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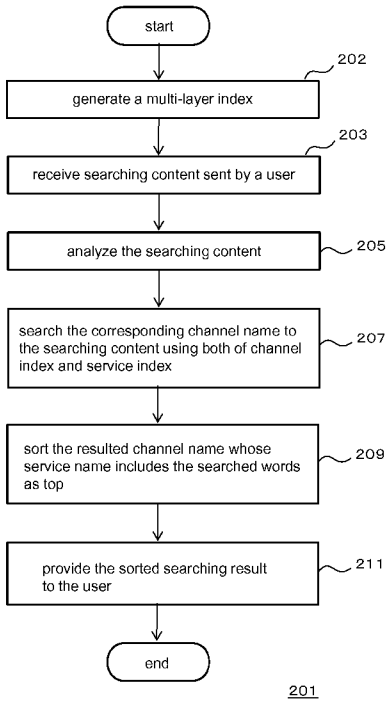
(54) **Title**: METHOD AND SYSTEM FOR PROVIDING SEARCHING RESULT ON THE BASIS OF USER'S INPUT

FIG.2



(57) **Abstract**: The present invention relates to a method for providing searching result on the basis of user's input. The method comprises the steps of: generating a multi-layer index consisting of a plurality of index of Metainfo; receiving a searching content includes broadcasting duration which is set by a user; analyzing the received searching content; searching the corresponding channel name to the searching content using multi-level index; sorting the resulted channel name whose service name includes the searching content as top; and providing the sorted searching result to the user.

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METHOD AND SYSTEM FOR PROVIDING SEARCHING RESULT ON THE BASIS OF USER'S INPUT

FIELD OF THE INVENTION

The present invention relates to a method and system for providing searching result on the basis of user's input.

BACKGROUND OF THE INVENTION

Currently, STBs (Set Top Boxes) can acquire the Channel and Services information from SI (Service Information) data, and PSI (Program Specific Information) data transferred within the multiplexed stream, and STB stores them into flash, and then displays this information through EPG. For example, "China Voice" in Zhe Jiang Channel, the user could acquire the services information (current service name, broadcasting duration; next service name) by pressing the "Info" button on STB remote controller. This kind of information can be defined as Metainfo. But if the user wants to find all entertainment services and picks one of them to watch, they cannot acquire the related information from STB. Since STB doesn't index the Metainfo. The only way users can do is to find the entertainment services by zapping manually, service by service. And this costs a lot of time.

Current STB has the following defects:
1. Current STB doesn't analyze and classify the Metainfo;
2. Current STB doesn't index the Metainfo; and
3. Current STB doesn't provide users the services searching method.

On the other hand, in the existing digital broadcasting service, program-related information is provided via EIT (Event Information Table) in SI. The program-related information includes Metainfo such as title, service date/time, program descriptions, and so on for each program in a respective channel.

Based on the information provided via the EIT, some TV products allow a user to search a program using a combination of search conditions. However, the existing search method uses only single-level search (or single-layer search).

In order to resolve the defects mentioned above, the invention provides an effective services searching method to help users find right services quickly.

The method and system according to the invention include functions below:
1. Store, analyze and classify the Metainfo;
2. Establish multi-level index for Metainfo; and
3. Provide a method to provide searching results to a user.

As related art, US20100242077A1 and CN102131115A disclose method and system for searching programs with single-level search.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a method for providing searching result on the basis of user's input, the method comprising the steps of: generating a multi-layer index consisting of a plurality of index of Metainfo; receiving a searching content includes broadcasting duration which is set by a user; analyzing the received searching content; searching the corresponding channel name to the searching content using multi-level index; sorting the resulted channel name whose service name includes the searching content as top; and providing the sorted searching result to the user.

According to another aspect of the present invention, there is provided a system for a system for providing searching result on the basis of user's input, the system comprising: generating a multi-layer index consisting of a plurality of index of Metainfo; a receiver for receiving a searching content includes broadcasting duration which is set by a user; a controller configured to: analyze the received searching content; search the corresponding channel name to the searching content using multi-level index; sort the resulted channel name whose service name includes the searching content as top; and provide the sorted searching result to the user.

BRIEF DESCRIPTION OF DRAWINGS

These and other aspects, features and advantages of the present invention will become apparent from the following description in connection with the accompanying drawings in which:

Fig. 1 shows an exemplary flow chart illustrating a system to store, analyze and classify the Metainfo to

establish multi-level index according to an embodiment of the present invention;

Fig. 2 shows an exemplary flow chart illustrating a method to provide searching result on the basis of a user's input using multi-level index according to an embodiment of the present invention; and

Fig. 3 shows an exemplary block diagram illustrating a system according to an embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In the following description, various aspects of an embodiment of the present invention will be described. For the purpose of explanation, specific configurations and details are set forth in order to provide a thorough understanding. However, it will also be apparent to one skilled in the art that the present invention may be implemented without the specific details present herein.

In an embodiment, the system 101 includes four devices and two databases as described in Fig. 1. The four devices consist of Metainfo Collection Device 103, Metainfo Analyzing Device 105, Metainfo Index Device 107, and Metainfo Searching Device 113. The two databases consist of Metainfo Database 109 and Index Database 111. They are working together in the processes below.

1. Metainfo Collection Device 103
This device 103 is used to collect all the Channel and Service information (Metainfo) through analyzing SI and PSI data in the multiplexed stream. The main information includes Channel name, current service name, current service start/end time; next service name, next service start/end time.

2. Metainfo Analyzing Device 105
This device 105 is one of key devices of this system 101, with a classify device inside. Here, the classify device means the text classifier, with SVM (Support Vector Machine) or other algorithms, which is existing technologies. The device 105 can analyze and classify the Channel and Service information. The information will be classified as two types below.

(1) Classified by Channel name: Channel type is fixed and easy to be tagged. For example, CCTV-5 can be tagged as

Sports/NBA/Football/Basketball, etc. This type can be saved as:

Channel Name	Channel Name Abbreviation	Tags
CCTV-5	CCTV-5	Sports, NBA, Football, Basketball, etc.

(2) Classified by Service name: service type is not fixed. There are 2 circumstances for this type.

(a) Long-term broadcasting services or Series. For example, "China Voice" and "The road to health" are Long-term broadcasting services. These kinds of services are famous, stable and long-term broadcasting. STB can classify and tag them easily. And they are stored as below format:

Service Name	Duration	Channel Name	Tags
China Voice	19:00~19:30	Zhe Jiang Channel	News, Report, etc.
The road to health	19:40~20:30	BTV-3	Health, illness, etc.

(b) New or short-term broadcasting services. For example, the movie "Ye Wen" is short-term broadcasting service. In this case, it is necessary for the classify device to classify and tag them in real-time. And it is stored as below format:

Service Name	Duration	Channel Name	Tags
Ye Wen	19:40~21:30	CCTV-6	Kong Fu

The function of Metainfo Analyzing Device 105 is to tag Channel name and Service name.

3. Metainfo Index Device 107
The function of this device 107 is to index the Channel information and service information. It is necessary to establish two sets of indexes.

(1) Channel index
Index Channel Name, duration and tags.

(2) Service index
Index Service Name, duration and tags.

The system normally produces the indexes as background while searching by a user.

4. Metainfo Searching Device 113
This device 113 is one of key devices of this system 101. The main function is to output the searching result (Channel name and service name) according to the user's inputs, as described in below steps:

(1) User input the searching content (text format).
(2) Analyze the Searching content.
(3) Search by index of Channel name and Service name.
(4) Return Channel name and service name

Hereafter is an example:
(1) User input "Current NBA services".
(2) Analyze, search and return searching result (Channel name and Service name).
For analyzing the input term, the system utilizes NLP (Natural Language Process), and so on.
(a) "current" means current duration, and therefore acquire the duration from both of Channel index and Service index.
(b) NBA services:
- First of all, search the Channel name matched with "NBA" from Channel index.
- If there is, then put it as one of the result. If there isn't, then search the Channel tag matched with "NBA", and find CCTV-5, BTV-6. These Channel names will be return as one part of the search results.
- Continue to search the Service index. And find one service name is "NBA history", then check it's Channel name is CCTV-9.
- Sorts the results (CCTV-9, CCTV-5, BTV-6). The principle is to sort Channel name whose service name includes the searched words "NBA" as top, that means CCTV-9 will be sorted as top. This principle is assuming the user's intension is to see the NBA related service in current duration, not the Channel which has the possibility to play the NBA related service.

If the user wants to search "Health services in next duration", the progress is the same as above.

In the embodiment, multi-level index consists of channel index and service index, and however, other or additional index can be applied to the invention.

If the user inputs broadcasting specific broadcasting period, the system sorts the resulted channel name whose service name includes the searching content in the order of the broadcasting data.

Fig.2 shows an exemplary flow chart 201 illustrating a method to provide searching result on the basis of user's input using multi-level index according to an embodiment of the invention.

At step 202, the system generates a multi-layer index on the basis of the Metainfo.

At step 203, the system receives a searching content such as "Current NBA services" sent by the user.

At step 205, the system analyzes the searching content. For example, the system can determine that "current" means current duration, and therefore acquire the duration from both of Channel index and Service index.

At step 207, the system searches the corresponding channel name to the searching content using both of channel index and service index.

At step 209, the system sorts the resulted channel name whose service name includes the searched words as top.

At step 211, the system provides the sorted searching result to the user.

Fig. 3 illustrates an exemplary block diagram of a system 301 according to an embodiment of the present invention. The system 313 is a set top box connected to display 311 such as TV, computer system, tablet, portable game, and the like. The system 301 comprises a CPU (Central Processing Unit) 303, a storage 305, a user input module 309, and a display 311. A memory 307 such as RAM (Random Access Memory) may be connected to the CPU 303 as shown in Fig. 3.

The storage 305 is configured to store software programs and data for the CPU 303 to drive and operate the processes as explained above.

The display 311 is configured to visually present text, image, video and any other contents to a user of the system 301 such as TV.

The user input module 309 may include keys or buttons to input characters or commands and also comprises a function for recognizing the characters or commands input with the keys or buttons.

These and other features and advantages of the present principles may be readily ascertained by one of ordinary skill in the pertinent art based on the teachings herein. It is to be understood that the teachings of the present principles may be implemented in various forms of hardware, software, firmware, special purpose processors, or combinations thereof.

Most preferably, the teachings of the present principles are implemented as a combination of hardware and software. Moreover, the software may be implemented as an application program tangibly embodied on a program storage unit. The application program may be uploaded to, and executed by, a machine comprising any suitable architecture. Preferably, the machine is implemented on a computer platform having hardware such as one or more central processing units ("CPU"), a random access memory ("RAM"), and input/output ("I/O") interfaces. The computer platform may also include an operating system and microinstruction code. The various processes and functions described herein may be either part of the microinstruction code or part of the application program, or any combination thereof, which may be executed by a CPU. In addition, various other peripheral units may be connected to the computer platform such as an additional data storage unit.

It is to be further understood that, because some of the constituent system components and methods depicted in the accompanying drawings are preferably implemented in software, the actual connections between the system components or the process function blocks may differ depending upon the manner in which the present principles are programmed. Given the teachings herein, one of ordinary skill in the pertinent art will be able to contemplate these and similar implementations or configurations of the present principles.

Although the illustrative embodiments have been described herein with reference to the accompanying drawings, it is

to be understood that the present principles is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one of ordinary skill in the pertinent art without departing from the scope or spirit of the present principles. All such changes and modifications are intended to be included within the scope of the present principles as set forth in the appended claims.

CLAIMS

1. A method for providing searching result on the basis of user's input, the method comprising the steps of:
generating a multi-layer index consisting of a plurality of index of Metainfo;
receiving a searching content includes broadcasting duration which is set by a user;
analyzing the received searching content;
searching the corresponding channel name to the searching content using multi-level index;
sorting the resulted channel name whose service name includes the searching content as top; and
providing the sorted searching result to the user.

2. The method according to claim 1, wherein the multi-level index includes the channel index and service index having channel name, service name, service duration, and tags.

3. The method according to claim 1 or 2, wherein the broadcasting duration includes broadcasting date.

4. The method according to claim 3, wherein the step of sorting includes the resulted channel name whose service name includes the searching content in the order of the broadcasting data.

5. A system for providing searching result on the basis of user's input using multi-level index, the system comprising:
a generator for generating a multi-layer index consisting of a plurality of index of Metainfo
a receiver for receiving a searching content includes broadcasting duration which is set by a user;
a controller configured to:
analyze the received searching content;
search the corresponding channel name to the searching content using multi-level index;
sort the resulted channel name whose service name includes the searching content as top; and
provide the sorted searching result to the user.

6. The system according to claim 5, wherein the multi-level index includes the channel index and service index having channel name, service name, service duration, and tags.

7. The system according to claim 5 or 6, wherein the broadcasting duration includes broadcasting date.

8. The system according to claim 7, wherein the step of sorting includes the resulted channel name whose service name includes the searching content in the order of the broadcasting data.

FIG.1

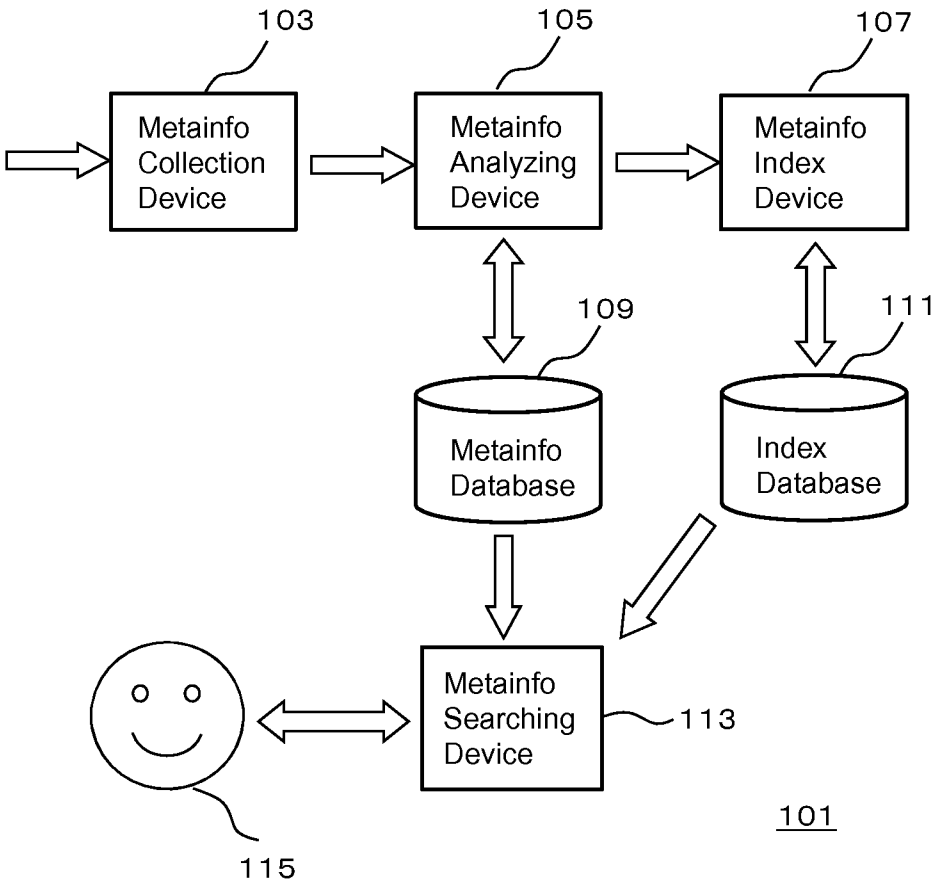

103
105
107
Metainfo Collection Device
Metainfo Analyzing Device
Metainfo Index Device
109
111
Metainfo Database
Index Database
Metainfo Searching Device
113
115
101

FIG.2

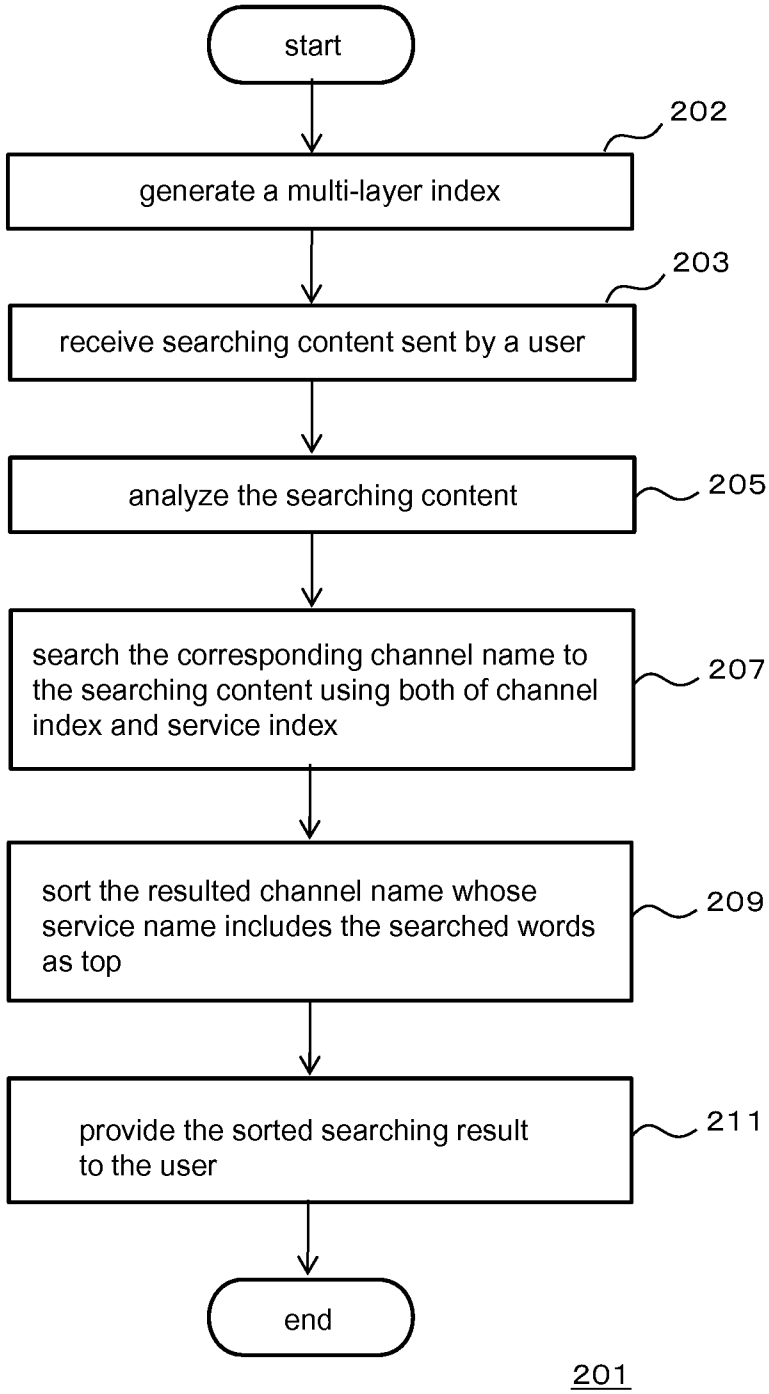
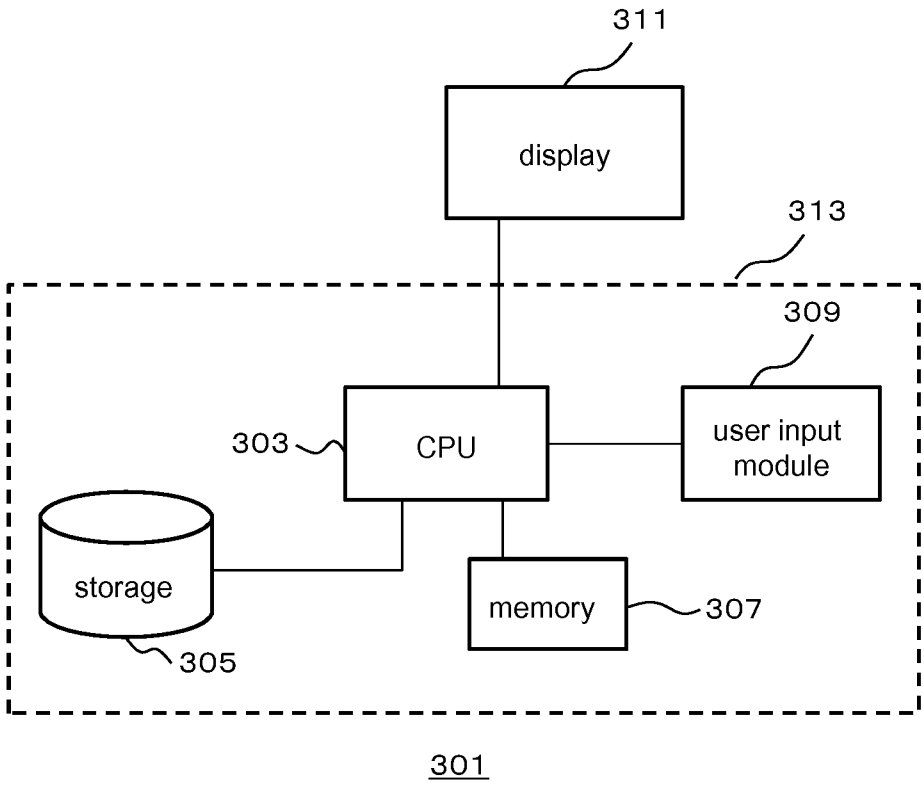

start
202
generate a multi-layer index
203
receive searching content sent by a user
analyze the searching content
205
search the corresponding channel name to the searching content using both of channel index and service index
207
sort the resulted channel name whose service name includes the searched words as top
209
provide the sorted searching result to the user
211
end
201

FIG.3


311
display
313
309
303
CPU
user input module
storage
memory
307
305
301

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2013/077399

A. CLASSIFICATION OF SUBJECT MATTER

G06F 17/30 (2006.01) i

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)

IPC: G06F, 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 practicable, search terms used)

CNPAT, CNKI, EPODOC, WPI: set, top, program, channel, search, index, multiple, IPTV, keywords, tags, metadata, layer, name

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 101271454 A (BAISHITONG NETWORK TV TECHNOLOGY DEV. CO.) 24 September 2008 (24.09.2008) description, page 5, paragraph [0018]-page 7, paragraph [0008] and figure 1	1-8
Y	CN 101808187 A (SHENZHEN SKYWORTH DIGITAL TECHNOLOGY CO., LTD.) 18 August 2010 (18.08.2010) description, paragraphs [0045], [0047], [0068]	1-8
A	US 2010/0242077 A1 (KOTA, Kalyana et al.) 23 September 2010 (23.09.2010) the whole document	1-8
A	US 2010/0063878 A1 (NDS LIMITED) 11 March 2010 (11.03.2010) the whole document	1-8

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 February 2014 (17.02.2014)	**20 Mar. 2014 (20.03.2014)**
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LI, Weihua Telephone No. (86-10)62413676

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2013/077399

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 101271454 A	24.09.2008	None	
CN 101808187 A	18.08.2010	None	
US 2010/0242077 A1	23.09.2010	None	
US 2010/0063878 A1	11.03.2010	WO 2008135912 A1	13.11.2008
		AU 2008247013 B2	26.05.2011
		EP 2143275 A1	13.01.2010