

Design and Implementation of the Korean Style Plug-In using the Wordpress

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Abstract— Following the advancement of IT technology, high quality open API market has emerged that are developed by outstanding developers. Especially, Wordpress is showing rapid growth in the open-source CMS market. Accordingly, the Korean CMS market is also experiencing change from the previous focus on XEengine into the Wordpress platform. Nevertheless, even though Wordpress market is growing in Korea and the number of homepages using Wordpress is rapidly increasing, it is still far behind the global market trend. The interpretation is that it is because UI in Wordpress does not fit the Korean sentiment. Hence, this paper developed Wordpress UI that is suitable for Korean sentiment by designing and implementing plug-in that supports application of Five-color and patterns useful for decorating blogs in traditional Korean style using Wordpress.

Keywords—wordpress, plug-in, korea style, CMS

I. INTRODUCTION

DOCUMENT is a Wordpress (<http://wordpress.org>) is one of the open-source CMS that has a characteristic of enabling free modification of website or menu composition even in case one is not familiar with HTML [1]. Wordpress is a writing tool that supports easy building and management of website and approximately 15% of the global websites are made using Wordpress. Moreover, since Wordpress is made in 'mobile response web design' that is compatible with mobile website, it has an advantage in that there is no need to build a separate webpage exclusively for mobile. Moreover, it is easily connected to social network service (SNS) such Twitter and Facebook. Hence, Wordpress is an interior tool that helps easy building and management of website and makes homepage easily seen on diverse mobile devices [2].

Homepage using Wordpress is composed of frame, theme, and plug-in. Currently, there are more than 7,500 plug-ins in official plug-in directory. In addition to this, a number of other supporting services are providing various themes and plug-ins. However, growth of theme or plug-in using Wordpress is stagnant in Korea.

II. RELATED RESEARCH

A. Wordpress Market Place

Figure 1 below presents the Wordpress usage and its market

share as of January 2015 shown in W3Techs CMS trend. Wordpress turned out to occupy 23.3% of the total market based on the usage [1].

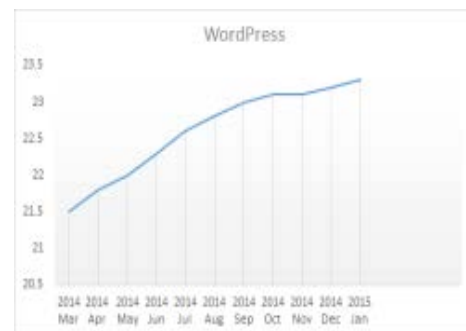


Fig. 1 Amount of CMS Usage

B. Wordpress Plug-In

Plug-in in Wordpress is a core component that enables users to freely change Wordpress as they wish without altering the core code of Wordpress. Plug-in is capable of realizing any imaginable function and most of the standard CMS works can also be processed using plug-in [3]. Plug-in in Wordpress is created using Wordpress API and the Wordpress can be limitlessly extended when plug-in is used. Moreover, in case of using plug-in, one can add function to Wordpress without altering the core code[4]. Hence, plug-in can be made either simple or complex according to the nature of tasks.

C. Five-Color

Five-color, also called as five colors of five directions, is traditional Korean color composed of five colors of yellow(黃), blue(靑), white(白), red(赤), and black(黑). It is based on the concept of Yin and Yang that says the energy of Yin and Yang emerged to become heaven and earth and these two energies of Yin and Yang subsequently created the Five Elements of tree(木), fire(火), earth (土), gold(金), and water(水). Five Elements also involve five colors and directions. With the center and four directions as standard, yellow(黃) means center, blue(靑) means East, white(白) means West, red(赤) means South, and black(黑) means North [5].

D. Plug-In Security

When creating plug-in, defending security against hacking or exploit is one of the most important stages. If security flaw of plug-in is exposed to malicious hacker, the whole website

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composed of Wordpress can be disrupted [6].

For this, there is a security tool built in Wordpress that can enhance safety of plug-in. Nonces used in Wordpress means a number that can be used only once. In Wordpress, secret key is generated in order to determine whether diverse task requests (option storage, form template submit, Ajax request, etc.) are illegal and Nonces is used here. The secret key is generated prior to task requests, and the created key is transferred contained in the task request. The identity of the key is subsequently checked before running the script [3].

E. Wordpress Hook

In extending Wordpress function, hook is one of the important functions. Hook is a terminology used in Wordpress and, in general, it is called hooking. Hooking is a software engineering terminology which refers to command, method, technique or behavior that changes or interrupts in the middle in function call, message, or event that take place among software components in computer programs such as operation system or applications. In case of using hook, random function can run to change the Wordpress function or output in the middle of running Wordpress. Hook is the most important method that Wordpress contents and plug-in uses to exchange information and it can be called as 'PHP function call that has transmissible parameter' [7].

F. Action and Filter

There are two types of hook. An action hook is run in case of event within Wordpress. For example, action hook is the one that can be called when new post is registered. A filter hook is used when contents are stored in database or changed before being printed on screen. The filter hook involves contents of post or page. Hence, the contents can be changed after being transferred from the database or before being printed on the browser screen [7].

III. IMPLEMENTATION AND DESIGN

This paper designed and fabricated plug-in based on Wordpress platform. UI was composed using Javascript and CSS and color picker was fabricated using JQuery. As shown in Figure 2, an independent space was created in the same name for WordPress plug-ins to be stored in the WordPress installation folder "wp-content/plugins".

```
/wp-content/plugins/ks-fivecolor-plugin/
/wp-content/plugins/ks-fivecolor-plugin/ks-fivecolor-plugin.php
/wp-content/plugins/ks-fivecolor-plugin/inc
/wp-content/plugins/ks-fivecolor-plugin/css
/wp-content/plugins/ks-fivecolor-plugin/images
/wp-content/plugins/ks-fivecolor-plugin/js
```

Fig. 2 Plugin Folder of Wordpress

The "inc" folder collects other script files that will be used by retrieving from the main plug-in script file "ks-fivecolor-plugin.php". The "images" folder is created to

store relevant images such as icons and five-colored images. The "js" folder stores JavaScript files and the "css" folder stores style sheets. Once WordPress is executed, the "wp-content/plugins" folder is read in and all plug-ins installed inside the folder are identified, and then only activated plug-ins are executed. Not only the main system of WordPress, but also all plug-ins are executed within the same namespace. Therefore, as shown in Figure 3, the names of functions or variables were designed using a prefix.

```
ks_fivecolor_plugin_functionName();
```

Fig. 3 Function Name of Plugin

By using the prefix "ks_fivecolor", conflicts with other plug-ins can be avoided and PHP errors can be reduced. In addition, as shown in Figure 4, a plug-in header included in the main script file was configured.

```
<?php
/*
Plugin Name: Korean Style – Five Color Plugin
Plugin URI: http://thekoreansilk.com
Description: This plugin supports application of Five-color and
patterns useful for decorating blogs in traditional Korean style
Version: 0.0.9
Author: Korean Style Team, Andong National University
Author URI: http://multi.andong.ac.kr
License: GPL2
*/
?>
```

Fig. 4 Plugin Header

The plug-in header is used to obtain information related to plug-ins by parsing in WordPress, and plug-in information is printed out on the WordPress administrator's screen. The header is an essential item that should be included in plug-ins, and WordPress cannot recognize the plug-ins without the header. Plug-in files saved in this manner are compressed into a zip file, and can be used by installing them as plug-ins and activating them.

Figure 5 below shows pattern setting screen using plug-in that uses Wordpress developed in this paper. When setting the plug-in's pattern, background color and foreground color can be determined and the registered pattern image can be chosen to be applied. For development of Korean style plug-in, a function that enables setting of Five-color was added differently from previous color pickers and patterns were also designed such that diverse Korean style patterns can be included.



Fig. 5 Color-Picker Prototype

Figure 6 below shows screen where Five-color was applied. Korean style color picker plug-in that supports Five-color was designed such that background, pattern image, Five-color, etc. can be changed.



Fig. 6 Choosing the Background Color

It was implemented such that background can be repetitively set after choosing the background color or pattern image, by applying Background-Repeat. Moreover, it was composed so that it can be applied to header and footer of Wordpress.

Figure 7 and 8 below show a screen where color picker that supports Five-color is applied in initial layout of Wordpress



Fig. 7 Applied Pattern

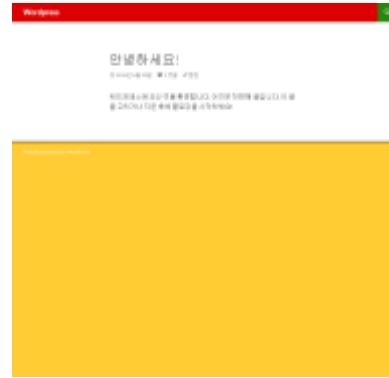


Fig. 8 Applied Five-color

In this paper, plug-in was designed by applying Korean style Five-color, whose provision enables application of Korean style patterns, which was impossible in previous color pickers. In previous plug-ins, Korean style pattern could not be provided or Five-color could not be selected. The plug-in implemented in this paper enables controlling the blog's theme using diverse Korean patterns. Not only the background color, headers color and footer color can be freely chosen, but also the colors can be chosen following the Korean traditional color of Five-color in a differentiated manner.

IV. CONCLUSION

In recent CMS market, Wordpress became the number one domestic CMS tool, surpassing the express engine (XE). Following such trend in domestic market, the number of domestic homepages that use Wordpress is also rapidly increasing. However, there was no case in Wordpress market where theme or color that has exclusively Korean color or Korean sentiment was applied.

In this situation, this paper designed and implemented plug-in that enables making blog in Han(□)guk style by using Wordpress whose usage is ever increasing. Previous plug-ins and themes were mostly fabricated according to the international style. Here, Han(□)-style plug-in was fabricated, being differentiated from the previously made theme changing plug-ins. Considering that literature and information about Wordpress in Korea is still insufficient, there can be some difficulties when designing and implementing Wordpress in Korean style plug-in and theme.

Wordpress based on open-source enables many developers to easily develop additional extended programs, supporting limitless extension. Based on the plug-in that uses Korean color developed in this paper, it is expected that more plug-ins that fit Korean sentiment will be developed in the future. Moreover, in addition to the Korean market, its usability as a global plug-in is also expected to grow considering increasing amount of global attention to Korea these days.

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