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Research on Dynamic Customized UX Provision Methodology through Mobile Cloud

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Abstract

Existing mobile user interfaces are mostly stationary currently. In this paper, we propose an efficient dynamic customized UX provision methodology through mobile cloud to delivery next-generation dynamic mobile interface. The proposed customized interfaces could be utilized in those smart devices. The improvement is focused on existing soft keyboard application. Through a simple sign-in process, the customized keyboard interfaced defined by user own can by synced, stored on the cloud and ready to be apply on other compatible devices of the same user in anytime. With cloud based interface, through specific username and password, various smart mobile devices are able to receive their custom interface.

Keywords: Hadoop, Cloud Server, Software Keyboard, Customized UX

1 Introduction

According to the statistic from Ericsson, in the world the percentage of people using smartphone is approximately 25 to 30 percent, while in Korea it is even higher, up to 67.6 percent. And this year, the shipments of smart mobile devices could reach 1.9 billion and continues rising in number and popularity. The user considers smartphone as a personal device, so the demand for personalize the device especially in user interface is existing. There are a lot of mobile app that could allow users to decorate their screens, layouts with various themes to choose from but the downside is you have to install each theme in your device and there is lacking syncing mechanism in case user own multiple devices. In particular, the software keyboard could allow you to change the keyboard appearance as you want. However, they haven't met the requirements of special groups like the elderly or the handicapped people. This paper proposes a context interface offering users their own designed, easy to use keyboard layout anytime anywhere. In order to do that, the service is connected to cloud server [1, 2]. Unlike traditional method, by using cloud server, customized user interfaces could be distributed across devices efficiently, make the UI change an automatic, fast and convenient for the users.

2 Related Works

(a) (b)

Figure 1: (a) Dodol keyboard layout (b) Go keyboard layout

Various applications allow user to choose a preferred user interface from existing ones. Particularly, many keyboard apps like Dodol keyboard have this function. These apps offer plenty of soft keyboard layouts that users can easily change the layout that suits their own preference. The user not only can use the skins provided by app owner but also from self-made skins by other users.
Figure 1-(a) shows Dodol keyboard layout with separate symbol keyboard, make it quick for user to access but still doesn't taking space since these special characters are not often used. The layout of soft keyboard made by GO team foreign developers is showed in figure 1-(b). With GO software keyboard users are able to apply various skins and theme. Because these keyboard software aim at providing universal keyboard for all users, so some specific needs from particular

users are not responded. The themes and skins would suit common users, but the actual keyboard layout may be uncomfortable for the elderly and people with disabilities to use. Furthermore, the choices of layout appearance are still limited, users can't define the layout as they wish unless they have good programming background and can access to the app development toolkit.

3 Mobile Interface Provider Structure

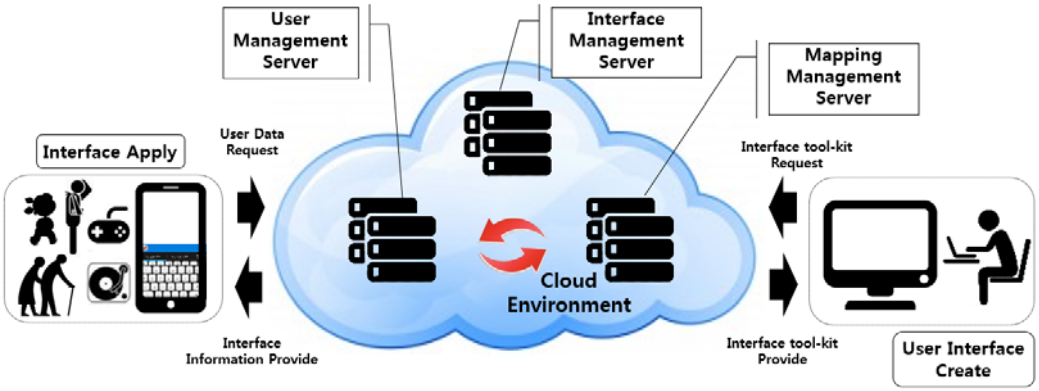
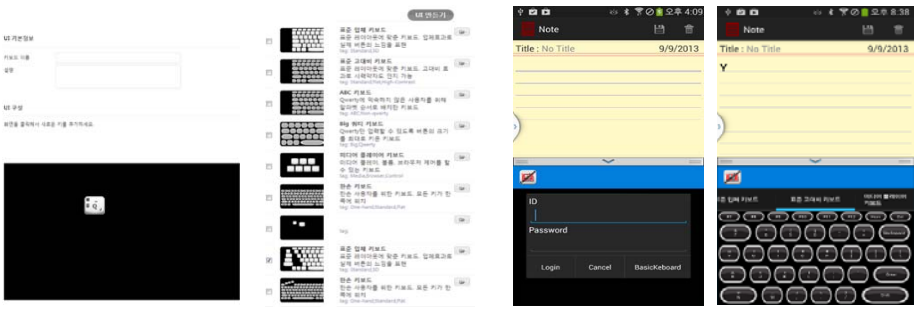


Figure 2: System architecture of the customized UX provider

Previous mentioned keyboard apps can only provide numbers of layouts. This paper will propose a solution that allows users to create their own layout. And not only that, the layout can be synced to multiple devices of that user. As show in figure 2, the cloud will provide users with their own interface. Anytime, anywhere, with 3G or WIFI connection, the users can log in to the cloud server and their stored interfaces will be provided. The interface can be made to suit the application environment or human specific needs.



(a) (b)

Figure 3: (a) Customize interface on the website (b) Log in to use the custom interface

As show in figure 3-(a), the interface customization could be done through web interface and the customized interfaces could be shared among users. The left screenshot in Figure 3-(b) shows the login display, the right side shows the custom layout offered after login successfully. In the red box on the figure is the list of custom input layouts that can be selected and also users can slide to see more than three layouts.

4 Cloud Services for Providing Interfaces

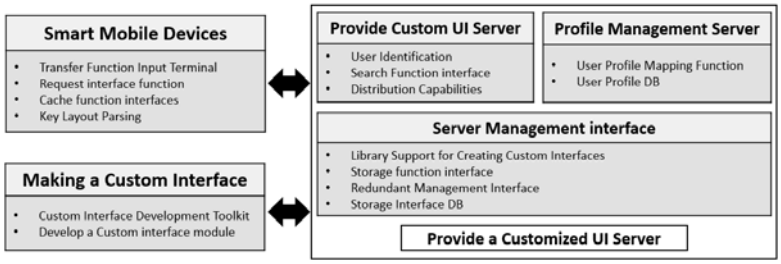


Figure 4: Cloud structure to provide interfaces

In the figure 5 is the cloud server based on Hadoop [3]. Each of the server links to others as show in figure 4. The server use login credentials to identify users and then the interface information could be retrieved. Profile Management Server uses mapping for faster information searching when users request for interfaces. The cloud server provides authoring tools to help user access and customize keyboard interface via website, the interface will be stored on interface management server.

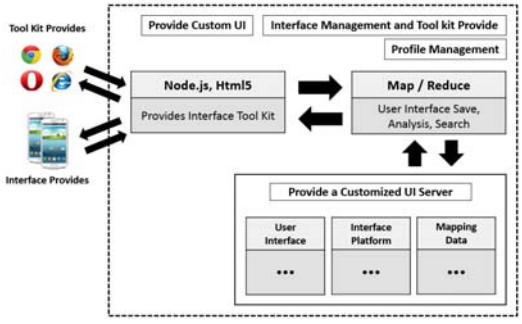


Figure 5: Hadoop distributed architecture

Table 1. Data type

<ui = 000001 name = “BigWord”>
<key=“a” val = 0x61 x = “0” y= “1” width = “20” height = “21”/>

Cloud server as showed in figure 5 is configured based on Hadoop [4], the saved information on each server will be stored and distributed in HDFS [5]. When the users request interface, by using Map and Reduce server can quickly bring the needed information in a form of key and value. The information provided back to the user will be in the form of XML[6]. The received information is in XML format so that it could be easy to analyzed and applied.

4 Interface Layout Sharing

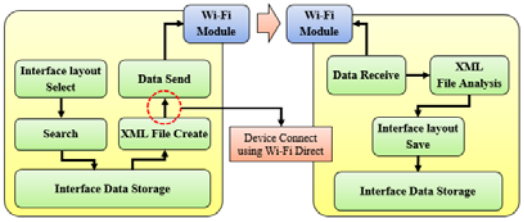


Figure 7: Interface Layout Sharing Method

Figure 7 demonstrates how the mobile use Wi-Fi direct interface to share data. Wi-Fi Direct [7] is a Wi-Fi Peer-to-peer (P2P) technical specification helping devices connect and exchange data without an Access Point (AP). And this technology is utilized here for sharing data. Figure 8 shows that the interface layout is stored in the mobile device and ready to share just by select the sharing button. The interface layout file is in XML uniform so it can be easily reuse at the receiving device. On the receiver side, the devices will analyzing the memory to save the data before receive the XML layout file. Of course by default, the layout data can be share through the cloud server but it requires Internet connection. And in case the users prefer sharing immediately, using Wi-Fi Direct method is much more convenient and speedy.

5 Interface Layout Sharing

This paper presents the use of cloud services in customizing mobile interface. In contract to traditional methods, Cloud services and distributed processing technology are introduced here to offer various customized interfaces for the users. To eliminate the action of finding and installing themes again and again in case user has multiple device, by utilizing cloud services the set up part is only a simply login. By providing many typed and highly customized interface, useful layout for the elderly, the disabled, children etc. could be put to use in various environment. In the future, hopefully more extensive research on this project could bring out better result. One of the development directions is using biometric login for faster, more convenient and secured authorization process than using ordinary username and password.

6 Conclusion

This paper presents the use of cloud services in customizing mobile interface. In contract to traditional methods, Cloud services and distributed processing technology are introduced here to offer various customized interfaces for the users. To eliminate the action of finding and installing themes again and again in case user has multiple device, by utilizing cloud services the set up part is only a simply login. By providing many typed and highly customized interface, useful layout for the elderly, the disabled, children etc. could be put to use in various environment. In the future, hopefully more extensive research on this project could bring out better result. One of the development directions is using biometric login for faster, more convenient and secured authorization process than using ordinary username and password.

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