Automatic Generation of a TV Programme from Blog Entries

Masaki Hayashi
Steven Bachelder
Department of Game Design,
Uppsala University
Visby, Sweden
masaki.hayashi@speldesign.uu.se

Naoya Tsuruta, Takehiro Teraoka, Kazuo Sasaki,
Wataru Usami, Koji Mikami, Tsukasa Kikuchi,
Yuriko Takeshima, Kunio Kondo
School of Media Science, Tokyo University of Technology
Tokyo, Japan
kondo@stf.teu.ac.jp (Kunio Kondo)

ABSTRACT
TVML (TV program Making Language) is a technology capable of obtaining TV (television)-programme-like Computer Graphics (CG) animation by writing text script. We have originally developed TVML and have been studying generative contents with the aid of TVML. This time, we have created an application that automatically converts blog posts into CG animations with TV news show format. The process is: 1) to fetch HTML of the blog posts and perform Web scraping and natural language processing to obtain summarized speech texts, 2) to automatically give a show format obtained from the analysis of professional TV programme to get TVML script, 3) to apply the CG character and artworks etc. that fit the blog content to obtain the final CG animation. In the demo session, we will explain the method and will demonstrate the working application on a PC connected to the Internet showing CG animations actually created on site.

Author Keywords
Computer graphics; animation; Internet blog; television programme

ACM Classification Keywords
H.5.1: Information interfaces and presentation (e.g., HCI): Multimedia Information Systems

INTRODUCTION
The amount of UGC (User-Generated Content) provided on the Internet such as blogs, video sharing services (YouTube etc.) and SNS (Social Networking Service) are extremely large and play a significant role in the current media.

The technology called TVML (TV program Making Language) which is developed by the authors has been used widely to enable Computer Graphics (CG) animation creation even for amateur people to promote UGC [1]. Users can make a TV-programme-like CG animation automatically generated by a computer simply by writing a text script.

This time, we have implemented a system that automatically converts blog entries into TV-programme-like CG animations using the TVML technology. The motivation for our method is to allow blog entries to be watched in the movie. This has the potential to increase opportunities especially for young users accustomed to seeing rather than reading and to promote the media

In our automation process, there are following three important points:

1) A method to obtain texts of announcer's speech and superimposed texts used in a TV programme from a blog post using Web scraping and natural language processing.

2) A method of automatically giving the effects (camera angle, artwork, video switching, etc.) to the texts obtained by the process 1) mentioned above to convert it into a TVML script. The effects are obtained by analyzing the professional TV programme.

3) Technology for setting up professional quality CG characters, CG studio sets, lighting, etc. used in CG animation made by TVML.

The novelty of our work is to conduct multidisciplinary collaboration of researchers and developers from different fields needed to fulfill these three aspects above aiming to develop the system which enables to automatically obtain CG animation output with close to the professional quality.

In the demo session, we will explain the details of the process and demonstrate the working application on a PC connected to the Internet to create CG animations from the targeted blog site.

METHOD
The process of the conversion from the targeted blog site to CG animation is described below.

System Configuration
Figure 1 shows the system configuration. HTML text data fetched from the blog site is processed by Web scraping and natural language processing and converted into an intermediate file called "APE script" written in XML format (APE: Automatic Production Engine). Next, the TVML conversion module called "APE engine" converts the "APE script" into a "TVML script" by referring to a "TVML template". The "TVML template" is specifically made manually from the broadcasted TV programme selected as a programme suitable for the target Web content by analyzing it and imitating it. Finally, the system applies appropriate artwork to this and obtains final CG animation.

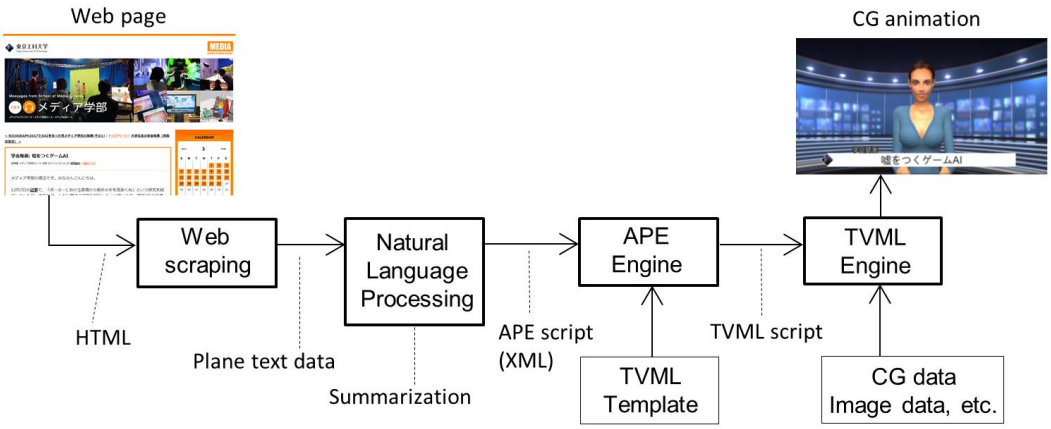

Figure 1. System configuration.

The three important points of the process mentioned in the Introduction are briefly described in the following.

Web scraping and natural language processing

The blog site that we used for the development is a Japanese blog of the Tokyo University of Technology for its publicity (http://blog.media.teu.ac.jp/). To obtain the texts from the blog site, we built a simple crawler that collected the blog entries and scraped their titles, images, and texts. Then the text was summarized automatically using the Basic Summarization Model [2] to limit its length within 200 words suitable for the final animation. At the same time, it also outputs a sentence with the highest importance as the superimposed text. The shortened text, superimposed text, and images are passed to the next process.

Show format template giving the effects

The data from the previous phase is converted to a TVML script using a show format template. The template is made by analyzing the actual TV news programme that we chose for this purpose. The template itself is kind of a single TVML script which mimics, for instance, a news anchor, a studio set, camera angle and movement, music, sound effect, artwork, etc. used in the real news show. Once you create this template, CG animation can be mass produced with this production pattern by giving different script each time.

Generation of the final CG

The final animation is obtained by a TVML engine to combine the TVML template and the text and the images extracted from the blog post with the CG anchor, studio set and artwork data necessary for the generation. This time, we asked several production people to make artworks suitable for the blog. The artworks are an opening title picture, a jingle (short music in the opening), CG studio set, decorative artwork used for superimposing, sound effects, ending titles etc.

IMPLEMENTATION AND EXPERIMENT

We implemented all the functions described above to make an application working on a PC with Microsoft Windows10. And the TVML SDK (System Development Kit) implemented on the Unity Game Engine is used as middleware. The generated animations can be seen at the following link.

https://youtu.be/2AZYFjjeJ9E

Looking at the animation results, the automatically summarized sentences were largely acceptable however, we have several problems such as, some of the sentences were too long to fit into the superimposing, sometimes the wrong sentence was chosen, the displayed image did not match the content of the narration, etc.

CONCLUSION AND THE DEMO

We have described a system that automatically converts blog entries into CG animations. The main points of our system are 1) natural language processing of blog content, summarizing it to length suitable for CG animation, extracting a superimposed sentence and an image URL, and 2) a mechanism to imitate a TV programme as a reference, converting it into TVML to produce CG animation by using a template made in regards to the sense of the original blog as a source.

In the demo session, we will demonstrate the working application on a PC to show generated CG animations on the venue. We have been developing other types of automatic Web-to-CG-conversion and some of the functions are implemented to the application. We will also show, for example, CG talk show generated from YouTube comments on site in order to appeal our ultimate goal which enables people to "watch" all kinds of Web contents as a form of computer graphics.

REFERENCES

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