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A Study on the Design of Low-Code and No Code Platform for Mobile Application Development

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Abstract

Workers' demands for new applications, especially mobile applications, are increasing. Many industry analysts, researchers and corporate executives say the demand for mobile applications is becoming increasingly difficult to follow in the IT department. Gartner predicts that by 2021, the demand for mobile application development within the enterprise will increase about five times faster than IT can deliver applications. The purpose of this paper is to provide an environment where non-developers who are in charge of business development can develop apps and webs for their work. The basic concept of a new innovative App development tool, Smart Maker Authoring Tool is to develop Apps on the level using easy-to-learn Word or Excel in a computer. The main feature is that the app is developed by a non-developer worker. The coding technology is perfectly optimized to the structure and operation mechanism of the IT Infra such as hardware devices and operating system, which are the targets for implementing a desired function. Rather, it shows excellent software productivity. The most important feature of future business development is that it is developed by a non-developer worker. In this paper, we propose a no-code and low-code platform for non - developers to develop their business. In the future, we will link the IoT based Arduino system and artificial intelligent interpretation system

Keywords: *Low-Code Platform, No-Code Platform, Mobile Application, Cross Platform, Software Development Automation*

1. Introduction

Recently interdisciplinary approaches receive greater attention in all fields. A future global IT leader is required to have integrated technology and marketing power in a two-tiered IT business market [1]. Not only research but also applications like internet of things (IoT) can be the one of exemplary case that involves mutual communications between human and objects, and between objects. Network framework that is the basis of previously described technologies is also reinvented to 5G intelligent network, which connects human and IoT seamlessly [2]. In a rapidly changing technology environment such as marketing, technology,

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IoT(Internet of Things), AI(Artificial Intelligence), Big Data and 5G, app development methods are also in the process of transition. Though there is a lot of controversy about how to develop the web, companies must continue to develop, maintain, and manage mobile apps for support, partners, and customers. Pure HTML5, JavaScript, and CSS3 Mobile Web preferences, native code purists, and hybrid mobile app followers all present convincing arguments and approaches, but in the end there is no absolute answer. Each approach and tool set has its advantages and disadvantages. The difficulty and expense of developing mobile apps is a major challenge for innovative companies[3]. In this paper, we design an application development software that can automate as much as possible with low-code and no-code platform according to the times.

2. Case study for App Inventor

Historically, for smart applications, smart app authoring tools have not yet effectively developed or initiated locally or internationally. Recently, conditions are just in more favor of smart network and smart phone, needless to say smart app authoring tools. Until the present, there is one reasonable smart app authoring tool at home or abroad, respectively, compared to that set forth herein, which is largely different from each other in terms of approach or the viewpoints of applicable business. The versions of smart app authoring tool herein are being prepared in Korean or English languages, with a special aim for a co-op with global tycoons, including Google. In this study, Korean specific smart app authoring tool is presumed to have a higher advantage in terms of innovative development and technology in global smart business market. To keep up with Apple's App Store with a profitable share in the market, Google Labs has launched an app authoring tool or App Inventor, which enables to create user specific app without special programming knowledge. The App Inventor is facilitated to use visual design and 'blocks' instead of program coding. Most of functions in Android phone can be found in blocks, and diverse tutorials are provided to operate App Inventor easily.

Table 1. Features of App Inventor

NO	Features of App Inventor
1	▪Develops applications by applying web browser and emulator and uses smart phone, if any.
2	▪Server stores the works of Inventor developer ▪Server stores or manages the project made by developer online.
3	▪Configures application by combining the components of program into blocks.
4	▪Develops application by using screen design and block editor(coding).
5	▪Possible to identify the results of experiment by operating virtual phone in making an app.
6	▪Program coding is conceptualized to create an app without knowledge on specific syntax or grammar.

7	▪Possible to upload developed application onto Android market by using conversion tool.

The approach of App Inventor altered the perception of programming that is designed in a complicate way. It has limitation to implementing sophisticated functions since it may be convenient to make simple apps. However, users' reviews indicate in media that it is not easy to develop apps by using App Inventor, some of which comment that it is not widely available for diverse cellular phones and generally leads to poor outcomes in terms of function. A British IT media, The Register, cites the reviews by David Fog of App Inventor in an article of New York Times, "I tried App Inventor over 1 day according to Google's directions but in failure. App Inventor is wonderful in terms of creative idea but not easily accessible for beginners." For creating applications, simply using drags and clicks are widely prevalent in Android as well as other platforms.

3. Case study for AppCooker

A local mobile service provider, CAMDESOFT developed AppCooker, which is not a developing tool but an app editor or creator, requiring no programming knowledge. Based on App Inventor, the app editor is providing an alternative or web-based app DIY service [5]. AppCooker includes mobile app editor which is applicable within browsers and whereby it is possible to create apps for Android as well as iOS and gives supports for entry into Android Market and AppStore. In Korea, the same app development method software has been developed and is currently being piloted by public institutions.

Table 2. Features of AppCooker

NO	*Features of AppCooker*
1	▪Enables to make Apple or Android app by using converting function. ▪Enables local smart phone users to use AppCooker based app.
2	▪Provides visitor list rarely found in existing applications. ▪Provides schedule rarely found in existing applications. ▪Provides map rarely found in existing applications. ▪Enables twitter service rarely found in existing applications. ▪Possible to make an interactive communication via visitor list.
3	▪Serves as unpaid agent for reviews and registration in Apple AppStore. ▪Serves as unpaid agent for reviews and registration in Android Market. ▪Lower burden on app publishing.
4	▪Unpaid updates regardless of the frequency of contents info. ▪Unpaid updates regardless of the frequency of app info.

5	▪Possible to link with RSS(Really Simple Syndication) data. ▪Possible to link with photos, moving picture or voice data. ▪Possible to link with data in HTML page. ▪Possible to link with map data.

App development tools developed in Korea and named as mobile ovens are edited and completed on the smart phone in the same way as CAMDESOFT's AppCooker.

4. Designing of Low-Code and No Code Platform

4.1 Design Concept of Smart Maker Authoring Tool

Workers' demands for new applications, especially mobile applications, are increasing. Many industry analysts, researchers and corporate executives say the demand for mobile applications is becoming increasingly difficult to follow in the IT department. Gartner predicts that by 2021, the demand for mobile application development within the enterprise will increase about five times faster than IT can deliver applications. Gartner said that the continued increase in smartphone sales is driving demand for enterprise apps that are comparable to the performance and ease of use of consumer apps. To keep up with these changes, organizations are moving to low-code, no-code platforms. With the LOCODE and NOCODE tools, general business users can quickly and easily create new apps or add features and become essential[6]. Raw code or no code builder for mobile application development aims to quickly process each company's mobile project[7]. The basic concept of a new innovative App development tool, Smart Maker Authoring Tool is to develop Apps on the level using easy-to-learn Word or Excel in a computer. The main feature is that the app is developed by a non-developer worker. The coding technology is perfectly optimized to the structure and operation mechanism of the IT Infra such as hardware devices and operating system, which are the targets for implementing a desired function. Therefore, coding work has been done so that machinery can understand the operations to be implemented in accordance with the architecture and operation of computer.

Even to implement a single program module of a simple function, it is necessary to call functions or services provided by CPU, memory, disk, OS, DBMS, etc. using a program language such as Java, C++, C#, etc. Therefore, this study is intended to design and implement a Smart Maker Authoring Tool to optimize the cost and time for developing and maintaining new application services under various smart phone platform environments.

4.2 Design Scope of Smart Maker Authoring Tool

The Smart Maker Authoring Tool is designed with 6 key functions listed below :

① GUI for designing App program windows and functions

② Implementation of business forms with high functionality

③ Artificial intelligence engine for automatic implementation of form window analysis and automatic DB design

④ Auto DB creation based on design map

⑤ App module packing and direct installation and execution in smart phones

⑥ Uploading packed App products and selling them in an open market

Menus of Smart Maker Authoring Tool are also designed to provide the key functions below :
First, design a perfect GUI Authoring Tool without necessity of coding.
Second, implement systematic modularization to support GUI Authoring Tool.
Third, design GUI Authoring Tool with component technology to provide function modularization.
Forth, implement up-to-date artificial intelligence engine to recognize and process components.

Table 3. 6 Key Function Menu of Smart Maker Authoring Tool

Menu	*Description*
Design tool	▪ A tool to draw and express input/output windows or forms of program
Data input tool	▪ A tool to enter or display data such as texts, numbers, images, voice, etc. in input/output windows or forms of App program
Scroll setting tool	▪ A tool that enables user to directly enter several data units in several data input fields or to display data received from other devices such as DB, etc. in the window
Data retrieval tool	▪ A tool to retrieve data stored in database to create reports in various forms
Event setting tool	▪ A tool to process operation events such as save, edit, delete, search, move, etc. according to user's manipulation
Document scheduling tool	▪ A tool that supports irregular documents, messages, time, etc. in regard to business process

4. Conclusion

The person in charge of the task to be developed knows the work well by the user experience but has never received the formal education program. However, since we have been in charge of this task for many years, we can develop the task with easy-to-use software development tools. In addition, it is easier and more user-friendly to develop the task than a program developer. Rather, it shows excellent software productivity. The most important feature of future business development is that it is developed by a non-developer worker. In this paper, we propose a no-code and low-code platform for non - developers to develop their business. Currently, this development tool can develop smart books with app development. In the future, we will link the iDot based Arduino system. At this time, the various chips used in the Arduino board will be implemented in a 3D and implemented virtually. The sources for all functions are c language based and can be modified by users or developers. As a follow-up project of this paper, an artificial intelligent

interpretation system will be provided for the convenience of its operators.

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