CS2310 Final project report

I-card and C-card management system on Android

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Abstract

With the proliferation and rapidly spread of Android mobile phones, it deserves to mobilize the IC card system to make it available to all the Android users, and facilitate them with the tool of easily managing their events through the idea of IC cards.

Stimulated by the inspiration from the web-based IC card management system, the term final project is about building an IC Card manage system on Android, the task includes constructing the IC card management system and implementing the I-card and C-card display on it, which is my task.

The mainly contributions of the final project includes several aspects:

1. Mobilized the web-based IC card management system and implement on Android mobile phone;
2. Added the I-card and C-card functionality to display the information of I-card and message flow of C-card;
3. Built the alarm system according to the time critical information on the I-card, capable of alerting the user when an even is to be done.

The outline of the report is: section one is about the background of the final project and related work; section two is about the design architecture of the IC card management system; section three is about the detailed implementation of the system; section four is about the future work and section five is the testing of the system.

Introduction

IC card is an application of visual language; it utilizes the simple design of a card-based display to organize an event. Sometimes a large event would appear quite complicated and hard to management, and with the use of IC card system, the structure of the even is visualized. The items on the IC card show the basic information about the event. Furthermore, partitioning the IC card into two parts and we achieve I card and C card. I card contains the component of the IC card
system, which includes several kinds of information such as name of the card, interaction pattern and so on, and the C card displays the message flows between I cards and as well shows the hierarchy structure of the event.

There is a web-based IC card system, which implements the functions including adding, editing, deleting an IC card, and importing or exporting the IC card information in the form of XML. Since the popularity of Android mobile phones, transplanting the IC card system from web to mobile phones would generate more convenience for people to organize their events.

**Architecture of IC card System**

The IC card management system has been successfully built in Android system, and can implement the adding, editing, cleaning the database, viewing a IC card, viewing all IC cards, importing and exporting in the form of XML, and displaying the petri net of all the IC cards. The screenshot of the menu is shown in Fig. 1.

![Fig. 1 Screenshot of menu page](image)

From the menu we can see the architecture design of the IC card system, which includes several functions including adding, editing, viewing IC cards and so on. It implements all the basic functions of the web-based IC card management system. In addition, it also implements the function associated with button “Display”, which is the task of displaying the petri-net.
Implementation

In order to implement the IC card petri net and the time reminder function, my task could be divided into two parts, including drawing the petri net and set the time alarm function.

1. Drawing the petri-net

After importing the XML data from outside, the IC card system would have the cards to show. Then, clicking the button “Display” in the menu would draw the petri net of all the imported IC cards. The petri net is shown in Fig. 2.

In Fig. 2, the names of the IC cards are shown in red, and the smaller words in blue are the message to be sent from this IC card. Since there might be a lot of IC cards needed to be drawn on the picture, the IC cards are designed to be close to each other. And users can drag the IC cards as they like to redesign the structure of the petri net to a desirable condition, just like the one in Fig. 3.
In addition, if user wants to see the more detailed information of the card, which is the I-card, he/she could click on the name of the IC card to see. Fig. 4 shows the result of clicking on the “Senior” card.

Besides, considering the fact that there might be a very large petri net and the screen with a limited size could show all at a time, I also implemented the dragging
function for the canvas, i.e. the user can drag the canvas to the left, right, top, bottom to see the image there.

2. Alarm function

In order to better express a particular function of an IC card – the time critical property, I implemented the alarm clock function. In this way, user can use the IC card system to better schedule the tasks of the IC cards. For example, if an IC card named “see the doctor” has a time critical property of “meeting at 10:00 am”, then the user could set the alarm according to the time.

To invoke the alarm function, first we need to press the menu button on the phone, and see a self-designed menu shown in Fig. 5.

![Fig. 5. A self-designed menu](image)

Then, click the “Set an alarm” button on the menu and enter the screen of setting an alarm, shown in Fig. 6.
Fig. 6. Screen of setting an alarm

After setting the alarm, when the time arrives, there would be an alert jumping out, shown in Fig. 7.

Fig. 7. Invocation of alarm
3. Event Alert

In addition to the alarm function use could use, there is another simpler alert function, which could read the time from the corresponding I card and let the user choose whether to set the alert. When the user click on the icon, he/she may obtain the basic information with the I-card as well as the “alert” button shown in Fig. 4. If the time critical section of the card has a specified time and date, then by clicking the “Alert” button would set an alert for the event, and when the time arrives, a reminder of the event would jump out, just as shown in Fig. 8.

![Fig. 8. Alert from the I-card “Senior”](image)

In this way, if there are a lot of events needing to be alerted, user doesn’t need to set the alarm one by one, and only specifying the corresponding times in the XML file and set the alerts would do all the job.

4. About

Fig. 9 shows the about information of the IC-card System.
Test on the Android mobile phone

After developing on the Android emulator on the computer, with the help of Prof. Zhang, we installed the IC card management system on the Android mobile phone, and tested the functions.

Fig. 10 shows the Android phone with the IC card management system installed. The testing video is linked in Youtube, and the result is good, almost all the functions could be displayed well.
Future work

Since the IC card system has a very wide range of application, as for this project, the alert function has much more space of improvement in the future. For example, we could add more flexible forms of the time critical information of the l-card to allow users editing their event alert. In addition, the visual effect of this software is at a basic level, which could be developed to a commercial software with very good-look UI feature.

Conclusion

The final project is about the mobilization of the IC card management system, which is a combination of the IC card system and Android mobile phone. Through this project, not only did I improve the Android programming skill, I also obtained much deeper understanding of the IC card theory, which has a highly worthy practical meaning in our daily life.