

Design and Development of Real-Time Interactive Big Data Visualization Application for Studio Use

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Abstract—The change of user habits, the intelligentization of mobile devices, and the development of new media have pushed the TV industry into a multi-screen era. While the discussion over TV programs by the Internet users keeps heating up, feedbacks from the social media have made a great influence on the content selection and production of the TV programs. By analyzing the features of TV and social media and discovering the advantages of combining the two, this paper goes behind the meaning of the interaction between TV and social media. After integrating the functions of Studio Interactive Platform and the demand of the studio, an idea of building a social media interaction presenting application for studio use based on Web is proposed. The paper describes the basic function and interface design of the application and illuminates the key points of development in every part of the applications in detail. The paper ranges over many aspects of front-end Web development, including the research of audio visualization by using the new features of HTML5, which makes it quite valuable.

Keywords—Audio Visualization; CSS; HTML; JavaScript; PHP

I. INTRODUCTION

With the development of the technology, a modern media ecological environment with the characteristics of mobile terminal, big data and social network is built for the media industry. How the traditional TV media and new media make the interactive win-win situation, how the traditional TV media improves its value and how the traditional TV media seeks the outlet of becoming bigger and stronger are the topic worth discussing. A survey result aimed at across the screen behavior on cities Internet users in China shows that 86.3% of Internet users use a smartphone as the across screen to match television while watching TV. The most common activities that people use mobile phones while watching TV include chat (such as using WeChat or other instant messaging applications), information query, Weibo, using social network sites and so on

[1]. It can be seen that social media not only has redefined the way of people's communication but also is changing people's TV viewing experience. Many TV viewers are used to watching TV and using the Internet access equipment to interact and share at the same time. And their interactivity and engagement are very strong. TV media should change ideas correctly to treat the change of the audience viewing habit and demand, make full use of the advantage of social media, reexamine the production concept of TV programs according to the characteristics of the current new media environment, increase interaction with the new media such as the Internet media and social media, continue to enhance television's authority influence and covering power and promote the continuous development of TV media [2].

This paper is to design and develop Web client application. How to use the latest technology to realize the magnificent visual effects and smooth interaction experience is the core of the study. HTML5 is currently the latest Web front-end development technology. HTML5 is the next generation of HTML and XHTML standards. From the broad sense, HTML5 actually refers to a set of technical combination including HTML, CSS, and JavaScript [3]. It can ensure the rich Internet application service and powerful information processing service at the same time, reduce the needs of the plugin for the browser, and provide more the standard set to enhance network application effectively. All relevant Web applications based on HTML5 can be standardized. At present, there are many use of HTML5 to develop Web application.

HTML5 can change the network service mode. HTML5 can enhance network interactivity. HTML5 can improve network security. HTML5 can simplify network development.

II. DESIGN OF INTERACTIVE BIG DATA VISUALIZATION STUDIO APPLICATION

Interactive big data visualization studio application is a Web front-end studio application based on design of interactive studio application.

A. Studio Interactive Platform

Studio interactive platform is generated because of the growing recognition and appeal to the new media transmission channel such as Weibo, WeChat for the film and television industry. According to the actual business scenarios, platform is divided into two level products: interactive support platform and interactive studio application platform.

On the basis of user management system, interactive support platform realizes the user's account associated binding to Sina Weibo, Tencent Weibo, Netease Weibo and Sohu Weibo and WeChat public platform account. The data interface with these information channel is realized. Based on the interactive features of product design, the encapsulation, distribution, feedback, analysis and statistics of four types of interactive data including topic, vote, PK, quizzes are realized in all channels. It can be divided into four modules including the user, collection, communication and interaction. The user module provides user management, authorization, and binding. The collection module is controlled by multiple processes using the background PHP program to brush database in order to obtain all kinds of messages and user data on WeChat and Weibo. The communication module provides a platform unified communication interface to protocol encapsulation of Weibo and WeChat. Based on this interface, the platform provides communication interface for interactive application platform. The interactive module provides interactive interface for interactive application platform and provides interactive interface for the communication module. When the interaction is released, the interface of communication module is called to release the interaction to Weibo and WeChat platform.

Based on the underlying support platform architecture, interactive studio application platform is the control end of the studio scene. It has a friendly user interface. It can provide the management service of visual application data and a set of data interface. It provides service for the various design scenarios in the front end. It can provide users and topics based surfing for the big four Weibo (Sina Weibo, Tencent Weibo, Netease Weibo and Sohu Weibo). It can also provide the interactive information browsing of WeChat public account. And the content need to present can be guided. The guided data can be locally processed, secondly edited, organized and finally published to the front end studio present application.



Fig. 1. Studio interactive platform.

B. Platform Present Situation and the Demand Analysis



Fig. 2. Studio interactive platform interface.

Fig.2 is the interactive platform login interface. All the entrances of the front end studio present application are on the right side of the interface. The existing application mostly uses a separate channel data. WeChat wall, vote, PK, quizzes all use separate entrance. That is to say, only one form of interactive rendering is from one entry every time.

However, if you want to give full play to the audience and the scene interaction, more than one forms of interaction often need to be used at the same time. In this case, the good cooperation of a director, the studio interaction platform operators and host is needed to switch among different applications according to the requirements of program process.

C. Application Function and Interface Design

According to above analysis, all the existing functions are integrated into one application. So multiplex data can be controlled through an application at the scene of the studio. The detailed design scheme of application is as follows.

1) Integration of the Entry Page

Program LOGO and different interaction module entry icon on the dark dynamic background are arranged in Fig.3 shows. Through sliding around the remote control switch, we can click to enter the corresponding module page respectively.



Fig. 3. Integrating entry page effect picture.

2) WeChat Topic Module

The two-dimension code entry, name and text of interactive topic are centered displayed. The content guided by WeChat and Weibo is chosen to preview render in the bottom of the hexagon. The pure text intercepted the front 80 characters is displayed as the tower shape. Image content is filled in the hexagon. Video content makes the user's avatar fill in the hexagon. The play icon is shown on the top center. Audio content displays audio icon and time.



Fig. 4. Audio display page effect picture in WeChat topic module.

3) WeChat Voting and Quizzes Module

WeChat voting module is the same form as WeChat quizzes module. The activities release page is as shown in Fig.5. The two-dimension code entry of voting or quizzes, name and text of interactive presentation are centered displayed. The activity topic maps and all the options are shown on the bottom.

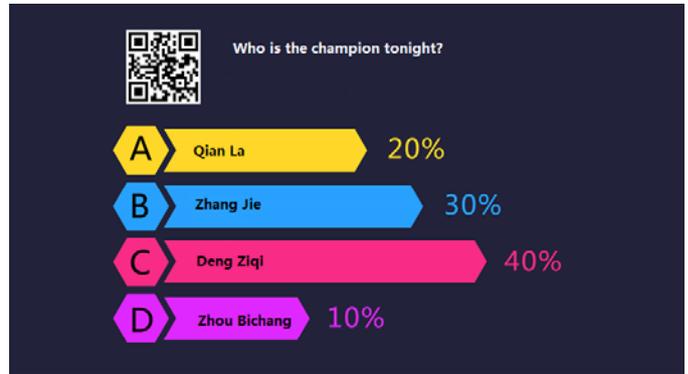


Fig. 5. WeChat voting and quizzes module.

4) WeChat PK Module

WeChat PK module activities release page is as shown in Fig.6. Similar to WeChat topic information collection page, the two-dimension code entry of PK interactivity, name and text of interactive presentation are centered displayed.



Fig. 6. WeChat PK module.

III. THE PHP WEB DEVELOPMENT TECHNICAL REALIZATION

The development languages used in this paper are all interpreted scripting language. HTML, CSS and JavaScript used in the previous static page are browser interpreted languages, which can be directly executed by the browser. It do not need to compile. So it is written directly in a text editor Notepad ++ and debugged by the browser. PHP used when connecting background data is a server interpreted language. PHP must run on the server side and cooperate with the existing platform. The popular LNMP server environment is adopted in this paper. LNMP is Nginx + PHP + MySQL server architecture under Linux system. LNMP is a free, efficient and scalable web service system.

A. Drawing Hexagon Using Pure CSS

An important element - hexagon shape is used in the visual presentation of application. The simplest method of realizing in a web page hexagon is to draw a hexagon in Photoshop, and then to be inserted as pictures. But in the application design of

this paper, hexagon is the container bearing dynamic information. The role is more than a picture. Considering the subsequent function expansion of application, pure CSS is used to draw hexagon [4].

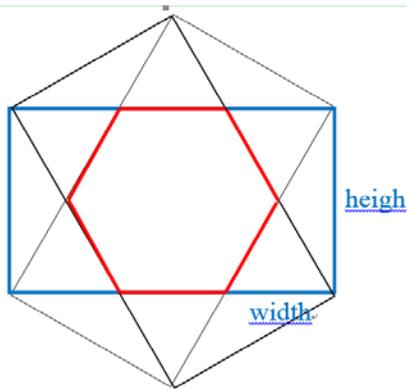


Fig. 7. Principle graph of drawing hexagon using pure CSS.

B. Hexagonal Arrangement

In the design, each message type is corresponding to one hexagonal container of different internal style. The containers are inserted and arranged according to certain rules. When the new data is accessed, the content type is determined firstly. The video, audio, images, text contents are respectively corresponding to a kind of hexagon structure style which is already designed before.

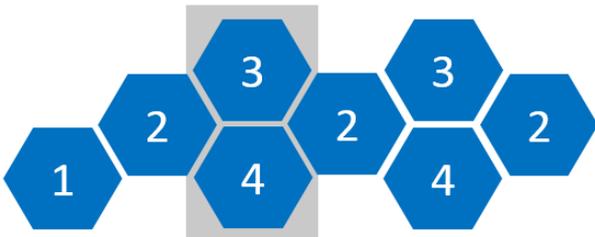


Fig. 8. Hexagonal arrangement.

C. Audio Visualization

In order to coordinate the expression of TV, in the development of audio playback function, the Windows Media Player is used to play visual effect, as shown in Fig.9. Audio visualization is according to the property changes of the audio (including frequency, volume and so on) [5]. The rendering dynamic graphical effect is real-time synchronous generated.

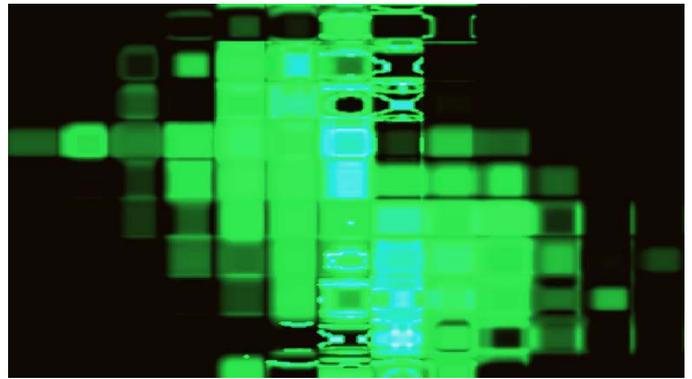


Fig. 9. Audio visualization.

IV. CONCLUSIONS

The change of user habits, the intelligentization of mobile devices, and the development of new media have pushed the TV industry into a multi-screen era. While the discussion over TV programs by the Internet users keeps heating up, feedbacks from the social media has made a great influence on the content selection and production of the TV programs. By analyzing the features of TV and social media and discovering the advantages of combining the two, this paper goes behind the meaning of the interaction between TV and social media. After integrating the functions of Studio Interactive Platform and the demand of the studio, an idea of building a social media interaction presenting application for studio use based on Web is proposed. The paper describes the basic function and interface design of the application and illuminates the key points of development in every part of the application in detail. The paper ranges over many aspects of front-end Web development, including the research of audio visualization by using the new features of HTML5, which makes it quite valuable.

This paper provides a form of the sample for the use of social media to the fields of TV media and audience interaction. It is believed that there will be more interesting and more luxuriant social interaction present application in all kinds of TV programs using this paper as a reference in the future. Let television media and new media to promote each other for the common development and create a more prosperous era of the media.

REFERENCES

- [1] Ju Wenzhou and Ji Xiuhuan, "TV media is analysed and the way of the fusion of social media," Science and technology innovation and application, 2013.
- [2] Shouxin Zhang, "Social media + APP: traditional open television interactive television new era," Journal of southern TV, 2013.
- [3] Xinqiang Ma, Zhao Sun, Zhe Yuan, and FengLi Chi, " Web standards and the core of the HTML 5 technology research," Journal of chongqing college of liberal arts (natural science edition), 2010.
- [4] Boris Smus. Web Audio API[M]. USA: O'Reilly Media, 2013.
- [5] Arunkumar Gudelli. How to draw polygon using HTML5 Canvas [J/OL]. <http://www.arungudelli.com/html5/html5-canvas-polygon/>.