Fig. 1

Determination of audio stream categories as provided by the TV Service Provider

Voice-over Function called

The audio output designated for the voice-over function is determined

It is established whether a headphone plug is connected to the audio output terminal designated for the voice-over function

The main audio stream is fed from a first audio output and the audio output terminal designated for the voice-over function is fed with the auxiliary audio stream
METHOD FOR OPERATING AN IMAGE DISPLAY DEVICE WITH VOICE-OVER FEATURE

[0001] The present invention relates to an image display device having voice over feature to enable blind or visually impaired people to have an improved television viewing experience together with people having no visual impairment or loss.

[0002] Digital and interactive TV systems provide commercial services in order for improving television viewing experiences of people having visual impairment or loss. A person having visual impairment will not be able to watch the video content being broadcasted but will instead hear the audio content associated with the video content. Interactive TV services may provide that certain TV programs are aired in multiple audio streams in the form of a first audio stream directly associated with the video content of the program and a second audio stream known as voice-over specially produced as a narrative voice not forming part of the sphere of the program being viewed. The voice-over is provided as a separate additional audio stream and typically describes the scene on the screen to help visually impaired people better understand and enjoy the program.

[0003] Among others, one of the prior art disclosures in the technical field of the present invention can be referred to as EP2608565, which discloses a digital broadcast receiver. The digital broadcast receiver includes a broadcast reception unit which receives a digital broadcast signal; a signal separation unit which separates a main audio signal, an auxiliary audio signal, and an audio description descriptor from the received digital broadcast signal; an extraction unit which extracts auxiliary information from the audio description descriptor; a mixing unit which generates an audio signal by mixing the main audio signal and the auxiliary audio signal based on the auxiliary information; and an audio output unit which outputs the audio signal.

[0004] The present invention provides a method by which an image display device is operated such that users with visual impairment or loss and no visual impairment or loss alike can enjoy a TV program together in the
same environment. The present invention therefore provides that while a visually challenged person benefits from the provided voice-over service, a given family member sitting beside can also watch the program in the conventional manner.

[0005] The present invention therefore provides a method by which an image display device is operable to provide a first audio output assigned to the main audio stream and a second audio output assigned to the auxiliary audio stream as provided by the characterizing features defined in Claim 1.

[0006] Primary object of the present invention is to provide a method by which an image display device is operable to provide multiple audio streams by which persons with or without visual impairment can simultaneously enjoy.

[0007] The present invention proposes a method by which, a first and a second audio streams respectively designated as the main and the auxiliary audio streams are received and their respective categories are determined.

[0008] In the event that the users initiate a voice-over function, an audio output terminal designated for said voice-over function to be performed is determined. It is then ensured that a headphone plug is connected to said audio output terminal designated for the voice-over function. The main audio stream is fed at an audio output terminal other than the audio output terminal designated for the voice-over function and the auxiliary audio stream is fed at the audio output terminal designated for the voice-over function and to which a headphone is connected.

[0009] Accompanying drawings are given solely for the purpose of exemplifying a method by which an image display device is operable, whose advantages over prior art were outlined above and will be explained in brief hereinafter.

[0010] The drawings are not meant to delimit the scope of protection as identified in the claims nor should they be referred to alone in an effort to interpret the scope identified in the claims without recourse to the technical disclosure in the description of the present invention.

[0011] Fig. 1 demonstrates a general flow diagram according to which the image display device of the invention executes the method of providing a first audio output assigned to the main audio stream and a second audio
output assigned to an auxiliary audio stream.

[0012] The present invention proposes an image display device enabling a plurality of users with or without visual impairment to view a TV program in the same environment without causing any disturbance to each other. It is accomplished that a person having blindness or visual impairment can follow the main audio stream directly accompanying the video content of the program being viewed as well as an auxiliary audio stream specially prepared to describe the scene on the screen for helping visually impaired people better understand and enjoy the program. Likewise, a person with no visual sight problems can conventionally follow the video content and the accompanying main audio content without having to hear the auxiliary audio content.

[0013] To this end, the image display device of the present invention is operable such that audio stream categories as provided by the TV service provider are first determined. For instance, the audio content directly associated with the video content of the TV program is the main audio stream. The main audio stream may typically present the words that are being spoken on the screen to be in contextual relationship with the images shown thereon. On the other hand, the auxiliary audio stream is produced as a narrative voice not directly forming part of the program but verbally describing the video content of the same to help visually impaired people visualize it.

[0014] When the main audio stream and the auxiliary voice-over stream are determined, it is established whether there is an actual demand from the users for initiating the voice-over function. If the voice-over function is initiated by way of selecting a respective menu in the interface environment, an output designated for the voice-over function is then determined. An image display device such as a flat panel TV typically has several audio outputs including a headphone output terminal with appropriate impedance, specifically dedicated to be connectible with a headphone plug to drive the same.

[0015] To this end, when the voice-over function is initiated, according to the present invention, it is established whether a headphone plug is connected
to the audio output terminal designated for the voice-over function. In the event that a headphone is detected, the main audio stream is fed from a first audio output and the audio output terminal designated for the voice-over function and to which a headphone is connected is fed with the auxiliary audio stream. This ensures that the voice-over stream is only audible through a headphone. Since the main audio stream is available at a speaker output of the image display device and hence directly audible in the room, it will also be readily discernible to the ears of visually impaired persons.

[0016] In a nutshell, the present invention proposes a method for operating an image display device, said image display device having a plurality of audio output terminals, said method for operating an image display device comprises the steps of:

[0017] a) receiving a first audio stream designated as the main audio stream of a program directly associated with the video content of the same,

[0018] b) receiving a second audio stream designated as the auxiliary audio stream produced as a narrative voice not directly forming part of the program but verbally describing the video content of the same,

[0019] c) determining categories of received audio streams in the form of the main audio stream and the auxiliary audio stream,

[0020] d) establishing whether initiation of a voice-over function is requested,

[0021] e) determining an audio output terminal to be designated for said voice-over function to be performed,

[0022] f) establishing whether a headphone plug is connected to said audio output terminal designated for said voice-over function,

[0023] g) feeding the main audio stream at an audio output terminal other than said audio output terminal designated for said voice-over function and,

[0024] h) feeding the auxiliary audio stream at the audio output terminal designated for the voice-over function and to which a headphone is connected.

[0025] In an alternative embodiment of the present invention, the step of feeding the auxiliary audio stream at the audio output terminal designated for the voice-over function comprises the step of feeding the auxiliary audio
stream in a manner to be mixed with the main audio stream at the audio output terminal designated for the voice-over function.

[0026] In this regard, the invention ensures that the mage display device is operated such that users with visual impairment or loss can enjoy a TV program together with persons having no visual impairment or loss sitting in the same environment. The present invention therefore provides that while a visually challenged person benefits from the provided voice-over service, a given family member sitting beside can also enjoy the program in the conventional manner.
Claims

1. A method for operating an image display device, said image display device having a plurality of audio output terminals, characterized in that, said method for operating the image display device comprises the steps of:
   - receiving a first audio stream designated as the main audio stream of a program directly associated with video content of the same,
   - receiving a second audio stream designated as an auxiliary audio stream produced as a narrative voice not directly forming part of the program but verbally describing the video content of the same,
   - determining categories of received audio streams in the form of the main audio stream and the auxiliary audio stream,
   - establishing whether initiation of a voice-over function is requested,
   - determining an audio output terminal to be designated for said voice-over function to be performed,
   - establishing whether a headphone plug is connected to said audio output terminal designated for said voice-over function,
   - feeding the main audio stream at an audio output terminal other than the audio output terminal designated for the voice-over function and,
   - feeding the auxiliary audio stream at the audio output terminal designated for the voice-over function and to which a headphone is connected.

2. A method for operating an image display device as in Claim 1, characterized in that said step of determining an audio output terminal to be designated for the voice-over function to be performed comprises the step of determining an audio output terminal specifically dedicated to be connectible with a headphone plug in the form of a headphone output terminal.

3. A method for operating an image display device as in Claim 1, characterized in that the step of feeding the auxiliary audio stream at the audio output terminal designated for the voice-over function comprises the step of feeding the auxiliary audio stream in a manner to be mixed with the main audio stream at the audio output terminal designated for the voice-over function.
Determination of audio stream categories as provided by the TV Service Provider

Voice-over Function called

The audio output designated for the voice-over function is determined

It is established whether a headphone plug is connected to the audio output terminal designated for the voice-over function

The main audio stream is fed from a first audio output and the audio output terminal designated for the voice-over function is fed with the auxiliary audio stream
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N5/60 H04N21/81 H04N21/485 H04N21/439
ADD.

According to International Patent Classification (IPC) onto 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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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[X] Further documents are listed in the continuation of Box C.  [X] See patent family annex.

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Hindelang, Thomas

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## INTERNATIONAL SEARCH REPORT

### Documents Considered to be Relevant

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