

Development of Personal EPG for Purpose-oriented Broadcasting

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Abstract

The recent broadcasting environment has shifted to embrace multimedia and multi-channel features through terrestrial, satellite and cable media. This has multiplied the number of broadcasting programs. With the information on a myriad of programs provided to TV viewers, information overload occurs, and thus, the TV viewing environment is shifting to one where viewers cannot select programs passively. Thus, a growing need is emerging to ensure a personalized electronic program guide (EPG) to help individuals select TV programs according to their taste. This paper presents a personalized EPG that enables a purpose-oriented broadcasting service to provide personalized broadcasting programs in tune with the user's requirements and preferences.

Keywords: Electronic Program Guide, Digital Broadcasting, User Preference, Multimedia.

1. Introduction

The launching of digital broadcasting is increasing the number of broadcasting programs because the broadcasting environment is shifting to multimedia and multi-channels involving terrestrial, satellite and cable broadcasting. Furthermore, with the development of digital broadcasting technologies, broadcasting service operators and providers can now provide interactive broadcasting services between themselves and the users, instead of the current one-way TV services provided to an unspecified multitude of viewers. The interactive environment can provide information on customized TV programs, thus offering viewer-oriented broadcasting services to respond to diverse viewer needs.

A need for purpose-oriented broadcasting is emerging to provide personalized broadcasting services and allow viewers to gain easy access to their desired programs from a variety of broadcasting programs.[1-2]

This paper presents a personalized electronic program guide which enables an interactive, purpose-oriented broadcasting service to provide customized broadcasting programs according to the user's requirements and preferences.

This paper is presented in the following structure: Chapter 2 explains the concept and structure of the personalized EPG; Chapter 3 gives an explanation on the registration and certification procedures to develop a personalized EPG; Chapter 4 shows screens that display the metadata of the program stream as treated in the personalized EPG; and lastly, Chapter 5 presents the conclusion and future research tasks.

2. Structure

The differential and personalized EPG(Electronic Program Guide)[3] registers the user's personal information and the information on the user's preferred TV programs, as well as provides a list of the TV programs differentiated and stored according to the user's preference. TV program data and metadata information on the TV programs are displayed on the screen in diverse formats of videos, images, and text, through user interaction. Also, the development of Java platform-based graphic user interfaces supports interaction in diverse terminal platforms.

The differential and personalized EPG consists of User Profile Register, User Preference Register, Login Certifier for authorizing users, XML Parser [4] for extracting metadata on TV programs, JMF (Java Media Framework)[5] Player for displaying TV programs, Image Viewer, Text Viewer, and Graphic User Interface for treating user events. Figure 1 shows a structure of the personalized EPG

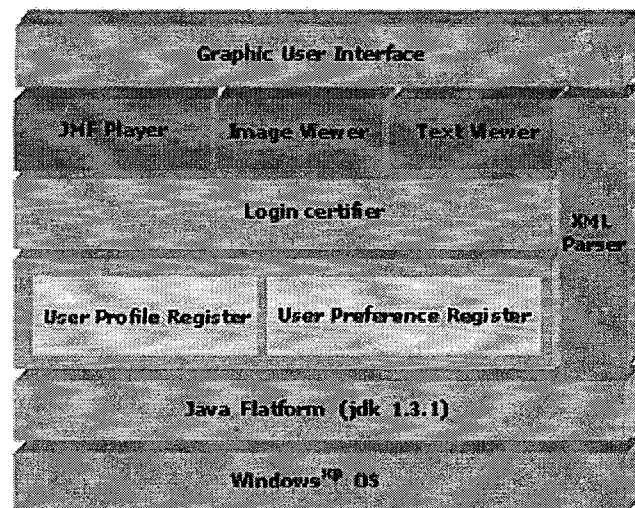


Figure 1. Structure of Personalized EPG

3. User Registration and Certification

3.1 User Registration

User Registration procedures consist of User Profile, to allow the registration of user ID and password and thus provide personalized TV program services, and User Preference Register designed to save in individual terminals the information on the user-preferred TV programs such as

Staff, Authority, Genre, and Priority. Users are free to update their registration information according to their requirements in their terminals.

■ User Profile Register

- User ID: Users use the first-portion digits of their resident numbers to watch TV programs according to their age.

- Password: arbitrarily defined password.

■ User Preference Register

- Staff: One selects his/her favorite Actors, Actresses and Directors and enters his/her name.

- Authority: One selects his/her favorite program producer and broadcaster.

- Genre: One selects his/her favorite program genre.

- Priority: One selects his/her favorite item (Staff, Authority, Genre, Title, Keyword etc.), and then the priority level (Very High, High, Low or Very Low) for the related item.

TV-Anytime [6] is a standard for content service in an environment using storage systems at home. It defines the standard for interactive integrated systems from content production, to the service provider and to the consumers.

TV-Anytime largely changes existed broadcasting order offering restrictive channel and contents one-sidedly according to broadcasting schedule. It can search and filter for selectional store and play of contents and watch on diverse TV program with a set-top-box through home network

The following table 1 show a few things presented contents type classes of user preference from TV-Anytime Specification ver 1.1

	Airshow, Comedy
Interactive Games	Content games categories, STYLE

Table 1. contents type classes of user preference

Before logging in, an initial user is required to click on the User Register button in the User Interface to move to the User Registration Screen and enter the User Profile and User Preference. Figure 2 shows the User Interface for user registration.

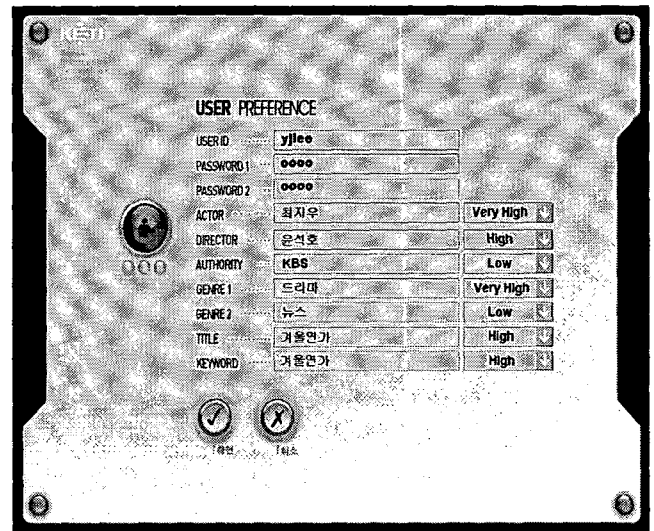


Figure 2. User Registration Interface

Genre Type	Details
Non-Fiction	News, General non-fiction, Arts & Media, Sciences
Sports	Team sports, Racket sports, Water sports, Winter sports, Adventure sports, Golf
News	Daily news, Foreign/International, Local/regional, Weather forecasts
Music	Classical music, Jazz, Pop-rock, Blues/Rhythm and blues/Soul/Gospel, Rap/Hip Hop/Reggae, Dance
Leisure/Hobby	Cookery, Travel/Tourism, Fishing, Music, Gaming
Fiction	Romance, Action, Fantasy/Fairy tale, Musical, Comedy, Classical drama
Amusement	Game Show, Quiz/Contest, Variety Show, Humor, Magic/hypnotism, Circus, Rodeo,

3.2 User Certification

The program, using pre-saved personal user profile (user ID and password) from the Login Certifier, compares the user login information—namely, user ID and password—with it, to detect whether the user is registered or not, and then give authorization. If the user certification fails, the User Certification Failure message window appears.

A registered user takes over locators of metadata on TV programs and TV program data which are extracted from the server and stored in the terminal according to the TV program preferences stored in the User Preference.

Locators use syntaxes of <transport mechanism>:<transport system specific> as defined in TV-Anytime Specification ver.1.1. They have transmission stream IDs, service IDs, table IDs, event IDs and other parameters.

The classification of the individual TV programs stored in terminals has the directory structure as shown in Figure 3.

4. Implementation of Personal EPG

Metadata containing additional information on TV programs are created by parsing and storing user preference in XML documents. The program parses metadata on TV programs stored in the terminal and provides information on TV program lists and synopses.

First, the user's preference on the differentiated TV programs is individually stored in the TV program storage in XML documents through the XML Parser in the terminal. The stored user preference items can be updated by the user through the User Preference Register.

Second, the program analyzes metadata (Program Title.xml) of TV programs in the certified user's program storage using the XML Parser in the terminal. Then, it creates a program list which is comprised of stored TV program channels (CH: Channel), content providers (CP), program running time, publication time and program titles. Still, it parses program synopses and displays them in text.

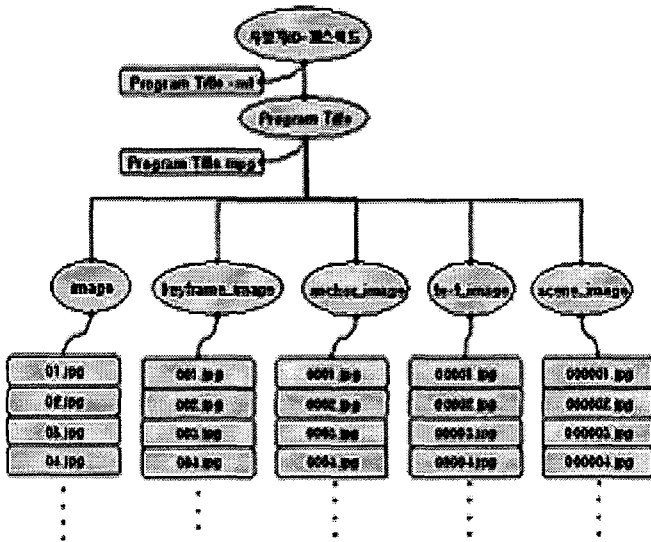


Figure 3. Storage of Individual TV Programs

In the storage of individual TV programs in the server, a registered user has videos, image data and metadata on programs for additional information of his/her favorite programs. In particular, the image storage by program contains image data that represent images in the section where program scenes are changed, which are extracted according to key frames, anchor, text, and scene conversion features. Figure 4 shows the User Interface for user certification.

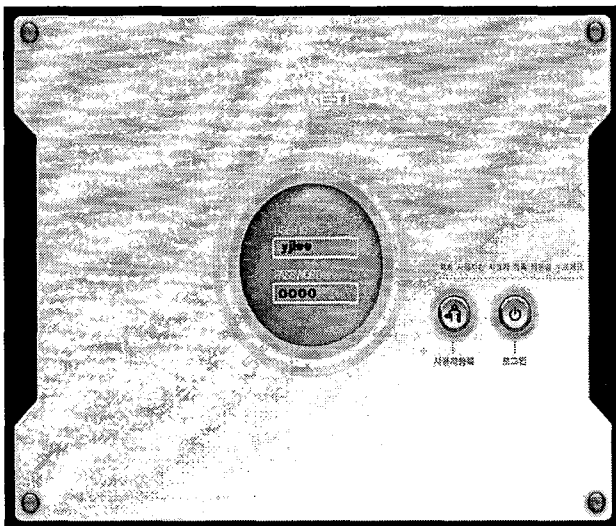


Figure 4. User Certification Interface

A registered user enters his/her ID and password to obtain user certification, and then logs in. The user is required to enter the first-portion digits of his resident registration number to make his age known. If the user ID and password do not match one another, the Error Message Window will appear.

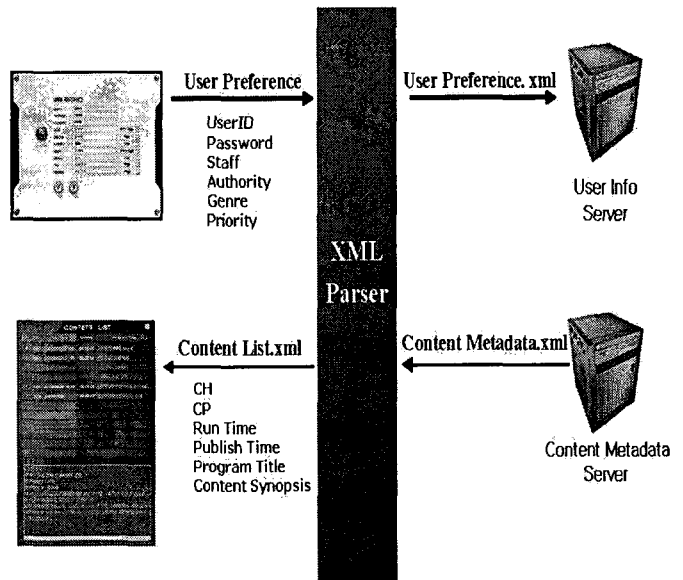


Figure 5. XML Parser in Personal EPG

The TV program display in the personal EPG serves as the JMF (Java Media Framework) Player, Image Viewer, Text Viewer and Graphic User Interface to treat user events. Types of programs stored in the program storage by individual user include texts, images and videos representing metadata information. These data are displayed in related areas when a button event appears following user interaction.

Stored text data are displayed after being analyzed by the XML Parser in the terminal, displaying the currently stored TV program channel (CH), CP, Running Time, Publication Time and Program Title in the program list viewer. Each column of the program list shows metadata information on each program. Each row shows items on each program metadata information. Columns by each program treat user events and display videos of related programs and additional

information in each window. They also display information on parsed program synopses in the text window.

For image data, the program sorts out the image data and explains the metadata information on video and TV programs and mainstream images in sections, where scenes of original video and TV programs are changed into images extracted according to key frame, anchor, text, scene conversion features, then stores them in the image storage by TV program. Stored image data are decoded with the Image Viewer and displayed. The system supports images in the format of psd, jpeg, jpg, png, bmp, etc.

Video programs are implemented with the JMF Player that JAVA platforms support. Video types supported include mpg, mpeg, avi, WMV and WMA. The JMF Player, as user interface, supports Play, Pause, Stop, Exit and Enlarge functions in TV programs. Figure 6 shows a screen of the implemented personal EPG. The following table 2 is function and API of JMF Player.

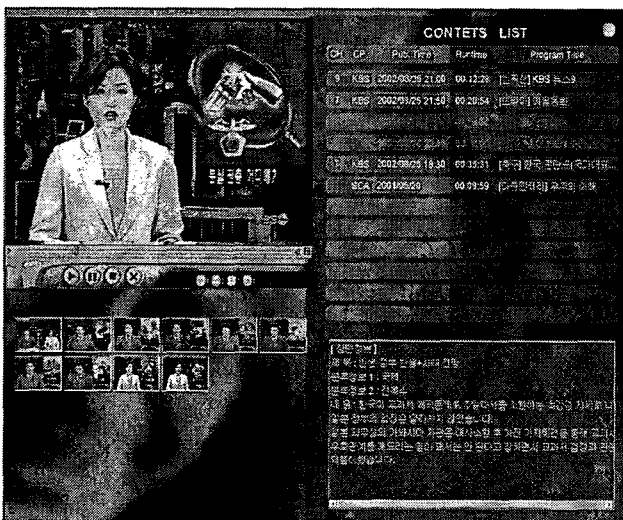


Figure 6. Example of Personal EPG Implementation.

Function	API
Play	mediaPlayer.start();
Pause	mediaPlayer.stop();
Stop	mediaPlayer.stop(); mediaPlayer.setMediaTime(new javax.media.Time(0)); mediaPlayer1.deallocate();
Exit	mediaPlayer1.close();
Enlarge	pausePlayer(); mediaPlayer.saveMediaTime(); mediaPlayer.setLocation(0, 0); mediaPlayer.setSize(FrameX, FrameY); startPlayer();

Table 2. Function and API of JMF Player

5. Conclusions

With the launching of digital broadcasting, the number of domestic channels can reach up to 200. If one channel provides 20 to 30 programs, it will be difficult for ordinary users to watch their desired programs. This paper presents a personal EPG enabling, purpose-oriented broadcasting services that offer broadcasting programs custom-made according to the user's requirements and preferences. Further research should be conducted to automatically identify user preferences and program selection.

References

- [1] J. U. Ryu, M. C. Kim, J. H. Nam, G. O. Kang, and J. U. Kim, "User Preference Based Intelligent Program Guide", Anthology of Theses, Korean Society of Broadcast Engineers, vol.7, no.2, pp. 153 ~ 167, 2002.
- [2] Y. M. Sohn, and M.C. Kim, "MPEG-21 Context Digital Items for TV Personalization," Spring Seminar of The Korea Information Science Society, 2003.
- [3] European Telecommunications Standards Institute. Electronic Program Guide (EPG); Protocol for a TV-guide using electronics data.
- [4] XML Schema, W3C Recommendations (version 20010502), available at: <http://www.w3.org/TR/2001/REC-xmlschema-0-2001050>
- [5] Sun Community Source Licensing(SCSL) – Java Media Framework API <http://java.sun.com/products/java-media/jmf>
- [6] The TV-Anytime Forum Specification, available at: <http://www.tv-anytime.org>