An authoring tool to provide images and 2D graphics for smart educational cloud services

In-Kwon Kim*, Ji-Seong Jeong*, Min-Ho Song*, Ga-Ae Ryu*, Chan Park**, Rae-Hyun Jang**,
Kwan-Hee Yoo*
*Chungbuk National University, Korea, **Korea internet software, Korea
E-mail : leibniz55@chungbuk.ac.kr, farland83@chungbuk.ac.kr, songminho@cbnu.ac.kr, relaxative@nate.com,
szell@chungbuk.ac.kr, jrh@kis21.com, khyoo@cbnu.ac.kr

1. Introduction

Recently, according that not only internet services environment is improved, but also performance of smart devices is upgraded, application smart services have been developed [1]. The most one of them is educational services [1,2,3]. The development of a variety of smart educational content is required to be able to promote the educational services. However, users cannot create conveniently the educational content for eBook such as EPUB, as well as multimedia content including images and 2D graphics. In order to solve the problems, we have developed the cloud educational services [4] as well as an authoring tool [5] to support multimedia content. Smart education cloud system, which has been developed in [4], is a kind of education cloud systems for small size users. The system stores all data for a user into a cloud server. As shown in Figure 1, the user creates the educational content which will be uploaded to the system via the network. Here, the contents can include many types of multimedia which are text, image, 2D graphics, movies, 3D objects and augmented reality. After upload the contents, the students can show the contents by the contents viewer of their smart devices.
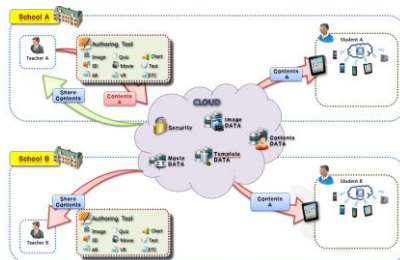

Fig. 1. The cloud system diagram proposed by Jeong, et.al [3]

Kwon, et.al [5] proposed implementation results of the authoring tool's framework proposed by Jeong, et.al[4]. Additionally, they described items for editing text/page and simple images. In order that their proposed authoring tool is used to provide the education content, functions for editing images and 2D graphics have to be provided. In this paper, we propose an authoring tool which can create easily image/2D graphics content for the cloud education service system.

2. The proposed authoring tool

The proposed authoring tool supports 2D graphics and images as context types as shown in Figure 2. The components of 2D graphics consist of polyline, rectangle, triangle, circle, ellipse and text, and an editor of the 2D graphics can load/create/edit/save the components. The editor of images supports eleven functions such as loading, saving, cuts, blur, sharp, gray, darkness, brightness, vertical flip, horizontal flip and invert. The data will be saved in the storage space in the cloud server, and the server creates metadata for controlling the contents in database. Users using our proposed authoring tool can save education content made by the components into a HTML5 file so that they can see the education content on smart devices.
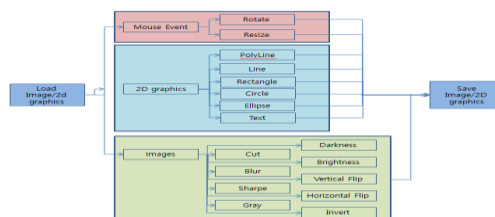

Fig. 2. The components of images and 2D graphics provided by our authoring tool

The proposed authoring tool is implemented on PC MS Windows by using MFC C#, OpenCV and WPF(windows presentation foundation). Basically, a user loads an image and performs editing works on the image, and then creates/edits 2D graphics. The edited results are saved into SVG(scalable vector graphics) format[6] so that the content can be viewed on smart devices. Figure 3 (a) shows a screen of the proposed authoring tool after loading a penguin image, and Figure 3(b) shows annotation results given by using 2D graphics components such as circle, line, and text for illustrating the image. Two circles in Figure 3(b) are done to give illustration on penguin's nip and penguin's wings, respectively.
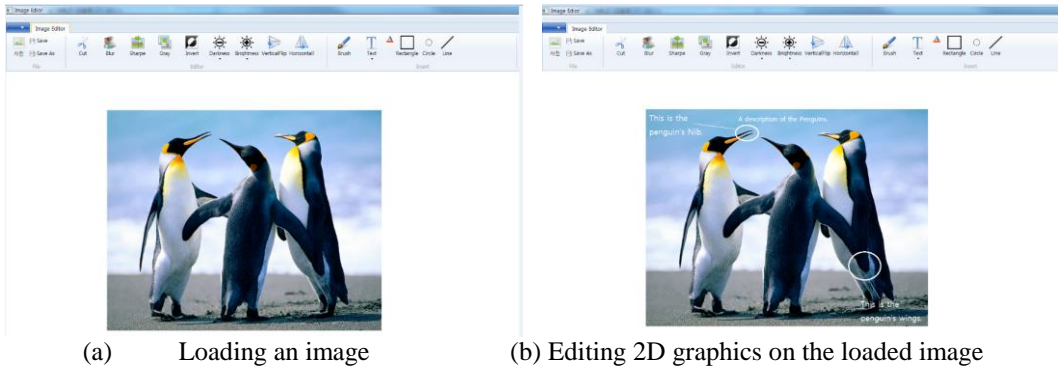

(a)　　　　Loading an image　　　　(b) Editing 2D graphics on the loaded image

Fig. 3. The components of images and 2D graphics provided by our authoring tool

3. Conclusion and further work.

We developed an authoring tool to support editing functions of images and 2D graphics for creating education content which is used on smart devices and is saved into a XML file. In order that teachers can create favorable and flexible education content, advanced functions such as video, audio, 3D graphics, and augmented reality have to be supported. And the research on encryption and decryption is required to support transmission of safe education content.

4. Acknowledge

5. References

[1] H.Y.Kim, O.G. Min And G.H Nam, "The Technology Trend of Mobile Cloud", Electronics and Telecommunications Trends, ETRI, Vol. 25, No. 3, pp.40-51, 2010
[2] E.S Jeong And C.S Park, "A study on Standard strategy of Digital Textbook in Smart Learning Environment" 2011 Korean Society For Internet Information Conference, Vol.11, No. 1, pp. 355-356, 2011
[3] S.J Lee, J.S Yoo, K.H Yoo, H.S Byun And J.S Song, "Design and Implementation of e-Textbook Based on XML", The Journal of Korean Contents Association, Vol 6, No. 6, pp.75-87, 2005
[4] J.S. Jeong, et al, "A Content Oriented Smart Education System based on Cloud Computing", IJMUE, Springer, Vol. 8, No.6, pp. 313-328, 2013.
[5] S.O Kwon, et al, "Design and Implementation of Educational Content Authoring Tool for Smart Devices", Journal of the Korea Contents Association, Vol.13, No. 12, pp. 001-008, 2013
[6] SVG(Scalable Vector Graphics), www.w3.org/Graphics/**SVG,** May, 23, 2014.