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# Text Generated TV

## A New Television System Delivering Visual Content Created Directly by Text

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**Abstract**— We propose a new television system based on a methodology which circulates a text-based script on the Internet representing visual content instead of transmitting complete video data. This Text Generated TV is realized by the technology called T2V (Text-To-Vision) enabling to create TV-program-like CG animation (CGA) automatically from script. Our new TV system is made by integrating the research results of T2V technology that we have been studying. The new TV system provides Use-Generated-Contents, automatic generated CGA from text sources available on the Internet, and interactive video game like applications in TV context. The Text Generated TV is regarded as one of the object-based content representation. Hence, it has a lot of possibilities and flexibilities and we believe that it has a big potential toward the future TV system. In this paper, we introduce our concept and a prototype development and discussion on new aspects of our approach.

**Keywords**— Text visualization, TV system, CGA, T2V

### I. INTRODUCTION

We have been studying a technology that enables to create TV-program-like CG animation (CGA) automatically from text-based script (Fig. 1). We named this technology "T2V" (Text-To-Vision) [1] [2]. The T2V enables to convert text to video by using real-time character animation, voice synthesis, font display, image display, movie and sound playback and so on.

We have been studying the T2V technology from many aspects. And as a final step, we are now constructing a new TV broadcast system by integrating the research results. The system is based on a concept that users enjoy visual content by visualizing script transmitted via Internet, whereas users receive the produced audio-visual data in the current TV broadcast.

In this paper, we introduce our concept and a functioning prototype based on the Text Generated TV methodology.

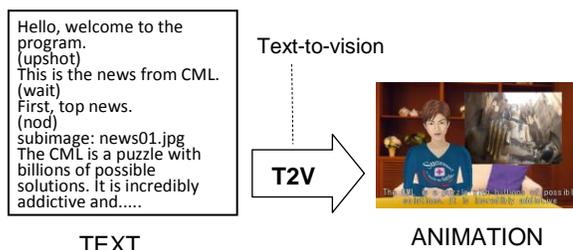


Fig. 1. Concept of T2V

### II. TEXT GENERATED TV

We have been pursuing a new way of creating and providing TV content which is completely different from the current TV system. Fig. 2 shows the proposed Text Generated TV. It is to circulate "script" which will produce video content in electronic way, whereas the current TV is based on the circulation of audio-visual data of the complete video content. We are aiming to establish the same type of system that has been done in the World Wide Web. In the WWW, content is first described in HTML format and circulated and delivered to a user, then, the final visual content is generated by Web browser at the user side. In that mean, our system is TV version of WWW.

In order to construct this, we use T2V technology that we have researched and developed for many years. In the T2V research, we have primarily three targets; those are 1) UGC (User-Generated-Content), 2) Automatic movie generation, 3) Interactive TV application. As for the target 1), we aim at promoting UGC in movie creation by providing easy-to-use T2V animation making tool to users. As for the target 2), we aim at establishing a method of realizing automatic mass production of TV-program-like CGA by converting Web page to animation. As for the target 3), we aim at constructing video-game-like interactive application based on the T2V technology.

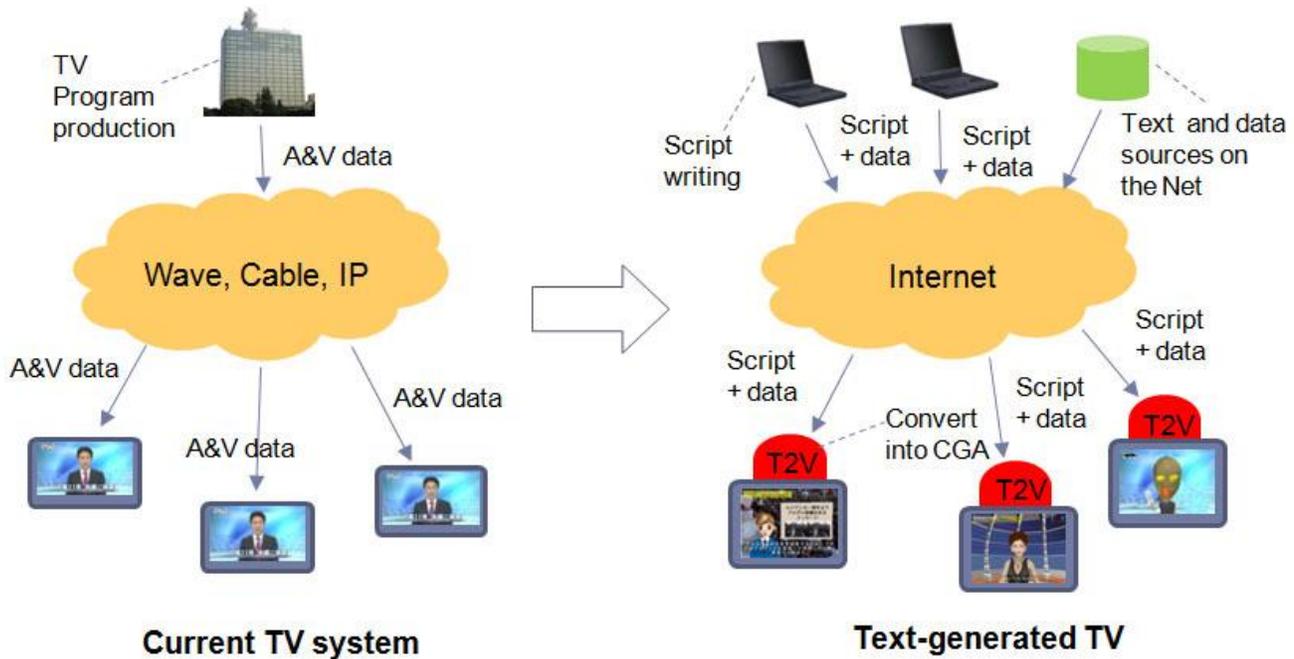


Fig. 2. Current TV system vs. Text Generated TV

In our new TV system, a user can enjoy the TV-like contents coming from those three different developments. It comes with a capability of watching numerous CGAs created by non-professional people and TV-like animations generated from various text sources available on the Internet and even playing video-game-like interactive TV applications.

to allow a user to create animation instantly by typing in text just like writing words on a word processor (Fig. 3). The specification of the text is designed intuitively so that anyone can easily create animation with it.

Fig. 4 shows an example of T2V script, the main part of the script is speech text. And the commands in parentheses are

### III. T2V (TEXT-TO-VISION)

In this chapter, we introduce the base technology T2V briefly and more about the developments in our research mentioned in the previous chapter.

The basic concept of T2V is "To visualize any arbitrary text." Based on the concept, we have developed T2V Player designed



Fig. 3. T2V Player

```

title:FOOD EXPLORE
subtitle:Gukbap will cure your hangover<br>in Seoul
(happy, little)
In the afternoon of the second day when I stayed in Seoul,
my Korean friends took me to a Korean style cheap restaurant.
(nod)
subimage:seoul1.jpg
This is it!
The restaurant's speciality is
'Gukbap', a famous Korean soup with rice.
mainimage:seoul1.jpg
A raw egg and dried seaweed are served in a small bowl on
the side.
You're supposed to put them in the soup, mix well and eat.
(back to studio)
This tastes very good!
(wait)

```

Fig. 4. Example of a T2V script

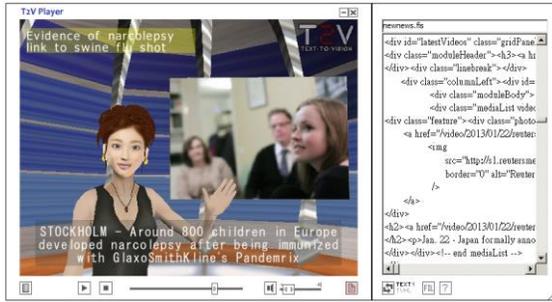


Fig. 5. Automatic news generation. HTML source on the right is converted to animation on the right.

available to control character's movement and camera etc. You can also use image file display, movie file playback and sound file playback in the script by specifying the data file. T2V Player combines the script and the materials to produce CGA in real-time. It could be a very good tool for especially non-professional people to create their own CGA.

Automatic content generation is another interesting way of using T2V technology. [3] Since text can be converted to CGA, it can open up a way of generating CGA automatically by computer from any type of text source available on the Internet. For example, a news Web site is written in HTML. If you design a converter which reads HTML of the news site and converts it to script of T2V, then TV-like news show can be obtained automatically (Fig. 5).

Lastly, we introduce an interactive way of using T2V. T2V playback engine is generating 3DCG animation and synthesized voice working in real-time, therefore it can be used for constructing interactive application such as video game. For example, a user can interrupt an on-going TV show then have a dialogue with the actor of the TV program to ask something about the show. [4]

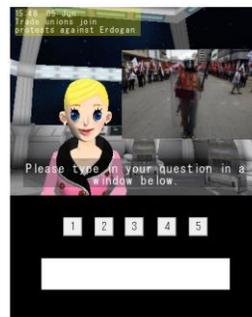
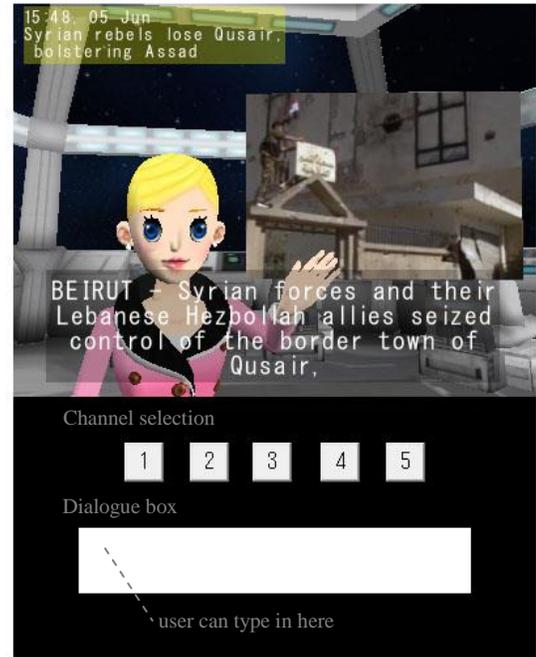
#### IV. PROTOTYPE OF TEXT GENERATED TV

As mentioned in the previous section, the basic concept of T2V is to create TV-program-like CGA by combining script and material. It can also be rephrased as object-based video production. The current TV system is built on the delivery of digital audio and video data, which had been already completed in the TV production. On the other hand, the proposed Text Generated TV is achieved based on the object-based video production.

In our Text Generated TV, scripts representing the contents are circulated on the Internet and delivered to viewers and visualized at the viewer side. Since our system is based on the object-based video production, it would be much easier to process and re-use the video contents such that to create a multilingual version of the original content, to make a longer version or a concise version of the original, to compile

multiple contents, and many more. Thus, the aspect of television would completely change.

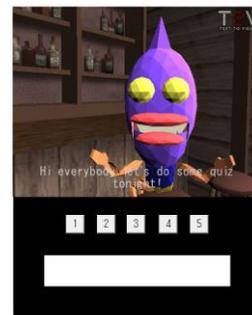
We are now developing a prototype of the Text Generated TV using the T2V research results. A user uses a special viewer to visualize the circulated scripts on the Internet. The viewer has



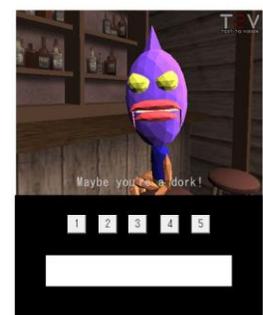
User interruption



Question and answer



Another channel



Interactive quiz show

Fig. 6. Prototype viewer of Text Generated TV

the following three features; 1) it accesses the server containing user-generated-scripts and visualizes them, 2) it automatically converts Web pages to animations, 3) a user can interrupt the animation at any time to have dialogue with the character. Fig. 6 shows the user interface screen of the prototype. It has a playback screen and channel select buttons and a dialog box. A user can watch user-generated animations and automatic generated animations by selecting the channel. Also you can interrupt the playback animation by typing into the dialogue box to have a dialogue with the character at anytime you want and resume the original animation at anytime. The prototype is still in the very early stage, however, it equips the basic elements of the system.

## V. DISCUSSION

In the configuration shown in Fig. 2, the visualization module (the viewer) should be at the terminal user side, however, this visualization function does not necessarily exist at the user side. It would be possible to deploy the visualization function in the cloud computing on the Internet. This is only the difference of the implementation. The important fact is that all of the video contents to be distributed, are made based on the object-based method.

The object-based method in our new TV system is in parallel with the establishment of the Web and its structure. The Web is deployed on the Internet and the content is initially written in HTML. Basically, the HTML describing Web content is delivered to users and is visualized by Web browser. Our idea in TV world is similar to the production of Web content by HTML. The world of Web has been evolving dramatically. It initially started from a simple HTML representation, but continued to add new features such as style sheets, JavaScript, server side computing, etc. and it's gaining significantly larger expression power of the content. We hope that our Text Generated TV system will evolve in the same way.

As mentioned in the chapter 3, our base technology T2V only deals with the TV production using CGA. Therefore the live action footage is used as it is in the CGA. Those are treated as materials and cannot be described for itself in the script. It is equivalent to display image file in a Web page using "img" tag of HTML. The advantage of capability of processing and reusing the content in our system would diminish if the content contains a lot of live action footage. This fact means that the Text Generated TV is not almighty. It should cover half of the TV content at most. Hence, we do not intend to replace the current TV system with the Text Generated TV. Those are different each other naturally. The world of the current TV

broadcast and the ordinary video production have never ended and will last for so long. What we try to do is to establish our TV system built on the Internet elsewhere the current TV system is. In other words, we aim to evolve our system while coexisting rather than competing.

## VI. CONCLUSION

In this paper, we described the proposed text-based television system and introduced the early stage prototype and discussed about several aspects of our approach. We are now improving the prototype system further for practical use so that we can perform a field test on the Internet.

Television is one of the largest conventional media. And the television industry has not changed very much. There have been many attempts to combine Television and Internet, however, we have not yet seen the remarkable success. One of the recent attempts in the TV industry is Smart-TV. Several big companies such as Apple, Google, Samsung etc. have announced the products of Smart-TV, however, it is not becoming a big success.

The design principle in Smart-TV is primarily to add Internet content (e.g. Web site browsing) and social networks (e.g. viral information such as Twitter) with the conventional television content. However, we need to integrate TV and the Internet in a more profound and seamless way in an effort to move to the next generation TV. We consider that our approach is one of the solutions to realize convergent media of TV and Internet. And in the future, we will see that half of the TV show is going to be made in full computer graphics.

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