

A Study of Automatic Program Production Using TVML

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Abstract

This paper describes a method to create TV programs automatically using TVML (TV program Making Language). TVML is a scripting language that we have developed for generating TV programs by computer. In this paper, we focus on automatic news program creation. We define XML tags for describing contents of a news program, and presentation data for creating the program by given XML file. We have also developed an automatic news program creation software based on the idea.

Keywords: TVML, TV program production ,XML computer graphics , contents creation

1. Introduction

Distributing contents on the Internet is now commonplace and with the start of digital broadcasts, transmission of digital contents is now possible. In light of this, research into the “contents handling technique”, that is, automatic generation of contents and the processing of the contents by computers, is becoming increasingly important.

The authors have developed the TV program Making Language (TVML) ^{[1][2]} to enable this contents handling technique, mainly in the television program production field. In this paper, we explain a method for automatic program production using TVML that has been developed for producing news programs at an experimental stage. We also developed a method of describing the details of the program (program data) by using XML (eXtensible Markup Language). And we designed an automatic program-production model based on program production processes used in the actual television industry. We then combined the method and the model in a prototype software application in which the user simply inputs program data in order to automatically generate news programs.

2. What is TVML?

TVML is a text-based language that can be used to describe a complete television program. It can describe all actions, relating to studio shots, video playback, titles, super-impositions, and BGM, that

are required in program production. It interprets the program script written in TVML and generates the TV program in real time. The TVML player operates on a graphic workstation. TVML is based on scripts used in actual program production, and one line in a TVML script is equivalent to one event. For example, the following description would be used to make a computer-generated character called Bob say “Hello” and then make the camera take a close-up view of him.

character: talk (name = BOB, text = “Hello”)

camera: close-up (what = BOB)

The TVML player reads this script line by line and, using real-time computer graphics, speech synthesis and multimedia computing techniques, generates the desired audio and video.

3. Overview of Automatic Program Production Using TVML

Significant numbers of programs in a number of fields follow standard formats. For example, the presentation style of regular news programs is basically pre-determined and actual news programs are produced by adding standardized presentations of a day’s information. First, we start our study of automatic program-production techniques, by looking at these standard program techniques.

Fig.1 is an overview of our developed method for automatic program production. First, the program data (program contents) required for making a standard program is classified into two groups: “information data” and “presentation data.” Information data refers to the information that is to be conveyed to viewers via the program. For example, in a news program, information data includes pictures of incidents and events. On the

other hand, presentation data describes the way in which that information should be shown to viewers as a program. Presentation data includes the framework of the program, the way in which an announcer reads the information, and the studio setup. A user enters the input data (information and presentation data) into the automatic TVML-script-generation algorithm as shown in Fig. 1, and then the algorithm generates the TVML program script automatically. The television program is then generated by playing the TVML script back on a TVML player.

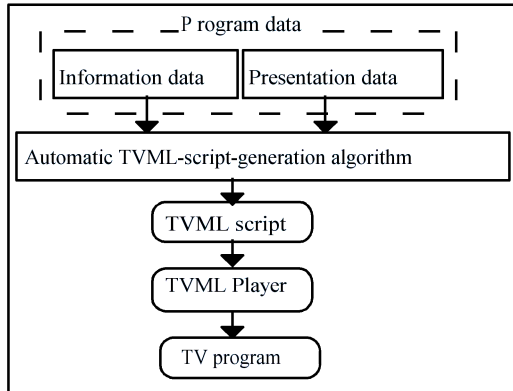


Fig.1 Overview of automatic program production using TVML

4. Description of Program Data by Using XML

We opted to use XML to describe the program data. Using XML offers the following advantages: (1) tags can be used to give details of program data structures such as <TITLE> and <INTRO>; (2) functions can be easily extended; and (3) data can be easily diverted from other media sources.

In this research we targeted news programs and, as shown in Fig. 2, defined the information data along the lines of that of a general news program. The presentation data was defined within the scope of current TVML functions and consisted of the items shown in Fig. 3.

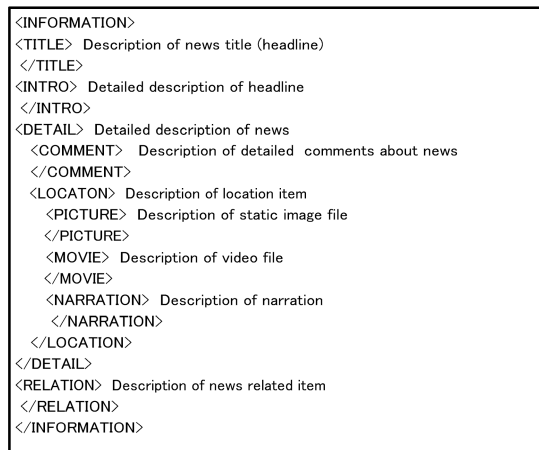


Fig.2 Structure of information data

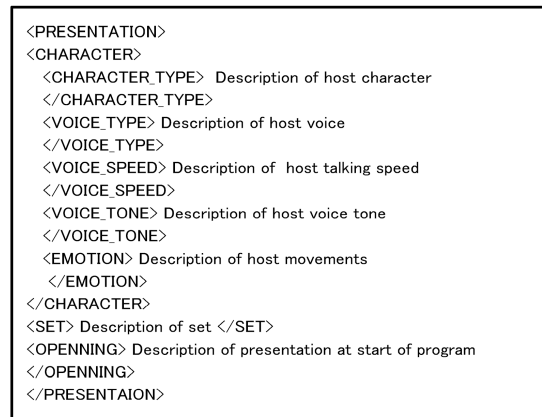


Fig.3 Structure of presentation data

5. Automatic TVML-Script-Generation Algorithm

In the production of an actual program at a TV station, the planning, framework, and presentation of the program are supervised by the program director. The director arranges all the required resources (studio, announcers, artwork, etc.) and creates the program. Each resource operates in accordance with the instructions and wishes of the director so that a “complete program” is created where all parts cooperate.

As shown in Fig. 4, we modeled the process of automatic program production in TVML according to program-production processes used in the real world. The algorithm consists of two main parts:

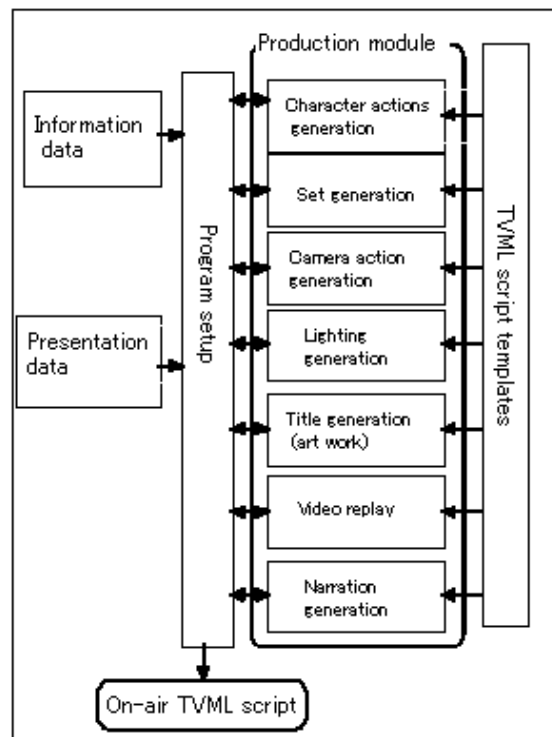


Fig.4 Automatic TVML-script-generation algorithm

Program setup:

This part is equivalent to the director in the real world. It issues instructions to each resource (production module) according to the program setup obtained from the information data. And it integrates the results (which are pieces of TVML script) from these production modules and generates the complete on-air program (a complete TVML script).

Production modules:

This part is equivalent to the resources in the real world. The program setup part gives these modules the data required to produce the scene within the program framework for which they are responsible. Program components (which are described by TVML script) are generated according to the data template (the TVML script templates) held separately by each production module.

The TVML script templates consists of a number of tags, and appropriate data coming from the program setup section are substituted in these tags to create on-air TVML script. Examples of TVML script templates and on-air TVML script are shown in Fig. 5.

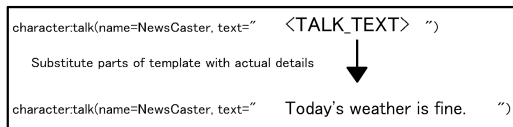


Fig.5 Example of substitution from TVML script templates

6. Use in Software Applications

We made application software in a graphics workstation based on our newly developed method for automatic program production. In this application, program data is entered from a GUI(Graphical User Interface), information and presentation data files are created, and the script-generation algorithm (Fig. 4) is applied to them. Obtained TVML script is then used to automatically produce the program.

Fig.6 shows examples of the information data and the presentation data. And Fig. 7 and Fig.8 shows examples of the program output. By classifying program data into information and presentation data, "one piece of information can create a number of programs by using a number of presentation methods" or "a number of pieces of information can be used to produce by one presentation method."

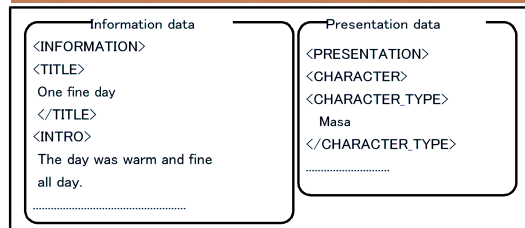
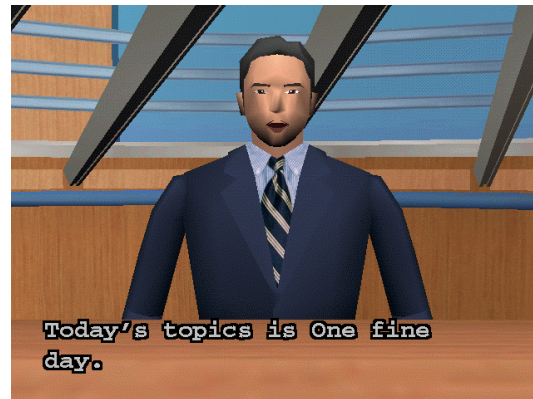


Fig.7,8 Examples of output images

7. Conclusion

We have developed a method that automatically produces programs by using TVML. And we have used this method in a trial to automatically produce a news program. The features of the method are: (1) the classification and definition of program data into two groups—information data and presentation data—and the description of this data using XML, and (2) an automatic program-production algorithm that models the program production processes used in the real world and an algorithm for automatically creating TVML script from program data.

In this research we looked at news programs but in the future we will extend our research to include programs in other genres, including, for example, talk-show programs. By using production modules working in harmony as independent agents, we intend to develop a script-generation algorithm that is close to the program production used in the real world.

References

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Fig.6 Examples of information data and presentation data

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