Development of an Electronic Diary Application for Windows Smartphones

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ABSTRACT

Being mobile influences not only the type of information people seek but also the ways they attempt to access it. A personal diary may include the person’s experiences, thoughts or feelings. Diaries have made it more convenient to write down the events happening to the author as it happens. In this paper, a diary application was developed for Windows Smartphone. The application was developed using C# programming language on Visual Studio 2014. The user has the ability to write entries, read entries and edit written entries. The diary software was evaluated using a questionnaire completed by twenty (20) users, for user-friendliness, flexibility and accessibility. User responses showed that 16 users (80%) rated the friendliness of the application as excellent or very good. Correspondingly, 17 users (85%) rated the flexibility in navigation while using the application as being either excellent or very good. For accessibility to previous diary entries, 19 users (95%) rated this feature as excellent or very good. We intend to replicate the application on other mobile platforms in our future work.

Keywords: electronic diary, windows app, mobile smartphones

1. INTRODUCTION

People often need information while on the go. Sometimes the information required is essential to the task at hand, such as finding a hotel for the night. Other times, the need is associated with a question prompted by a conversation or a nearby object (e.g. a billboard). Based on the importance of the need and the amount of time available, people use a variety of strategies to obtain the desired information [1]. Technological advances in recent years have meant that digital display media are becoming more “paper-like” and wireless. Light weight digital displays are now more mobile and portable than ever. The quality and readability of the display screens are approaching the brightness, resolution and contrast of plain paper. New techniques for stylus-based entry are making possible more paper-like interactions, such as allowing richer and more flexible mark-up and manipulation of digital documents [2]. Some of the most influential people in history kept detailed journals of their lives. The importance of diary writing cannot be over emphasized. It can be said that diary writing harnesses the mental, creative, and emotional benefits in the diary author. It also helps the author to keep some personal moments spent and other memorable/imporant events. In the generation that we live in today, people don’t like to carry their traditional paper diary along with them; this is simply because of the size. As such they are not able to record activities/event as they happen. This paper addresses this problem with the development of a mobile electronic diary application. Section 2 discusses our related work while the application design is explained in Section 3. We then give details of our implementation and user evaluation in Sections 4 and 5. Section 6 concludes the paper with recommendations for future work.

2. RELATED WORK

Electronic diaries are a way of keeping a copy of a diary on a computer. This allows the user to browse their appointments, and mark appointments on electronic machines. Since the computer holds the details of each appointment users can be reminded in advance of meetings and appointments. The use of computers also introduces flexibility into the format of diaries, presenting different views, such as by year, month or week. Unlike a paper diary, the computer automatically adds new pages when needed, extra room for each day, and retains copies of diaries for years gone past [3]. A mobile application consists of software or set of hardware programs that run on a mobile device and performs certain tasks for the user [4]. It is a new and fast developing segment of the global Information and Communication Technology. Mobile applications are easy, user friendly, inexpensive, downloadable and runnable in most of the mobile phone [5]. An accurate and descriptive e-diary (Light speed Mobile Diary) allows an author to capture experiences in real-time using light speed mobile. Such a diary can be completed in offline mode any time a wireless signal cannot be accessed [6]. The benefit of the Light speed Mobile Diary is that it connects you to hard-to-reach segments of the population who prefer mobile communication. The ability to capture data such as photos of in-store displays, out-of-home advertisements or other brand interactions provides a dimension not previously available in traditional recall-based diary studies [6].
Keeping a life log with the help of mobile life logging devices such as a Sense Cam or a smartphone is more convenient and liable and is becoming an acceptable choice for people who choose to life-log. However, simply generating a diary automatically using sensors on a mobile device produces a semantic gap, in which it is difficult for people to interpret raw data into a human readable language. Narratives for life logs can be generated in a few ways [7].

3. DESIGN

Mobile computing is a growing trend where microprocessors are embedded in everyday objects to allow them to communicate information. Mobile computing devices are completely connected and constantly available, which relies on the convergence of wireless technologies, advanced electronics, and the Internet. Current mobile consumer electronics are not simply mobile communication devices, because they can change the lifestyles of people and create new cultures. Thus, data exists anywhere that the user requires. Indeed, things that were previously unimaginable can now be achieved by mobile computing [8].

Windows Phone (WP) is a mobile operating system developed by Microsoft for smartphones as the replacement successor to Windows Mobile. Windows Phone features a new user interface derived from the Microsoft-developed "Modern" design language (formerly known as "Metro"). Unlike Windows Mobile, it is primarily aimed at the consumer market rather than the enterprise market. It was first launched in October 2010 with Windows Phone 7. Windows Phone 8.1 is the latest public release of the operating system, and was delivered in final form to developers on April 14 2014. It will be available for update to all devices previously running Windows Phone 8.

3.1 Software Application Lifecycle

The application’s life cycle is the set of states that the application goes through as the application executes. Small tablets and phone devices must balance multiple tasks, responsive and have a long battery life. The working condition of the phone dictates that the lifecycle is more involved than the desktop world. For example, when leaving a page to take a call, user expect their data still be on the page when they return. The point to knowing the windows phone 8 life cycle is to know when, where and how to save and restore state [9].

3.2 Software Specification

Software specification deals with what the software should be able to do majorly, with respect to windows smartphone. The developed application runs on Windows Phone OS platform (version 8.1). Its features include the following:

1. Setting passcode to protect the application on start-up
2. Write notes about what has happened in your life at a specific time
3. Add new events
4. Set and remove reminders for events
5. Set and remove alarms for events
6. Search for previous events entered
7. Deleting diary entries

3.3.1 Software Requirements

In developing the application, the following software were used:

- IDE (Integrated Development Environment) - Visual Studio 2014
- Programming Language - Visual C# 4.0
- Embedded Framework - .NET Framework 4.5
- Operating System - Windows 8.1
- Store (Marketplace) - Windows Phone Market
- Mobile Platform Version - Windows Phone OS 8.0

The language C# was used because it allows developers to share a large subset of an application’s code across multiple platforms while still building a completely native user interface on top of each platform. Applications with this approach will look and feel native because they’re using the exact same APIs and toolkits exposed by the platform. Using this approach allows the developer to concentrate on solving business problems rather than having to manage multiple languages; the code that is shared across platforms isn’t limited to mobile application.

3.3.2 Flowchart for Mobile Diary Application

The flowchart in Figure 1 shows the processing steps for the windows mobile diary application. The first step is to login with a username and appropriate password. If the user has not been previously registered, then the registration must be completed before login. The login gives access to the diary application functionalities as listed in Section 3.3.1.
Figure 1: Flow Chart for Mobile Diary Application
3.3.3 Use Case Diagram

The use case diagram as shown in Figure 2 below shows the simplest representation of a user’s interaction with the system. The user has four functions: input, setup, report and storage. The input function has to do with supplying the necessary username and password for verification to avoid a wrong user from viewing your personal data. Without the correct password and username, the diary content cannot be assessed. This serves as a security agent for the diary application. The task of a setup is to coordinate the inputted accounts after verification, make corrections when necessary to update the users account. The report function is concerned with the diary inputs including the management categories, new data or event and updates or correction of previous entries. The storage function deals with the retrieval of past diary entries for easy future reference.

![Figure 2: Use Case Diagram for Mobile Diary](image)

4. IMPLEMENTATION

This section discusses our implementation in terms of the class diagram and graphical user interface.

4.1 Application Class Diagram

The class diagram as illustrated in Figure 3 is the breakdown of the individual classes that were used to implement the application. Five classes (NewDiary, AddNewEntry, Search, UserRegistration and Alarm), were created to handle different functional aspects of the application. The primary key of each class is also shown as each class has an equivalent entity object used in the database associated with the application.
4.2 Graphical User Interface Implementation (GUI)

The application GUI consists of several window forms that perform different tasks. Each of these interface form is discussed subsequently in Sections 4.2.1 to 4.2.5.

![Class Diagram for Mobile Diary Application](image)

**Figure 3: Class Diagram for Mobile Diary Application**

4.2.1 Splash Screen

This is the first interface seen as soon as the diary icon is click on the phone. The diary splash screen can be seen in Figure 4.

![Mobile Diary Splash screen](image)

**Figure 4: Mobile Diary Splash screen**
4.2.2 Authentication
A password is required for access into the diary. The screenshot of the authentication screen is shown in Figure 5. There is no username required as the application is supposed to be personal to each user.

![Figure 5: Authentication Screen](image)

4.2.3 Adding New Diary Entries
The developed mobile personal diary provides user with easy means of entering their daily activities, event, personal feelings and others. It captures thought and memories in real time. This was achieved by catering for an easy to use tabbed interface that provides a means of adding a new entry, read, write and correct. The interface is initiated by clicking on the “Add Entry” Icon on the drop down menu. Figure 6 shows this interface.

![Figure 6: Add New Entry](image)
4.2.4 Entries Preview Interface
The mobile diary provide an extended means of view the content of a diary by clicking on an entry and a broad view of the entry, which allow editing an updating of the contents is displayed. This enables easy accessing of the content of the diary. This interface is shown in Figure 7. Also, the entries can be edited or deleted from the list of entries, all you need do is hold entry and a pop up comes showing if the entry should be deleted or edited.

![Figure 7: List of all Current Entries](image)

4.2.5 Adding Reminders
This helps the diary author to save upcoming events such as weddings, anniversaries, birthdays, etc. On the day of the event, a reminder pops out on the screen. A sample is shown in Figure 8.

![Figure 8: Add Reminder](image)
5. EVALUATION

The mobile diary stores vital information about a person’s experiences including comments on events such as wedding anniversary and birthdays. This information should have high privacy. These are adequately catered for in the developed mobile diary [10]. The diary software user evaluation table was generated from a questionnaire which was completed filled by 20 users. The user-friendliness, flexibility, accessibility were the major areas of user evaluation.

Based on user evaluation by twenty (20) users, results showed that 7 users (35%) rated the application as excellent, 9 users (45%) rated it very good while 4 users (20%) rated the application as good for user friendliness. Correspondingly, 4 users (20%) rated navigation's flexibility as being excellent, 13 users (65%) rated the application very good while 3 users (15%) rated it as just being good. For accessibility, 9 users (45%) rated the features as excellent, 10 users (50%) rated it as very good while 1 (5%) user rated it as just being good. The summary of user responses is shown in Table 1.

Table 1: Diary Software User Evaluation

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
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<tbody>
<tr>
<td>Application is user</td>
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<tr>
<td>friendly</td>
<td>35%</td>
<td>45%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
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<td>15%</td>
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<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Accessibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Legend: 5- Excellent, 4- Very Good, 3- Good, 2- Fair, 1- Poor

6. CONCLUSION

This paper has discussed the development of a mobile diary for windows smart phones. The application can be implemented on all other mobile phone platform such as Android and IOS. The application can also be modified as an online application accessible from both mobile and standalone hardware platforms. More improvements can be added to make the application more lively and interesting. Lastly, more features such as saving pictures can be added to increase the diary’s functionalities.
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