

Development of Content Management System with Animated Graph

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Abstract—Animated graph gives some good impressions in presenting information. However, not many people are able to produce it because the process of generating an animated graph requires some technical skills. This work presents Content Management System with Animated Graph (CMS-AG). It is a web-based system enabling users to produce an effective and interactive graphical report in a short time period. It allows for three levels of user authentication, provides update profile, account management, template management, graph management, and track changes. The system development applies incremental development approach, object-oriented concepts and Web programming technologies. The design architecture promotes new technology of reporting. It also helps user cut off unnecessary expenses, save time and learn new things on different levels of users. In this paper, the developed system is described.

Keywords—Animated Graph, Content Management System.

I. INTRODUCTION

NON-computer literate managers usually rely on technical staff to handle some computer related activities i.e. to publish a generated graph on the web. It is just such a waste of time and money, since they could handle it by themselves with the aid of a Content Management System (CMS). CMS is a database of information and a way to change and display that information, without spending a lot of time dealing with the technical details of presentation [1]. Information is usually displayed on a web browser window. CMS defines levels of access, track changes, an auditing trail, and will not let two or more people change the pieces of data that belongs to someone else, except with the authorization of administrator.

In addition, manipulating and managing the content is and has always been one of the primary functions of a computer. Initial computing applications include text formatters and program compilers. Content was initially managed by explicit user interaction through the use of files and file systems. As technology has advanced, both the types of content and the way people wish to use it have greatly changed. Content have been managed not only to produce the simple layout and access for the users only, it also has been used to provide the graphical interface to allow the users navigate easily with the clearly provided contents according the levels of their access

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to the content. It also enables users to produce text, graphic animation, and sound according to their demands and preferences. Sharing information becomes easier. Levels of access can be defined to control who has access to what data. The CMS can keep track of changes made by different users and will not let two people change the same piece of data at the same time [2].

This paper proposes a web-based CMS with animated graph to enrich the experience of graphical report and to establish standards to share information for common reporting purpose. The developed CMS is to enhance the hard code into the interface using different types of programming and IT components, which are needed by users in the business organization. The CMS-AG with Animated Graph contributes into Graphical Report that enable non-IT skill people to produce graphical report without involving programming skill. It can also assist people who want to know more about programming regarding graph as well as programming regarding the CMS or other purposes, to generate the code.

II. RELATED WORK

There are numerous CMS applications in the market that allows users to manage and manipulate content on the web. There are almost one thousand CMS listed on the web either an open-source or propriety [3], [4].

An example of a popular CMS is WebGUI, an open source application, which is a content application framework allowing for easy content management, while maintaining the ability to create and install custom applications [5]. WebGUI offers some built in application such as publish articles, participate in forums, create photo galleries, conduct surveys and polls, manage projects, create interactive event calendars and etc. WebGUI has graph and chart option for surveys and polls and they are not animated graph.

Some of the CMS made the option of graph and chart as an add-on function such as in Joomla!, MODx and Mambo [3]. There are some open-source CMS that add an extra cost for an extra function such as AguiferCMS. It provides distributed content entry with no knowledge of HTML, multi-tiered content approval, reusable content, content expiration, a web-enabled interface and tremendous flexibility in the way content displays [6]. User can download the software freely but will be charged for an extra function such as graph and chart.

III. SYSTEM DESIGN

The general architecture of CMS-AG is shown in Fig. 1. It explains how CMS-AG application interacts with the Web Server and Database in order to produce Graphical Report and display it on the web browser. The process starts with CMS-AG application calls the server side to support the server side script language and establish the connection to the database.

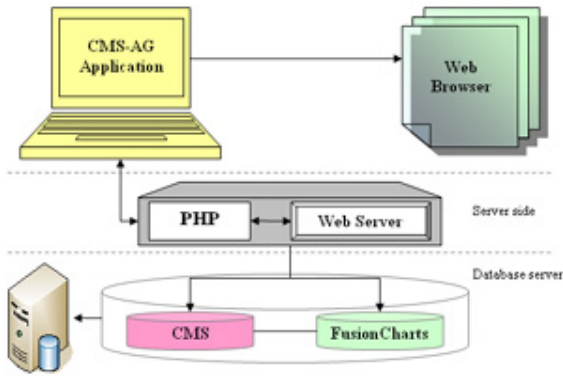


Fig. 1 CMS-AG architecture

Then the communications begin by sending request and receive the result. The CMS-AG application later sent the SQL statement request to generate data from the database through the web server. The database server will search for the result based on the query request and generate the data record to provide to the server side, and the web server will then pass the request to the application side. Finally, the application will interpret into client side language, produce the result, and load to the browser to display as interface outcome.

CMS-AG application Layers of Accessibility as shown in Fig. 2 is mainly focus on the levels of user access. They are Normal users, Administrators, and Security Admin which have different role of permission in accessing the content and functionalities.

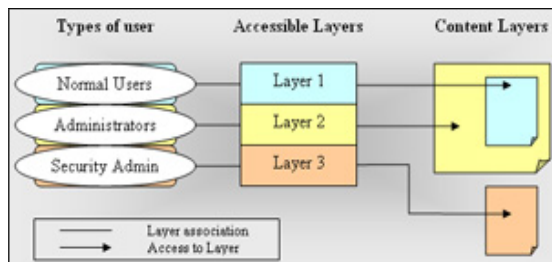


Fig. 2 CMS-AG accessibility layer

A. Normal Users

This is for those who have lower power access than that of Administrators. They have profile, normal login ID and password to login to access the first layer of the content. All Normal users are in this layer; they are able to create new XML Data Template(s), Use Global existing Template, Update Local existing Templates that belong to their own

access ID, and Delete Local Templates of their own belongings. Global Template refers to the existing template that the application system provides to and those which are created by the administrator and only for the standard-purpose used by its own organization.

Local Template refers to the templates that are created by normal user locally. So, those templates belong to the normal user respectively, and they can be standard or non-standard templates; however, it can still be used for personal purpose of organizational purpose. They also can edit their own profile. Moreover, users can produce the graphical report/Animated Graph from template provided or/and Generate code from the report together with the XML Data Template.

B. Administrator

An administrator has full privilege of the system. They are able to view all data of the users and database of Fusion Charts properties. They also can add normal user, Administrator, or Security Admin account. They have admin ID and password to login to access the second layer of the content which can view all contents that normal user can do including their own contents as an administrator. However, they can not view the Security Admin contents. The function includes access to all contents and functionality of Normal users and is able to delete XML Data Templates that belong to any Normal user; and they are able to add new user account, update user profile, and delete user account. So, Administrators are most likely to monitor the database of both users and the Fusion Charts XML properties database

C. Security Admin

This is for those who keep track of the changes from the normal users and administrators. They can access the third layer and are able to report the changes done by users and administrator. On the other hand, their access level is only to view and report, and they do not have authorization to the contents appeared to the Normal user or Administrator. Therefore, Security Admin mostly produces the reports on the changes of database that are done by the above two levels of users.

Use case diagram in Fig. 3 shows the functionalities of the CMS-AG system at a high level. It illustrates seven use cases which are authorization, graph template management, produce graph, generate report, security tracking, security report and account management.

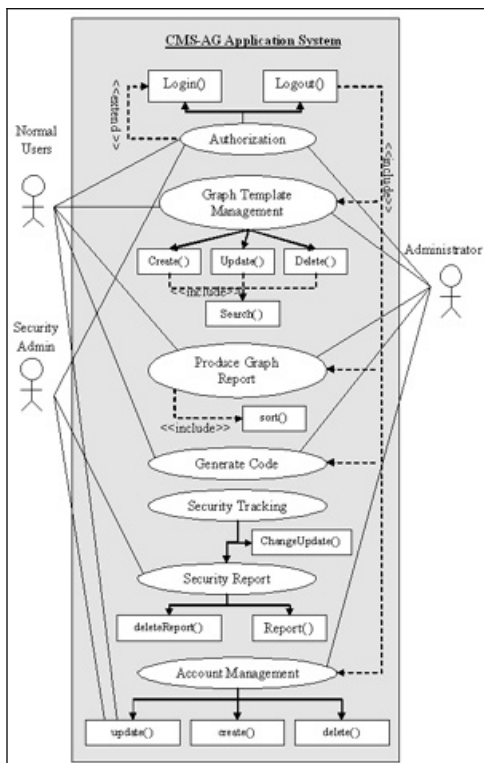


Fig. 3 CMS-AG use case diagram

The CMS-AG class diagram is shown in Fig 4. The class diagram depicts classes, which include the attributes and the association between classes.

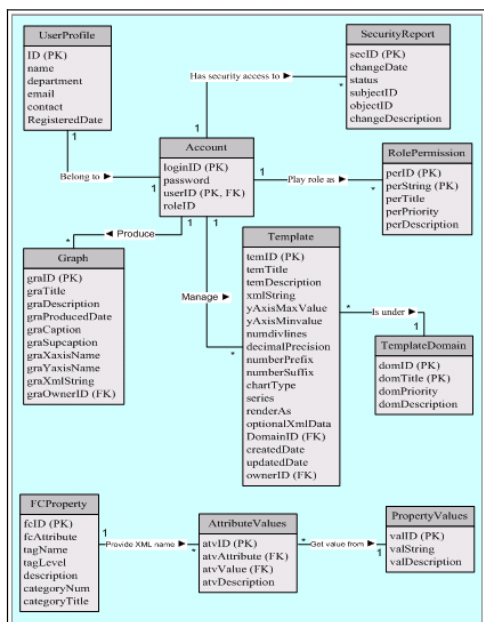


Fig. 4 CMS-AG class diagram

The CMS-AG sequence diagram is shown in Fig. 5, Fig. 6 and Fig. 7. The sequences diagrams detail out the process of the users in interacting with the CMS-AG application based on users' role permissions. It is a dynamic model used to show

the explicit sequence of messages that are passed between objects in a defined interaction. Since sequence diagrams emphasize the time-based ordering of the activity that takes place among a set of objects, they are very helpful for understanding real time specifications and complex use cases class diagram depicts classes, which include both behaviors and statistics, with the relationships between the classes.

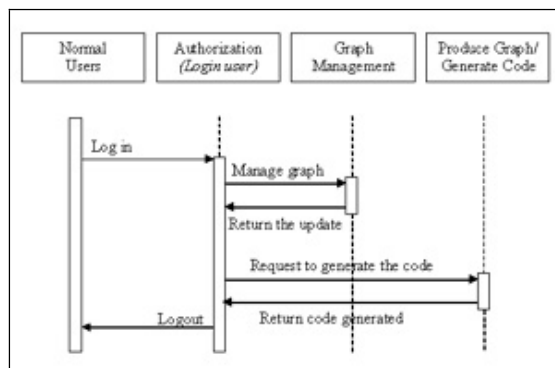


Fig. 5 CMS-AG sequence diagram for normal user

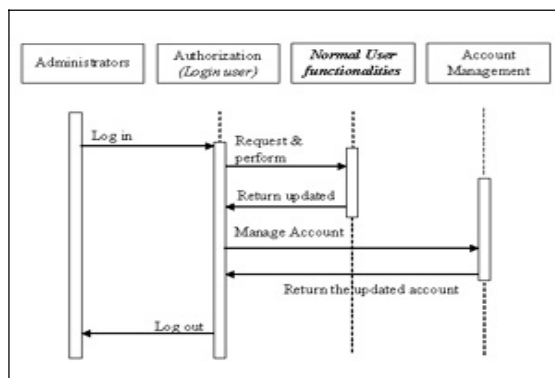


Fig. 6 CMS-AG Sequence Diagram for Administrators

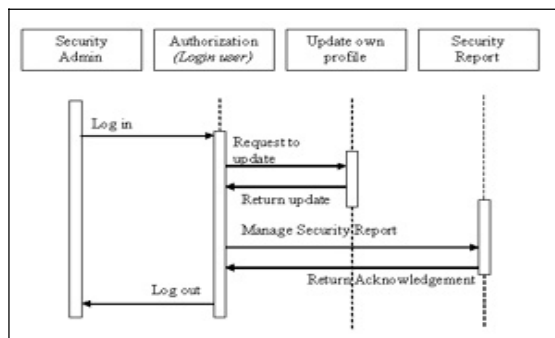


Fig. 7 CMS-AG Sequence Diagram for Security Admin

IV. THE APPLICATION

The application CMS-AG enhances the basic approach of content management system by integrating the animated graph that established the standard to share information in common graph reporting purposed. It helps non-technical skill people to handle their daily work faster by simplifying the function in the application.

Fig. 8 shows the CMS-AG application on the landing page. The users have to login in order to differentiate the level of access privileged. While doing login the application gathers the necessary information about the user in order to append the content respective to its access role or layer. Moreover, the user may be able to use sub functionalities or features that linked in the page to perform tasks such as account information, graph or security.



Fig. 8 CMS-AG homepage

Fig. 9 shows the functions for manage template. The page of Graph Template Management allows users to utilize, create, update, delete and produce graph and generate script for saving and deleting images. Users may select the different type of graphs and templates, and the preview will change and reload accordingly.

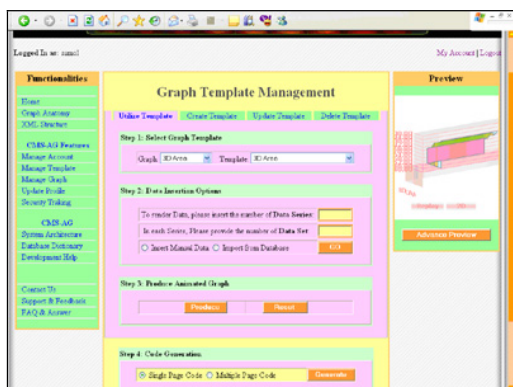


Fig. 9 CMS-AG Manage Template on the Utilize Template

Other step, user will need to insert the data into the graph so user need to provide the necessary input by key in the provided field and select the type of code generation. In the code generation section, users need to choose either to

generate the script in single page or multiple pages. The advanced preview on the Graph Template Management is designed for users in case of incompatibility of flash template with a small screen that may mess up the looked of the graph.

Then, the graph data will appear respectively with the nature of users' inputs. The Produce button allows user to produce the graph in the Pop up window with the text box of Graph title to be filled in when the user would like to save that graph as shown in Fig 10. The graph produced come along with an XML data, so it can be embedded in the single page script using the attribute dataXML or in separate page with dataURL in object > param > value. The sample codes are:

```
<param name=Vars value="dataXML=<graph caption='graph', color=....."
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```
<param name=FlashVars value="dataURL=Area.xml"
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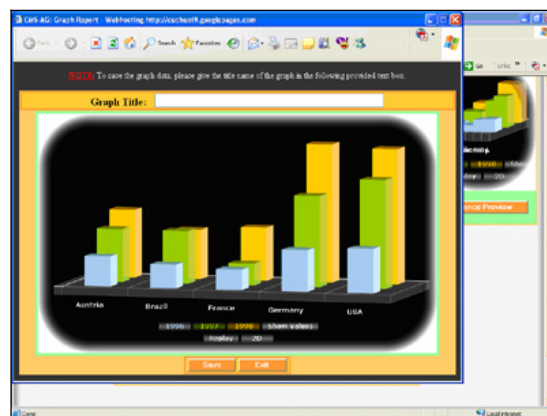


Fig. 10 CMS-AG Pop-up Window of Graph Creation

V. DISCUSSION

CMS-AG implements the use of flash template with XML data as the report plug-in and Web server programming as the tool to produce the graph report. User can follow the step or instruct the system to utilize, modify, update, or create the template in order to be used for producing the graph. The idea of putting the system online is to increase its availability and gives value to use in the convenient way. This application had implemented the concept of online tracking system, with the automated tracking features; the system is capable of keeping track the activities of users who make any change to the graph template and the account management and reporting those changes. This system is managed to generate code of the produced graph report in scripting such as XML, XHTML with CSS, and JavaScript to be used in the learning environment, especially for beginning practice education.

In addition, the pre-processing technique developed in this system before execution or translation, of the CMS-AG loading page, such as validation input, auto generated data and time, data redundancy elimination and mismatch checking could increase the reliability, integrity and security of the application. With the availability of the instruction or step to

go through, the users will be able to understand the schema of attribute to insert the data to the application. The users do not need to know how the programming or scripting is running behind the application.

Beside that, the development of system has also some limitations that bound it from performing to its full capacities. The application is suitable for the instruction in utilizing the template, updating some features in the template such as Y axis min and max value, division line, decimal, type of graph and etc. All of the above will be done in the flexible availability of time. System allows creating, updating, and deleting graph and user account according to their authorization to the system. It also functions with security tracking to notify changes to database as well as the system.

VI. CONCLUSION

This system development contributes and improves approach to the business and education environments. It provides graphical reporting functionality of a web-based content management system. The development of CMS-AG might need to further consider for enhancement to strengthen the use of the application. One of the suggestions is to provide file storing function for more convenient way to some users in producing the graph and saving the graph. With these function, users is able to save the template or graph as the text, XML or HTML files to be used later. Beside is importing or uploading feature where users could load their own XML data file to produce the graph. These allow the application object to select the server or database to be used. From this, it emphasizes that the system will have a great powerful feature to integrate with other database to generate data to be used in appending as the data for producing the graph.

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