Title: A METHOD FOR DIGITAL RECORDING

Abstract: The present invention relates to a method for deciding about the recording in case of conflicting preprogrammed recording processes in devices like DVR (Digital Video Recorder) or PVR (Personal Video Recorder) which can record digital broadcasting.
Description
DIGITAL RECORDING

[1] Field of the Invention

The present invention relates to a method for deciding about the recording in case of conflicting preprogrammed recording processes in devices like DVR (Digital Video Recorder) or PVR (Personal Video Recorder) which can record digital broadcasting.

[3] Prior Art

Programs in digital television broadcast can be automatically recorded during the broadcast according to the preferences made by the user in advance. In the common application of the said process, information related to the program desired to be recorded is input by the user to the device (DVR, PVR, etc.) which can record digital broadcast and the recording device automatically starts recording at the broadcast time of the program to be recorded. However in cases where the user selects a plurality of programs, the broadcast times of the selected programs may partially or completely conflict due to reasons like changes in the broadcast flow.

There are various methods in the state of the art developed for solving the problem of conflicting programs that are desired to be recorded.

For example, in the solution offered in the USA patent application US2003204848, it is disclosed that priorities predefined by the user according to criteria like scheduling date and whether the program has been watched before or not are taken into consideration. In the method disclosed in the Japanese patent application JP2005 176406, conflict resolution schemes are used which are formed by taking into account priorities determined according to different criteria.

The international patent application WO2006055468 discloses options related to partial recording of conflicting programs. Accordingly, programs can be recorded in certain portions, including or excluding the overlapping time segment depending on the adjustments made. The International patent application WO200602277 I comprises another method by which partial recording option is provided. In this method, taking into account the periods of the programs within the broadcast flow and the start and end times of the programs, the conflicting periods of two or more programs are calculated and based on these periods, alternative recording options are presented to the user.

However there are some disadvantages of the mentioned methods. In the methods where the user decides which of the conflicting programs will be recorded or where the selection is made automatically according to the priority settings, only one of the conflicting programs can be recorded while the others are totally abandoned.

Additionally, depending on the changes in the broadcast flow, conflicts appear which
can not be foreseen as the desired programs are entered into the recording device. In this case, in methods where the user is prompted for which program is to be recorded, the recording device is required to perform recording without regard to the user's preferences, when the user is not attending the device at the time there is a program conflict and a decision has to be made concerning which of the conflicting programs should be recorded. This situation results with customer dissatisfaction.

Summary of the Invention

The objective of the present invention is to realize a recording method which can automatically decide which program is to be recorded in case of conflicting pre-programmed recording processes in devices which can record digital broadcasting.

Another objective of the present invention is to realize a recording method which takes the ratio of the part of the program to be recorded to the total period of the program into account.

A further objective of the invention is to realize a recording method which prevents totally disregarding a program whose broadcast period is much longer, for the sake of recording a very small part of a program with a priority.

An additional objective of this invention is to realize a recording method which prevents recording preferences to be made without the information of the user in case if there are changes in the broadcast flow.

Detailed Description of the Invention

The method realized to fulfill the objective of the present invention and the block diagram of the system in which this method is applied, is illustrated in the accompanying figures.

Figure 1 is the flow chart of the inventive method.

Figure 2 is the table showing the start and end times for the programs to be recorded, in an exemplar embodiment of the inventive method.

Figure 3 is the scheme showing the total and conflicting time periods of the programs to be recorded in an exemplar embodiment of the inventive method.

In the inventive method, the user enters the information related to the programs he/she wants to record into the device (DVR, PVR, etc.) which can record digital broadcast. However in cases like changes in the broadcast flow, there arise conflicts in the recording times of these programs. Examples of changes in the broadcast flow include cases like the broadcaster changing the date and/or time of the program, and prolongation of the program periods.

As a solution to this problem, in the inventive method, when at least three programs conflict, after the recording of the first one of the conflicting programs is finished, the ratio of the remaining broadcast period of each of the remaining programs to the total broadcast of the concerned program is calculated. This ratio is called "significant
program period”.

In the calculation the significant program period, the following three parameters are used for each program: Tend, Tnow and Tstart. Tend denotes the end time of the program, Tnow denotes present time and Tstart denotes the start time of the program. The ratio of the difference between the end time of the program and the present time to the difference between the start and end time of the program, i.e. the "significant program period" is calculated. Magnitudes of the significant program periods obtained for each program are compared with each other, then it is decided to begin recording of the program with the greatest significant program period, and then recording of the said program is started.

The following formula is used for calculation of the significant program period:

Significant program period = (Tend - Tnow) / (Tend - Tstart)

The inventive method basically comprises the steps of:

- Beginning recording of the program which starts as first among the conflicting programs to be recorded (101),
- Completing recording of the program which starts as first (102)
- Comparing the significant program periods of the remaining conflicting programs (103),
- Beginning recording of the program with the greatest significant program period among the remaining conflicting programs (104),
- Recording of the program with the greatest significant program period among the remaining conflicting programs, till the end thereof (105),
- Checking if there are any remaining conflicting programs (106) and if there are still conflicting programs, returning to step 103.

In one embodiment of the inventive method, 4 (A, B, C, D) of the programs selected to be recorded are conflicting. The starting order of these programs in the broadcast flow is as follows: A, B, D, C. (Figure 1, Figure 3).

The digital recording device programmed to record the conflicting A, B, C and D programs, performs recording of the program (A) with the earliest broadcast start time, from the beginning till the end thereof. After the recording of the first program (A) is completed, the significant program periods of the remaining programs (B, C, D) are calculated in order to be able to make a preference among the said programs. As the decision procedure will be carried out at the end time of program A, Tnow will be 19:20 for a calculation of significant program period to be made at the said time. Upon calculating the significant program periods for each of the remaining programs by using the formula "significant program period = (Tend - Tnow) / (Tend - Tstart)", the resulting significant program periods for B, C and D are 0.167, 0.958 and 0.667, respectively. In this case, program C will be started to be recorded as it is the program
with the greatest significant program period. After recording of this program (C) is completed, as there is not a conflict between the remaining programs (B and D), function of the recording method in this example will cease upon completion of the recording of program C. However, in case there is a conflict between the remaining programs (B and D), new significant program periods are calculated based on the end time of the last recorded program (C) and the program with the greatest significant program period is started to be recorded. In such situations, the process of comparing the significant program periods and thereby deciding which program is to be recorded should be repeated until any conflicts between the programs are resolved.

[34] Within the scope of this basic concept, development of various embodiments of the inventive method is possible, and the invention cannot be limited to the examples described herein; it is essentially according to the claims.
Claims

[1] A recording method characterized in that in case at least three programs desired to be recorded by digital recording devices conflict with each other, after the recording of the first program is completed, the "significant program period" is calculated for each of the remaining programs which is the ratio of the difference between the end time of the program and the present time to the difference between the start and end times of the program, and upon comparing magnitudes of the significant program periods obtained for each program, it is decided to begin recording of the program with the greatest significant program period, and then the said program is started to be recorded.

[2] A recording method according to Claim 1 characterized in that it comprises the steps of
- Beginning recording of the program which starts as first among the conflicting programs desired to be recorded (101),
- Completing recording of the program which starts as first (102)
- Comparing the significant program periods of the remaining conflicting programs (103),
- Beginning recording of the program with the greatest significant program period among the remaining conflicting programs (104),
- Recording of the program with the greatest significant program period among the remaining conflicting programs, till the end thereof (105),
- Checking if there are any remaining conflicting programs (106) and if there are still conflicting programs, returning to step 103.
Figure 1

101

Beginning recording of the program which starts earliest among the conflicting programs decided to be recorded.

102

Completing recording of the program which starts earliest.

103

Comparing the significant program periods of the remaining conflicting programs.

104

Beginning recording of the program with the greatest significant program period among remaining conflicting programs.

105

Recording of the program with the greatest significant program period among the remaining conflicting programs, till the end thereof.

106

Are there still conflicting programs?

Yes
Figure 2

<table>
<thead>
<tr>
<th>Programs</th>
<th>Recording Start Time</th>
<th>Recording End Time</th>
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<tbody>
<tr>
<td>A</td>
<td>18:00</td>
<td>19:20</td>
</tr>
<tr>
<td>B</td>
<td>18:30</td>
<td>19:30</td>
</tr>
<tr>
<td>C</td>
<td>19:15</td>
<td>21:15</td>
</tr>
<tr>
<td>D</td>
<td>19:00</td>
<td>20:00</td>
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</table>

Figure 3
**INTERNATIONAL SEARCH REPORT**

**International application No**

PCT/IB2008/050726

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. H04N5/76

According to International Patent Classification (IPC) or to both national classification and IPC.

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<th>Category</th>
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<th>Relevant to claim No.</th>
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<tr>
<td>A</td>
<td>WO 02/39729 A (KONINKL PHILIPS ELECTRONICS NV [NL]) 16 May 2002 (2002-05-16) abstract</td>
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<tr>
<td>A</td>
<td>EP 1 530 368 A (TOKYO SHIBAURA ELECTRIC CO [JP]) 11 May 2005 (2005-05-11) figure 4</td>
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<td>A</td>
<td>EP 1 672 918 A (LG ELECTRONICS INC [KR]) 21 June 2006 (2006-06-21) paragraph [0054]; figure 5A</td>
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<td>A</td>
<td>EP 1 187 467 A (WEBTV NETWORKS INC [US]) 13 March 2002 (2002-03-13) abstract</td>
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[X] Further documents are listed in the continuation of Box C

[X] See patent family annex.

* Special categories of cited documents:

'A' document defining the general state of the art which is not considered to be of particular relevance

'E' earlier document but published on or after the international filing date

'L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

'S' document member of the same patent family

Date of the completion of the international search: 3 July 2008

Date of mailing of the international search report: 09/07/2008

Name and mailing address of the ISA:

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Authorized officer: Brod, Rosemarie
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