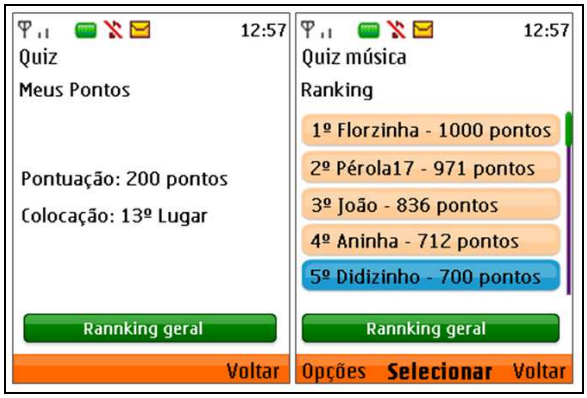

Figure 5. (a) Score points of the player shown at the end of a set of questions, and (b) General ranking screen

V. ADVANTAGES AND DISADVANTAGES OF APPROACHES

In this section, we aim to make a comparison between three approaches used to develop a mobile application which is described below. The idea of this application, which was created by [13], is to validate the creation of mobile entertainment applications.

The application was chosen in order to have a basis for comparison between existing services, a previously proposed service and the approach proposed in this paper.

The proposed application is based on the English Premier League, which is arguably one of the best football leagues in the world, and fans in the UK support it passionately.

The current service, which is in this section is called the first scenario, offers to mobile users work over the Short Message Service (SMS), and is generally limited to goal alerts, with the user paying by the number of SMS messages received. The application proposed by [13], which we call the second scenario, intends to improve both the timeliness of information and the range of information available. By providing information such as goals, red cards, yellow cards, substitutions, and so on, this application offers comprehensive updates on all the football matches on a given day. All the information is displayed in an easy accessible format, where a user can simply scroll through the event-by-event coverage of all the league games on that day.

Once all the events of the day become available to the application, the second part of this application becomes possible: a real-time fantasy football game. Fantasy football is played with a typical maximum budget of around £80 million for purchasing players. Players are selected from a list featuring over 500 footballers from Premiership clubs.

In the common approach, the user must use the native SMS editor to be able to order the SMS subscribe or order on demand. This approach is quite common and widely used; its main disadvantage is that to access the service you need to know its short number and an identification service code. Generally, media are used to achieve high penetration of the target audience, such as TV. Another disadvantage with this approach is that user interaction is extremely limited, with poor usability. Its main advantage is to work

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with a large user base and the adoption of this approach by many users generates massive user expertise.

The approach cited in Section 4 is called the third scenario.

In the approach that uses the MobileDeck concept working with a technology that is highly known and adopted is the great advantage over the second scenario approach, which uses GPRS technology to communicate with the information provider, thus limiting the number of potential users. When usability is concerned, the second and third scenario approaches, take a great leap in quality by adding a visual layer, as well as adding a range of options to create different kinds of applications.

The main disadvantage of the second and third scenarios is that for the user to be able to use these approaches, he needs to have an application installed on his mobile phone; the best solution to minimize this disadvantage is to have the application installed at the factory.

VI. CONCLUSION AND FUTURE WORKS

After completing game integration one could note that no feature of the questions and answers game designed originally for SMS was removed. New features such as name registers for identification and requests for overall rankings were added to the game. It is therefore possible to infer that the integration of the game to MobileDeck was proved a success in view of adaption and of providing a new way of playing games via SMS, where an attractive visual layer is added to enhance user interaction. Hence we can summarize that the main contribution of this paper is to demonstrate that the usability of games by SMS can be improved significantly through the use of the MobileDeck concept. As future work, a usability study should be conducted to try to measure the gain in usability by adopting the visual layer and whether the users of SMS games prefer to use the game via MobileDeck in case the game is brought to the emerging markets. If positive results are achieved, the integration of other games that can be played by SMS should be designed.

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