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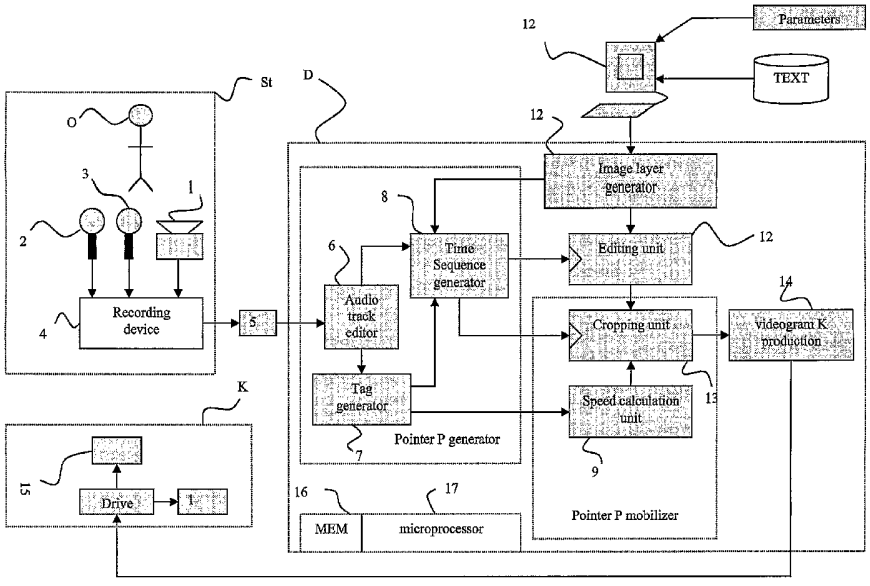
(54) Title: KARAOKE EDITING AND READING DEVICES AND EDITING METHOD IMPLEMENTING SUCH DEVICES



(57) Abstract: The invention relates to karaoke editing and reading devices and a karaoke editing method. The editing device comprises a means (6 - 8) for generating at least one scrolling pointer P intended to be displayed on at least one display medium (18) before the playback of a new line of the text of the song is started. The device also comprises a means (9, 13) for mobilizing each scrolling pointer P in relation to the detection of vocal characteristics detected on the audio part representative of the song as recorded on a videogram, for example. Then, the karaoke videogram K is transmitted to a reading device (K).

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Karaoke editing and reading devices and editing method implementing such devices

The invention relates to karaoke editing and reading devices and a karaoke editing method.

In the state of the art, a social activity or entertainment is known which involves performing a song while its musical or instrumental accompaniment is played back by reading a musical medium, such as an audio or video CD or a DVD.

This "play-back" technique has become more fun when accompanied by the display on a screen of the text of the song (in alphabetic characters), sparing the amateur performer from memory lapses.

This way of performing is called "karaoke", which will be used throughout this document to mean the entire system for producing such a play or even a recording of a number intended for use in a karaoke reading device.

This technique is sometimes complemented with the addition of a video clip or short displayed while the musical part is playing. The player, the amateur performer, adds his voice to the recording. The text of the song is displayed and synchronized with the music by colouring of the letters displayed in lines.

A drawback with this technique is that it does not take into account the moment when the user should begin singing. In practice, these systems display the text, then colour it directly according to a predefined rhythm. The result is that the user does not know when to start singing and can, consequently, lose the thread of the song.

Another problem with this technique is that the text colouring rhythm may be poorly synchronized with the rhythm of the lyrics of the song. Thus, the user who sings in time with the text colouring rhythm may find himself totally out of phase with the rhythm of the lyrics. To sum up, the rhythm imposed by the

colouring of the text does not correspond to the actual rhythm of the lyrics.

Another drawback with this technique lies in the conventional colouring method. It is active on the words actually pronounced and inactive during the silences. The result is that, during a line of song made up of groups of words separated by silences, the singer can again lose synchronization with the fixed progress of the recorded song.

These various drawbacks make it difficult for the singer to perform the song in perfect synchronism with the music.

The present invention provides a solution to these drawbacks.

In practice, the invention relates to a device for editing karaoke in the form of a videogram, the editing device being of the type comprising a means for recording at least the musical accompaniment of a song and, where appropriate, the visual part of a video short, so as to produce a videogram that can be read on a karaoke drive, characterized in that it also comprises a means for generating at least a scrolling indicator intended to warn the user of the start of a new phase of the song, so as to enable, subsequently when reading the edited videogram, at least one user of the karaoke to anticipate the progress of the song to be sung.

According to another aspect of the invention, the means for generating a scrolling indicator comprises a means for producing a graphic representation on said videogram of a scrolling pointer and which cooperates with means for determining the shape of the pointer, its position and display attributes such as its colour, its transparency.

According to another aspect of the invention, the editing device also comprises a means for recording a graphic representation of the text of a song to be sung, said graphic representation being intended for display in synchronism with the

subsequent play-back of the videogram and in that the means for generating a scrolling pointer comprises a means for generating a vertical bar displayed through a horizontal line of text of the lyrics of the song to be sung.

According to another aspect of the invention, the means for generating a scrolling pointer cooperates with a means for determining an insertion point on said display medium in relation to the play-back of the karaoke and with a means for mobilizing each scrolling pointer in relation to the display of the text of the phrase of the song to be sung.

According to another aspect of the invention, the editing device also comprises a means for analysing a pilot rendition of the singing of the song to be edited and for producing a signal analysing the pilot rendition and in that the means for mobilizing the pointer cooperates with a means for detecting changes to the signal analysing the pilot rendition which is used to produce a rhythm break tag on each predefined change and with a means for determining a law of movement of said scrolling pointer between two successive rhythm break tags.

According to another aspect of the invention, the editing device comprises a means for generating at least one sequence of display and scrolling images of the scrolling pointer on an image layer, added to the recording on the videogram being edited.

According to another aspect of the invention, the editing device also comprises a means for generating at least one sequence of images of the graphic representation of the text to be sung on a second image layer, added to the recording on the videogram being edited, such that the image layers will be displayed on a display medium in synchronism with time sequences representative of the vocal characteristics of the song.

According to another aspect of the invention, the editing device also comprises a means for generating at least one

sequence of colouring images on a third image layer, added to the recording on the videogram being edited, such that the text of said second layer is coloured in synchronism with the scrolling of the scrolling pointer of the first image layer and such that the image layers are displayed on a display medium in synchronism with time sequences representative of the vocal characteristics of the song.

The invention also relates a device for playing back karaokes edited using a karaoke editing device according to the invention. The play-back device comprises a means of reading a videogram and an indication means of at least one scrolling indicator, the status of which is determined by said videogram.

According to another aspect of the invention, the videogram is stored on a videogram server for transmission over a telephone network or similar so that it is played back on a mobile telephone including an indication means such as a display.

According to another aspect of the invention, the mobile telephone on which the videogram is played back is also connected to a mobile communications operation centre such that data such as instructions or the voice of the user currently playing back the karaoke is exchanged with the mobile telephone.

The invention also relates to a method of editing karaokes on a videogram, characterized in that it comprises a step for generating a scrolling indicator before the start of a new phase of the song in a predefined time slot, such that the user has time to prepare to sing; so as to enable, subsequently when reading (K) the videogram (S), at least one karaoke user to follow in real time the progression of the lyrics to be sung according to the vocal characteristics of the song such as rhythm changes or silences.

According to another aspect of the invention the editing method comprises a step for mobilizing the scrolling pointer, on a display medium, such that the pointer is mobilized in synchronism

with the lyrics to be sung according to the vocal characteristics of the song.

According to another aspect of the invention, the editing method comprises a step for progressively colouring the text to be sung in synchronism with the scrolling of the scrolling pointer.

According to another aspect of the invention, the editing method comprises a step for deleting the display of the pointer on the display medium when a line of text of the song has been sung.

According to another aspect of the invention, the editing method comprises at least one of the following steps:

- a step which consists in entering and dividing up the text to be sung into lines of text so that lines of text can be displayed on a display medium;
- a step which consists in generating type A foreground image layers and type B background image layers in relation to a sequence of text;
- a step which consists in editing, from a videogram, the audio track containing only the lyrics of the song to be sung;
- a step which consists in analysing the audio track edited in the step for detecting the vocal characteristics of the song in order to generate synchronization tags according to predefined vocal characteristics;
- a step which consists in generating time sequences on the basis of the synchronization tags and image layers;
- a step which consists in calculating, from a time sequence and the type A image layers, the scrolling speeds of the pointer between each synchronization tag;
- a step which consists in creating a montage of the image layers on karaoke videogram according to the different time sequences;
- a step which consists in cropping the image layers mounted on the video track according to a time sequence and the scrolling speeds of the pointer between each synchronization tag;

- a step which consists in recording the duly modified video track on a karaoke videogram that can be played back on request.

According to another aspect of the invention, the editing method generates, in the case of a song performed by a number of singers, a scrolling pointer of a different colour for each karaoke user who sings the part of one of the singers.

According to another aspect of the invention, the editing method comprises, in the case of a song performed by several singers, a progressive colouring step of distinct colour for each part to be sung associated with each singer in synchronism with a scrolling pointer associated with the part to be sung.

The invention will be better understood, and other objectives, features, details and advantages of the latter will become more clearly apparent from the explanatory description that follows given with reference to the appended drawings in which:

- Figure 1 diagrammatically describes a complete karaoke production and operation system incorporating a karaoke editing device and a karaoke reading device of the invention;
- Figure 2 illustrates a particular embodiment of a karaoke editing device based on the system of Figure 1;
- Figure 3 illustrates an application of the invention to a mobile telephone;
- Figure 4 illustrates another application of the invention to a mobile telephone;
- Figures 5(a) to 5(e) diagrammatically describe an operation implemented in a particular embodiment of the invention, in particular for synchronizing the display of the scrolling pointer;
- Figure 6 diagrammatically describes an operation for calculating the scrolling speeds of the pointer P on a display medium;

- Figures 7(a) to 7(c) diagrammatically describe the mounting of the type A and type B image layers on a blank video track in synchronism with the time sequence H2;
- Figures 8(a), 8(b) and 8(c) diagrammatically describe the placing of the image layers of the pointer P on the video track and the cropping of the type A image layers of the video track in synchronism with the speeds vi of movement of the pointer P;
- Figure 9 describes, in flow diagram form, the method of the invention.

Figure 1 diagrammatically describes a complete karaoke production and operation system incorporating a karaoke editing device and a karaoke reading device of the invention.

The complete karaoke system of the exemplary embodiment of Figure 1 comprises:

- a studio St for producing an original videogram O;
- a karaoke editing device D;
- a karaoke reading device K.

An original videogram production studio St comprises a recording unit 4 well known in the state of the art, which records:

- a singer O on at least a first audio track, for example using a first set of microphones 2,
- the musical accompaniment of the song performed on at least one second audio track, for example using a second set of microphones 3 or by any other mixing system well known in the state of the art, and
- simultaneously or subsequently, as appropriate, a video short, captured using video cameras 1 or any other video editing system well known in the state of the art.

The production studio St can thus be used to produce at least a reference rendition or "pilot" interpretation of the song concerned. This pilot rendition will subsequently be used in the karaoke editing process. It is therefore fixed or transmitted as a single element or as a component element of a pilot videogram O.

The videogram O produced can be transmitted by any means to any recording medium and/or broadcast by television broadcasting, by Internet, by DVD video disc or other means.

It will be understood in particular that, in the context of the present invention, the content of such a recording may not include songs, but the speech of the original performer O in a film scene or the recitation of a play. Such a recording may also not include a video part. However, the term videogram, which corresponds to most of the exemplary embodiments described, will be used.

The karaoke editing device D of the invention comprises:

- a means 6 - 8 for generating at least an indicator or scrolling pointer P intended to be displayed on at least one display medium 18 before starting to play back a new line of the text of the song, or more generally, before any predefined change to the rhythm of the song;
- a means 9, 13 for mobilizing each scrolling pointer P in relation to the display of the text of the line of the song to be sung.

More specifically, the editing device D comprises an editor of audio tracks 6 and, where appropriate, of video tracks, which edits from the memory medium 5 the audio tracks of a song and the video track containing the associated video short.

In a first editing step, the audio/video track editor 6 separates in the storage medium 5 the audio track of the pilot videogram O containing only the pilot rendition of the song. This pilot rendition could moreover be performed directly as part of the editing process. The pilot rendition of the song is performed by an experienced or reference singer. It is from such a rendition that the editing device of the invention activates a means for analysing a pilot rendition of the song to be edited and for producing a signal analysing the pilot rendition. As will be seen later, a means for mobilizing the pointer cooperates with a means for detecting changes to the initial rendition analysis signal. The actual

changes to the analysis signal are compared to typical changes for producing a rhythm break tag on each predefined change. Then, a means for determining a scrolling pointer movement law between two successive rhythm break tags comes into play.

The device comprises a synchronization tag generator 7 which reads a sequence and rhythm break reference on said audio track edited by the audio/video track editor 6, to generate synchronization tags on said audio track, such that the synchronization tags are positioned as marks displayed on the waveform graphically representing the audio track in time level with silence and rhythm change type vocal characteristics.

A time sequence generator 8 generates a time sequence H3 made up of a sequence of pulses formed in such a way that a pulse of said time sequence H3 is produced with each synchronization tag.

The device of the invention is connected to a computer 10 which is used to input the text of the song lyrics as well as display parameters such as font, font size and colour and the position of the text on a screen page. The text input is intended to be displayed subsequently on a display medium 18. The computer 10 is used also as a tool for dividing the text into text sequences intended for display on the display medium 18 on reading a videogram, such that each sequence contains no more than a predefined number of lines, such as four lines for optimum reading comfort. The text sequences obtained are stored in a memory MEM 16.

An image layer generator 11 recovers the various text sequences stored in the memory MEM 16 and generates for each of these text sequences image layers intended to be read on a display medium 18. In an embodiment, the image layer generator 11 generates a first series of type A image layers, representative of a scrolling pointer and its movement, displayed in the foreground on a display medium 18.

In another embodiment, the image layer generator 11 generates a second series of type B image layers, representative of the text of the song lyrics and displayed on the background on a display medium 18.

In another embodiment, the image layer generator 11 generates image layers for colouring the text displayed, which are inserted between the above-mentioned foreground and background.

The generation of these various image layers is described later.

In an embodiment, the time sequence generator 8 generates a time sequence H1 and a time sequence H2, by using the information from the audio track containing the text to be sung edited by the audio track editor 6 and from the image layers generated by the image layer generator 11. The time sequence H2 is used to synchronize the display of the image layers described previously on a display medium 18 in synchronism with said time sequence H2. More specifically, the time sequence H2 is used to synchronize the image layers in synchronism with the start and end of a line of a text sequence. The time sequence H1 is used to synchronize the display of the image layers in synchronism with the start and end of a text sequence. The time sequence H2 corresponds to the transition from one line to the next when reading the text displayed and the time sequence H1 corresponds to the transition from one displayed image layer to another displayed image layer. The generation of the time sequences H1 and H2 is explained later.

In a particular embodiment, a unit for calculating the scrolling speeds of the pointer 9 determines the horizontal scrolling speeds of the pointer between each synchronization tag. Based on the synchronization tags generated by the tag generator 7 and the image layers generated by the image layer generator 11, a speed calculation unit 9 determines the horizontal speed of

movement of the scrolling pointer on a display medium 18. For this, the speed calculation unit 9 evaluates the time elapsed between each synchronization tag and the distance in pixels of the sequence of text sung during this time slot. This distance in pixels depends mainly on the font and the size of the characters required by the producer displayed on screen.

The time sequence generator 8 uses the time sequences H2 and H3 to generate a time sequence H4 such that the appearance of the pointer on the display medium 18 or the disappearance of the pointer on the display medium 18 corresponds with each pulse of said time sequence H4. More specifically in the drawing, the representation of a rising edge corresponds to a line start and that of a falling edge corresponds to a line end. The generation of the time sequence H4 is described later.

The device comprises an editing unit 12. This editing unit 12 records on a videogram K the image layers such that these image layers are displayed in synchronism with the time sequence H1.

The device comprises a mobilization unit 13 which generates the movement of the pointer in synchronism with the time sequence H4 and according to the speeds calculated by the speed calculation unit 9 as well as, where appropriate, the colouring of the text in synchronism with the movement of the pointer P. Once the various data elements have been synchronized, the device records them on a video track of a videogram via a recording unit 14. The videogram K created in this way can be read by a reader 15 which displays the video clip, the text to be sung and the corresponding tools, in other words the scrolling pointer and, where appropriate, the colouring of the text, and which distributes the various audio tracks to a sound copying device.

Finally, the device also comprises a memory MEM 16 for storing the various data elements used and obtained during production of the medium and a microprocessor 17 which monitors and controls the various elements described above of the device of the invention.

Figure 2 shows an embodiment according to the principle of the invention as defined using Figure 2 in a working step.

A videogram with at least one sound track representative of the sung part of a number intended to be transcribed into a videogram K for karaoke is inserted into a videogram reader O. Such a videogram can be recorded on a CD-audio or DVD type optical disc. In this case, the videogram reader O is an appropriate drive.

The read output is processed on a sound track editor 6 which is used to separate the sung part of the number being processed from the rest of the videogram. Naturally, the invention can be applied with lesser effectiveness to a complex audio part mixing the sung part with the instrumental parts.

The signal representative of the sung part is then processed by a vocal characteristics detector 8 which is used to detect vocal characteristics specifying a change of rhythm in the song and used to predict, in combination with the time sequence of the videogram O, the behaviour of the karaoke singer. In particular, it is thus possible to warn the karaoke singer that a repeat of the song will occur within a predetermined time such as one second for example, that a silence is currently in progress, that the song is currently being speeded up or slowed down, and so on, by displaying a predetermined representation of the scrolling pointer. Naturally, the scrolling pointer P can be replaced by any scrolling indicator, acoustic in particular, enabling the karaoke singer to anticipate the next phase of the song.

Using the detection of such vocal characteristics, which will be explained later, a tag generator 7 is used to produce tag

signals of various types. A tag comprises a pulse which rises to an active value at a given time, typically expressed in seconds from the start of the videogram, when it is running normally.

By detecting such a tag, the device of the invention can then produce an action for signalling to the karaoke singer a change to the song such as a change of rhythm, a restart, etc.

The signalling to the singer is preferably given on a new videogram, designated videogram K, which is specially designed to be used in a karaoke session.

To this end, the device of the invention includes a circuit for generating a plurality of image layers synchronized on the input videogram O and by the tags detected by the tag generator. The circuit mainly comprises:

- a video memory 11 consisting of one to three image layers, as follows:

-- necessarily, an image layer PB in which the scrolling bar P will be displayed, for example, in a start area D to the left of the start of a future text display line, and this before the start of a new phase of the song, then mobilized in the direction of horizontal movement represented;

-- preferentially, a second image layer PT used as a text plane, in which the graphic representation of the lines of text such as Line 1 will be displayed as the videogram is played back;

-- optionally, a third colouring plane image layer PC, in which a colouring rectangle RC will be cropped in synchronism with the progress of the scrolling bar P of the image plane PB as can be seen in the drawing, such that an increasing part PC of each line in turn like the line Line 1 will be coloured on the final display of the karaoke reading device;

- for the image layer PB:

-- a fade generator F which is used to return the scrolling bar P at the end of each line such as Line 1;

-- a horizontal movement generator TR for moving the bar P; and

-- a scrolling bar generator PB,

all three of which are connected by activation inputs to the tag generator to work in synchronism with the detection of predetermined breaks detected on the audio track;

- for the image plane PC:

-- a colouring generator col which generates a colouring rectangle, the colour and other characteristics of which are freely definable;

-- a cropping generator Ro which, by cropping according to the progress of the scrolling bar P, is used to advance the leading edge of the coloured rectangle RC as can be seen in Figure 2;

both of which are connected by activation inputs to the tag generator to work in synchronism with the detection of predetermined breaks detected on the audio track;

- for the image plane PT:

-- a text generator GT used to compose the lines of text in synchronism with the tags,

which is therefore connected by activation inputs to the tag generator to work in synchronism with the detection of predetermined breaks detected on the audio track.

According to the invention, a first image layer is placed in the foreground in the videogram K and used to display a graphic bar or any other representation of the same type including an icon or even a smaller image, fixed or sequential, such as an image within an image (picture in picture). Such a graphic bar is then moved and, where appropriate, stopped, and/or erased as it passes through the image field intended to be displayed so as to indicate to the karaoke user rhythm changes, silences and other vocal characteristics rendered in the sound track analysed by the vocal characteristics detector.

Preferentially, a second image layer is placed in the background behind the image layer containing the above-mentioned bar on which is written the text of the song and which is currently being played back in the videogram sequence.

Colouring the text of the second image layer being played during the song is known. To this end, the text of the song is entered in text mode in the form of characters, the font, size, style and colour attributes of which are determined. In this case, a third image layer is placed in an intermediate plane between the foreground of the image plane containing the bar of the invention and the background of the image plane containing the current text of the song.

Preferentially, in this case, the colouring edge is moved in the direction of reading and the transition between the basic text colour and the colouring colour of the current text of the song is compelled to move with the scrolling pointer in bar form in the foreground image layer.

According to the variants, the foreground of the bar image layer, the background of the text image layer and/or the plane of the colouring image layer are then mixed with the rest of the videogram O read on the videogram reader O to produce a videogram K intended for reproduction on a karaoke device.

To this end, the videogram K editor comprises a first input capable of mixing the abovementioned one, two or three image layers, repeated for each frame or each sequence of frames of the original videogram O read on the videogram O reader. The videogram K editor comprises a second input capable of mixing one or more image layers, one or more audio tracks and, where appropriate, computer-generated type multimedia sequences derived from the videogram O read on the videogram O reader in action. The videogram K editor comprises an output capable of mixing the video, graphic, audio or computer-generated objects present on the first and second inputs so as to produce the

videogram K intended to be reproduced later on a karaoke reading device.

Such a videogram K can be transmitted over a transmission line as part of a radio broadcast, a television transmission, on an Internet program.

Such a videogram K can be stored on a medium of any type such as a CD-audio, CD-video, CD mixed, DVD optical disc or a magnetic medium such as a hard disc or a magnetic tape.

At the output of the tag generator, a number of tag signals are generated to activate at least one scrolling bar generator in the first image layer displayed in the foreground of the videogram K. Such a scrolling bar generator is used to choose a scrolling bar and give it a configuration made up of shapes, colours, various aspects freely defined by a person skilled in the art. However, preferentially when the scrolling bar is provided in conjunction with the display of the text of a song being played back, the scrolling bar is made up of an elongated figure, the longer dimension of which is substantially at right angles to the line of text currently being read.

Similarly, the trajectory, normally straight, of the scrolling bar is determined by its shape, its starting point and its finishing point. Such a definition can be implicit, for example, if the scrolling bar is provided in conjunction with the display of the text of the song currently being played back. In particular, a number of lines of text of the song can be displayed "overtyped" on the other layers in said text plane image layer. This practice is already well known in the karaoke field and will not be described further.

There is therefore, in the image plane of the scrolling bar represented, the trace of three text display lines that the scrolling bar will follow in turn in sequence when the videogram K is played back in a karaoke device.

According to an advantageous feature of the invention, particularly when the song marks a period of silence before the

start of a new line, the scrolling bar is displayed in its image plane in the margin to the left of the line on which it will scroll. The bar generator is then activated so that the bar produced by the scrolling bar generator then takes on a predefined appearance characteristic of a wait for a prescribed time, for example of one second, during which the bar generated by the scrolling bar generator takes on a colour or a predefined attribute such as blinking. When the videogram K is played back on a videogram reader K, the bar then appears in this way to warn the singer that he will soon have to perform the line of song in front of which the scrolling bar is positioned.

On returning to the videogram K editing device, by the receipt of a tag signal from the tag generator, a scrolling bar horizontal movement operation is then performed using the horizontal movement generator connected to the memory of the scrolling bar image layer. The scrolling bar is then compelled to move along the line 1.

Figure 3 represents a particular embodiment of a karaoke operation device based on a mobile telephone 31. It will be understood that such a karaoke operation device can also be based on a personal digital assistant (PDA), equipped with a means of connection to a mobile telephone network, for example of GSM type, but also of GPRS and/or UMTS type. The mobile telephone 31 of the exemplary embodiment mainly includes a means of connection for receiving a type K videogram produced by an editing device according to the invention, specified in particular using Figures 1 and 2 and held by a videogram K producer 30.

The means of connection in a first embodiment comprises a communication line, for example based on a multimedia message queue (for example according to the multimedia messaging system MMS protocol).

In a second embodiment, the means of connection comprises the transmission of a multimedia file, for example by postal means, in the form of a memory card which can be inserted into a memory card reader (not shown in Figure 3).

The sequence of images and sounds contained in the type K videogram is then played and stored temporarily in a buffer memory 32 of the mobile telephone. A software application well known to a person skilled in the art is used to form an MPEG standard reader 33, a first sound output of which is directed towards a loudspeaker 35 of the mobile telephone, in particular to produce the music recorded in the videogram K currently being read.

A second output of the MPEG file reader 33 is directed towards a display resource 34 of the mobile telephone 31. It mainly contains the display of a scrolling pointer which has been produced in the videogram K according to the above-mentioned methods by the karaoke editing device of the invention.

In a variant, the scrolling pointer is displayed on the display 34 in the foreground of the display of the text of the song contained and played back in the videogram K locally on the mobile telephone 31.

In a variant, the text displayed on the display 34 is coloured in synchronism with the movement of the scrolling pointer according to the sequence edited by the karaoke editing device of the invention held by the videogram K producer 30.

In a variant, a sequence of fixed images, as in a slide show, or a sequence of animated images, such as an MPEG sequence, is displayed on the display 34 originating from the videogram K according to the abovementioned methods by the karaoke editing device of the invention.

In particular, the user of the mobile telephone 31 can, while the videogram K is being played on his terminal, set up on another communication channel a call with a party, for example,

transmitting his voice to him while the karaoke is being played back. This additional call and the transmission of the videogram K can be monitored by the videogram K producer 30 for example in the operation of games.

Figure 4 contains a representation of a particular embodiment of a karaoke operation device, based on a mobile telephone 43, which can also be formed as has been described using Figure 3. The mobile telephone 43, or any other mobile device connected to a mobile communication network, is connected by a mobile communication channel to a centre 52 for broadcasting videograms K produced by an editing device according to the invention.

A videogram K production means 41 is connected to a coder-decoder (codec) 44 which acts as the interface between the mobile telephone 43 and the mobile communication network on which the karaoke is being played back.

The codec 44 is connected internally to the mobile telephone 43 in a manner known to a person skilled in the art with a software application 51 based on a local processor (not represented), a working memory space and various resources known to a person skilled in the art. Such a software application is programmed on the basis of an embedded Java compiler.

The software application 51 can be downloaded in the form of a Java applet from the broadcasting centre 52 and is run on the mobile telephone to activate a sequence for operating the videogram K transferred by the videogram K production means 41. A Java "servlet", not represented, is implemented on the side of the mobile communication network where the broadcasting centre is located, preferably in a mobile communications operation centre 42 connected by an appropriate communication channel with the codec 44.

Preferentially, a number of mobile telephones 43 can be managed sequentially or concurrently by the broadcasting centre 52.

The software application 51 of the mobile telephone 43 then distributes the data of the videogram K received to a memory 45 and to an audiovisual or multimedia sequence reader 46, the visual part of which is transmitted to a display 47 and the audio part to a loudspeaker (shown with no reference). These various means function in the same way as the same means of the mobile telephone 31 in the Figure 3 and will not be described further.

Moreover, the application 51 can send instructions in graphic form to the display 47 or in sound form or vocal form to the loudspeaker of the mobile telephone to give operating instructions to the user of the mobile telephone 43 while playing back the videogram K.

In response, the user can use the microphone 50 for dialogue with the mobile communications operation centre 42 or even use the keypad and the pointing device conventionally constituting a conventional user input means 49 on the mobile telephones. The microphone 50 and the input means 49 are conventionally connected to a detection means to be managed by the software application 51 so as to return the actions of the user of the mobile telephone 43 to the mobile communications operation centre 42.

In particular, the voice of the user currently performing the karaoke on the basis of the videogram K displayed and played on the mobile telephone 43 is thus available at the mobile communications operation centre. Such an arrangement can be exploited in particular on an interactive radio or television transmission.

There now follows a description of the generation of the synchronization tags using Figures 5(a) to 5(e) which respectively describe the audio track representative of the vocal part to be

sung and different time sequences H1 to H4 which will be explained later.

The synchronization tag generator 7 includes a means for analysing the audio track containing the lyrics of the song produced by the audio track editor 6, based on the videogram O obtained from the recording studio. The means for analysing the audio track of the vocal part mainly comprises:

- a circuit for evaluating the instantaneous amplitude of the sound on the audio track; and
- a circuit for detecting a vocal characteristic such as the start of a word, a silence, based on the detection of a threshold amplitude.

The circuit for evaluating the instantaneous amplitude is well known to a person skilled in the art. Similarly, a circuit for detecting the start of a word or a silence by detecting that the amplitude is greater than a word start threshold or below a silence level threshold is also well known to a person skilled in the art.

The analysis of the audio amplitude of the audio track of the vocal part is conducted to detect the position in time of predefined vocal characteristics of the song such as the start and end of each word and of each line. The tag generator inserts a synchronization tag in relation to said audio track at the position of these vocal characteristics. These vocal characteristics can be:

- a silence,
- a change of rhythm,
- any other recognizable break in a vocal characteristic.

The synchronization tag generator 7 also inserts synchronization tags at the start and end of each line, as well as at the start and end of each word. If a number of tags coincide, the synchronization tag generator 7 retains only one. Naturally, the invention does not force the user to position a tag on each vocal characteristic detected and it is possible to retain, for the

tag application process, only the most marked vocal characteristics on the audio track.

In an embodiment, the time sequence generator 8 includes a means for detecting on the audio track the position in time of the synchronization tags and includes a means for generating a time sequence H3 based on the position in time of the synchronization tags. Thus, the time sequence generator 8 generates rising edges on the time sequence H3 such that each edge corresponds to the position in time of a synchronization tag. Consequently, the time sequence H3 is representative of the position in time of the synchronization tags.

In another embodiment, the time sequence generator 8 includes a means for detecting positions in time corresponding to the ends of the lines of the text sequences and a means for generating rising edges on a time sequence H1, such that each edge corresponds to the position in time of an end of line of a text sequence.

In another embodiment, the time sequence generator 8 includes a means for detecting the position in time of an end of text sequence and a means for generating rising edges on a time sequence H2, such that each edge of the time sequence H2 corresponds to the position in time of an end of text sequence.

In another embodiment, the time sequence generator 8 includes a means for detecting the edges of the time sequences H2 and H3 which coincide, in other words detecting the edges that correspond to the position in time of an end of line on the time sequence H3 and includes a means for detecting the edges on the time sequence H3 that follow said detected edges. The time sequence generator 8 also includes a means for determining the time slots between said detected edges and the edges that follow them. The time sequence generator 8 generates falling edges on a time sequence H4, such that the falling edges of said time sequence H4 correspond to the detected edges of the time

sequence H3. The time sequence generator 8 then generates rising edges according to predefined time slots.

If this time slot is longer than one second, the time sequence generator 8 generates a rising edge on the time sequence H4, such that this edge appears one second before the edge that follows the edge corresponding to a line end. If this delay is less than one second, the time sequence generator 8 generates a falling edge on the time sequence H4, such that this rising edge follows the falling edge within a time equal to the time slot. The time sequence H4 represents the positions in time of the appearance and disappearance of the scrolling pointer on a display medium 18. The rising edge corresponds to the appearance of the pointer and the falling edge to the disappearance of the pointer.

Figures 6(c), 6(d), 6(e) and 6(f) diagrammatically describe an embodiment of how to calculate the scrolling speeds of the pointer P between each synchronization tag.

Figure 6(c) represents the audio track containing the lyrics of the text to be sung.

Figure 6(d) represents the time sequence H2.

Figure 6(e) represents the time sequence H3.

Figure 6(f) represents the sequences of text displayed on a display medium.

The speed calculation unit 9 includes a means for correlating the time sequences H2 and H3 to determine the edges common to both time sequences, in other words to determine on the time sequence H3 the edges that correspond to a line end (index B in Figure 6). The speed calculation unit 9 also includes a means for detecting on the time sequence H3 the edges corresponding to a line start (index A in Figure 6).

The speed calculation unit 9 comprises a means for determining the time slots TSi on the time sequence H3 between an edge a and the edge that follows it, provided that said edge

does not correspond to an edge b and comprises a means for determining the distance in pixels di of the text displayed during the associated time slot TSi.

Finally, the speed calculation unit 9 comprises a means for calculating the speeds vi on the basis of a function f such that vi=f(ITi, di).

The speed calculation unit 9 stores the calculated speeds in a memory MEM 16.

Figures 7(a), 7(b) and 7(c) diagrammatically describe the mounting of the type A and type B image layers on a blank video track in synchronism with the time sequence H2.

Figure 7(a) represents the type A and type B image layers placed in the memory MEM 16.

Figure 7(b) represents the video track containing the type A and type B image layers.

Figure 7(c) represents the time sequence H2.

The editing unit 12 recovers the type A and type B image layers from the memory MEM 16.

The editing unit 12 includes a means for generating a video track displaying the type A and type B image layers in synchronism with the time sequence H2.

On each edge of the time sequence H2, the editing unit 12 positions a type A image layer and the type B image layer associated with it, such that the type A image layers appear in the foreground on the display medium 18 and the type B image layers appear in the background on the display medium 18. The resulting video track is therefore a succession of fixed image layers which follow each other in synchronism with the time sequence H2 and of which only the type A image layers are visible on the display medium 18, the type B image layers being in the background.

Figures 8(a), 8(b) and 8(c) diagrammatically describe the placing of the pointer P image layers on the video track and the cropping of the type A image layers of the video track in

synchronism with the speeds vi of movement of the pointer P. The purpose of the cropping is to cut the left-hand part of image layer A, the delimitation of which corresponds to the current position of the pointer P, such that the image layer B located under the image layer A can be seen. Within the context of the invention, the objective of the cropping is to give an impression of progressive colouring of the text to be sung. The cropping is performed in synchronism with the scrolling of the pointer P, in other words, at a given position of the pointer, the lefthand part of the image layer is truncated. The scrolling of the pointer P, on the other hand, depends on the scrolling speeds calculated by the speed calculation unit 9.

For a better understanding of the cropping process, a text sequence between two tags is considered, the speed vi of the pointer P being constant between these two tags. Thus, the video montage produced between two tags comprises a first image layer A, a second image layer and finally a third image layer of the pointer P. The different image layers are overlaid, such that the image layer A is in the foreground and the image layer B is in the background. Thus, the image layer B cannot be seen. The image layer of the pointer P covers the image layers A and B. Between the two tags, the pointer moves at a predetermined speed vi. As the pointer moves, the text sequence scanned by said pointer is coloured at the same speed. Thus, at each position of the pointer, the part to the left of the position of the pointer P of the image layer A is cropped or truncated, which reveals the part to the left of the position of the pointer P of the image layer B. The device of the invention simultaneously records these changes of state on a blank video track. The result obtained is therefore a progressive colouring of the text in synchronism with the speed vi of movement of the pointer P.

Thus, the cropping unit 13 includes a means for detecting the edges of the time sequence H3 and recovers from the memory

MEM 16 the associated speeds of the pointer between each edge of said time sequence H3. The cropping unit 13 comprises a means for positioning in time on the video track, the image layers of the pointer P according to the speeds vi of movement. The cropping unit 13 also includes a means for cropping (or truncating) the left-hand part of the type A image layer delimited by the position of the pointer P on the x axis. The cropping process thus reveals on the display the background image layers B, which gives an impression of progressive colouring.

Figure 9 describes the method of the invention in flow diagram form.

The method comprises, so as to allow, subsequently on reading (K) the memory medium (5), at least one karaoke user to follow in real time the progression of the lyrics to be sung according to the vocal characteristics of the song such as changes of rhythm or silences:

- a step for generating a scrolling pointer (P) intended to be displayed on a display medium (18) before the start of a new phrase of the text of the song in a predetermined time slot, such that the user has time to prepare to sing;
- a step for mobilizing the scrolling pointer (P), on the display medium (18), such that the pointer (P) is mobilized in synchronism with the lyrics to be sung according to the vocal characteristics of the song.

The method also comprises a step for progressively colouring the text to be sung in synchronism with the scrolling of the scrolling pointer (P).

More particularly, in a first step E1, the method of the invention consists in entering the text to be sung and dividing it up into text sequences such that, when the text sequence is displayed on a display medium 18, said text sequence contains no more than four lines.

In a second step E2, the method of the invention consists in generating type A image layers of the text sequences, type B image layers of the text sequences and pointer P image layers. The different image layers generated in this way are stored in a memory MEM 16.

In a third step E3, the method consists in editing, from a memory medium 5, the audio track containing only the lyrics of the song to be sung.

In a fourth step E4, the method of the invention consists in processing the audio track edited in step E3 and in generating the synchronization tags according to the vocal characteristics of said audio track.

In a fifth step E5, the method of the invention consists in generating, based on the synchronization tags and image layers A and B, time sequences H1, H2, H3 and H4. The time sequence H1 is representative of the position in time of the end of each text sequence. The time sequence H2 is representative of the position in time of the end of each line of each text sequence. The time sequence H3 is representative of the position in time of the synchronization tags. The time sequence H4 is representative of the positions in time of the appearance and disappearance of the pointer P on a display medium 18.

In a sixth step E6, the method of the invention consists in calculating, from the time sequences H2 and H3, the time slots TSi between each synchronization tag and from the type A image layers, the distances di in pixels of the text sequences associated with the time slots TSi. The method then consists in calculating the speeds vi on the basis of a function f(), such that vi=f(TSi, di).

In a seventh step E7, the method of the invention consists in mounting the various image layers generated in the step E2 onto a blank video track according to the time sequence H2 determined in the step E5.

In an eighth step E8, the method of the invention consists in cropping the image layers, mounted onto a video track in the step E7, between each synchronization tag according to the time sequence H4 and the speeds vi of movement of the pointer P between each synchronization tag.

In a ninth and last step E9, the method of the invention consists in recording the duly produced video track on a memory medium, intended to be read in a drive 15 suited to the memory medium.

It will be understood in particular, in the context of the present invention, that the editing process generates, in the case of a song sung by several performers, as many scrolling pointers P, of different colours, as there are singers.

Similarly, still in the case of a song sung by several performers, the editing method generates image layers, according to the requirements of the invention, of the texts of each singer. Naturally, the colour then used for colouring the texts is different from one singer to another.

CLAIMS

1. Device for editing karaoke in the form of a videogram (5), the editing device being of the type comprising a means (St) for recording at least the musical accompaniment of a song and, where appropriate, the visual part of a video short, so as to produce a videogram (5) that can be read on a karaoke drive, characterized in that it also comprises a means (6 - 8) for generating at least a scrolling indicator P intended to warn the user of the subsequent start of a new phase of the song, so as to enable, subsequently when reading (K) the edited videogram (5), at least one user of the karaoke to anticipate the progress of the song to be sung.

2. Device according to Claim 1, characterized in that the means for generating a scrolling indicator comprises a means for producing a graphic representation on said videogram of a scrolling pointer and which cooperates with means for determining the shape of the pointer, its position and display attributes such as its colour, its transparency.

3. Device according to Claim 2, characterized in that it also comprises a means (10) for recording a graphic representation of the text of a song to be sung, said graphic representation being intended for display in synchronism with the subsequent play-back of the videogram and in that the means for generating a scrolling pointer comprises a means for generating a vertical bar displayed through a horizontal line of text of the lyrics of the song to be sung.

4. Device according to either of Claims 2 or 3, characterized in that the means for generating a scrolling pointer cooperates with a means for determining an insertion point on said display medium in relation to the play-back of the karaoke and with a means (9, 13) for mobilizing each scrolling pointer P in relation to the display of the text of the phrase of the song to be sung.

5. Device according to Claim 4, characterized in that it also comprises a means for analysing a pilot rendition of the singing of the song to be edited and for producing a signal analysing the initial rendition and in that the means for mobilizing the pointer cooperates with a means for detecting changes to the signal detecting the pilot rendition which is used to produce a rhythm break tag on each predefined change and with a means for determining a law of movement of said scrolling pointer between two successive rhythm break tags.

6. Device according to any one of Claims 3 to 5, characterized in that it comprises a means for generating at least one sequence of display and scrolling images of the scrolling pointer on an image layer, added to the recording on the videogram (5) being edited.

7. Device according to Claim 6, characterized in that it also comprises a means for generating at least one sequence of images of the graphic representation of the text to be sung on a second image layer, added to the recording on the videogram (5) being edited, such that the image layers will be displayed on a display medium (18) in synchronism with time sequences representative of the vocal characteristics of the song.

8. Device according to Claim 7, characterized in that it also comprises a means for generating at least one sequence of colouring images on a third image layer, added to the recording on the videogram (5) being edited, such that the text of said second layer is coloured in synchronism with the scrolling of the scrolling pointer of the first image layer and such that the image layers are displayed on a display medium (18) in synchronism with time sequences representative of the vocal characteristics of the song.

9. Device for playing back karaokes edited using a karaoke editing device according to any one of the preceding claims, characterized in that it comprises a means of reading a

videogram (K) and an indication means of at least one scrolling indicator, the status of which is determined by said videogram (K).

10. Device according to Claim 9, characterized in that the videogram (K) is stored on a videogram server (K - 30) for transmission over a telephone network or similar so that it is played back on a mobile telephone (31) including an indication means such as a display (34).

11. Device according to Claim 9, characterized in that the mobile telephone on which the videogram (K) is played back is also connected to a mobile communications operation centre (42) such that data such as instructions or the voice of the user currently playing back the karaoke is exchanged with the mobile telephone (43).

12. Method of editing karaokes on a videogram (5), characterized in that it comprises a step for generating a scrolling indicator (P) before the start of a new phase of the song in a predefined time slot, such that the user has time to prepare to sing; so as to enable, subsequently when reading (K) the memory medium (5), at least one karaoke user to follow in real time the progression of the lyrics to be sung according to the vocal characteristics of the song such as rhythm changes or silences.

13. Method according to Claim 12, characterized in that it comprises a step for mobilizing the scrolling pointer (P), on a display medium (18), such that the pointer (P) is mobilized in synchronism with the lyrics to be sung according to the vocal characteristics of the song.

14. Method according to Claim 13, characterized in that it comprises a step for progressively colouring the text to be sung in synchronism with the scrolling of the scrolling pointer (P).

15. Method according to either of Claims 13 or 14, characterized in that it comprises a step for deleting the display of the pointer (P) on the display medium (18) when a line of text of the song has been sung.

16. Method according to either of Claims 12 or 15, characterized in that it comprises at least one of the following steps:

- a step (E1) which consists in entering and dividing up the text to be sung into lines of text so that lines of text can be displayed on a display medium (18);
- a step (E2) which consists in generating type A foreground image layers and type B background image layers in relation to a sequence of text;
- a step (E3) which consists in editing, from a videogram (5), the audio track containing only the lyrics of the song to be sung;
- a step (E4) which consists in analysing the audio track edited in the step (E3) for detecting the vocal characteristics of the song in order to generate synchronization tags according to predefined vocal characteristics;
- a step (E5) which consists in generating time sequences on the basis of the synchronization tags and image layers;
- a step (E6) which consists in calculating, from a time sequence and the type A image layers, the scrolling speeds of the pointer between each synchronization tag;
- a step (E7) which consists in creating a montage of the image layers on karaoke videogram according to the different time sequences;
- a step (E8) which consists in cropping the image layers mounted on the video track according to a time sequence and the scrolling speeds of the pointer between each synchronization tag;
- a step (E9) which consists in recording the duly modified video track on a karaoke videogram that can be played back on request.

17. Method according to any one of Claims 12 to 16, characterized in that it generates, in the case of a song performed by a number of singers, a scrolling pointer (P) of a different colour for each karaoke user who sings the part of one of the singers.

18. Method according to any one of Claims 12 to 17, characterized in that it comprises, in the case of a song performed by several singers, a progressive colouring step of distinct colour for each part to be sung associated with each singer in synchronism with a scrolling pointer associated with the part to be sung.

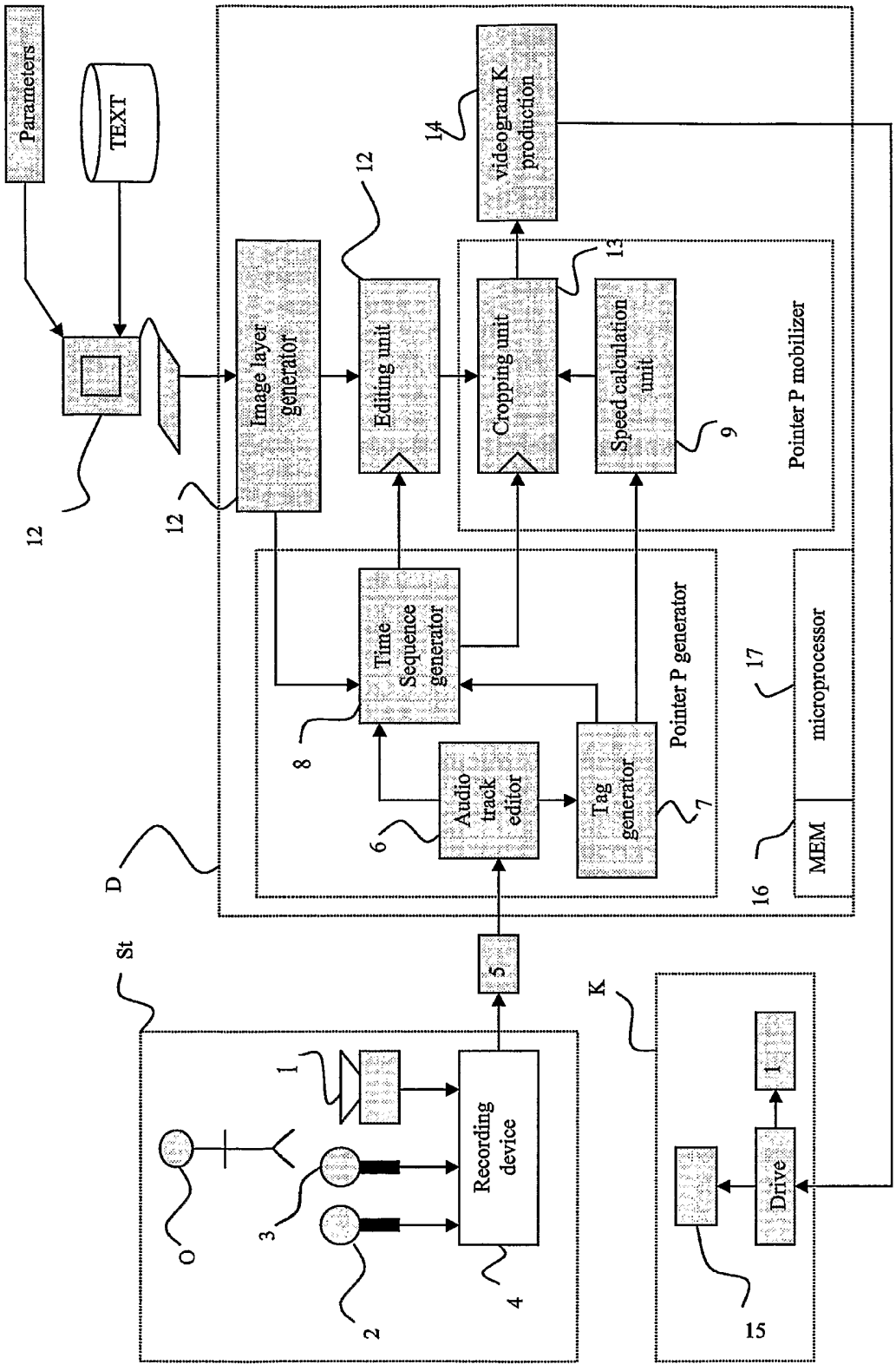

Parameters
TEXT
12
12
Image layer generator
12
Editing unit
14
videogram K production
13
Cropping unit
Speed calculation unit
9
Pointer P mobilizer
Time Sequence generator
8
Audio track editor
6
Tag generator
7
Pointer P generator
17
microprocessor
MEM
16
D
St
5
K
1
Recording device
4
O
3
2
1
Drive
15

Figure 1

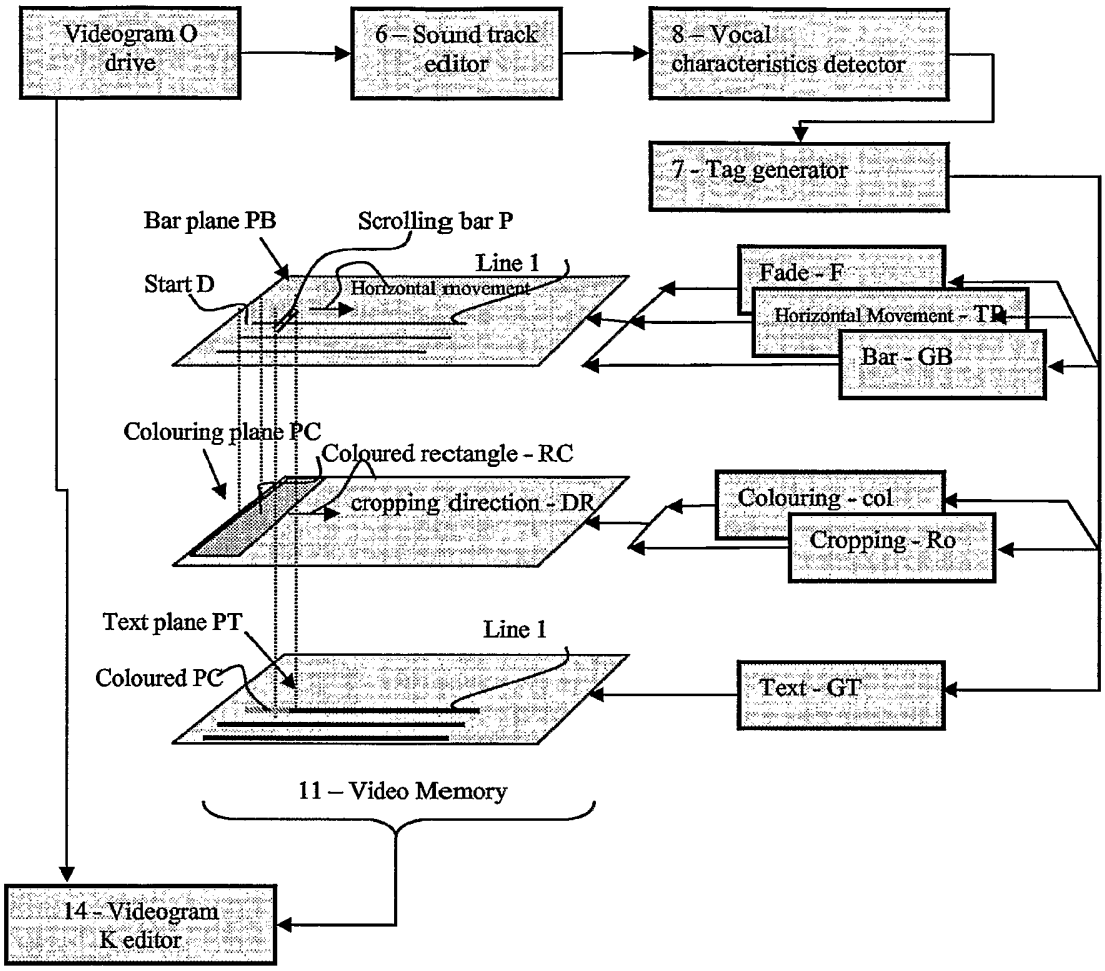

Videogram O drive
6 – Sound track editor
8 – Vocal characteristics detector
7 - Tag generator
Bar plane PB
Scrolling bar P
Line 1
Start D
Horizontal movement
Fade - F
Horizontal Movement - TR
Bar - GB
Colouring plane PC
Coloured rectangle - RC
cropping direction - DR
Colouring - col
Cropping - Ro
Text plane PT
Line 1
Coloured PC
Text - GT
11 – Video Memory
14 - Videogram K editor

Figure 2

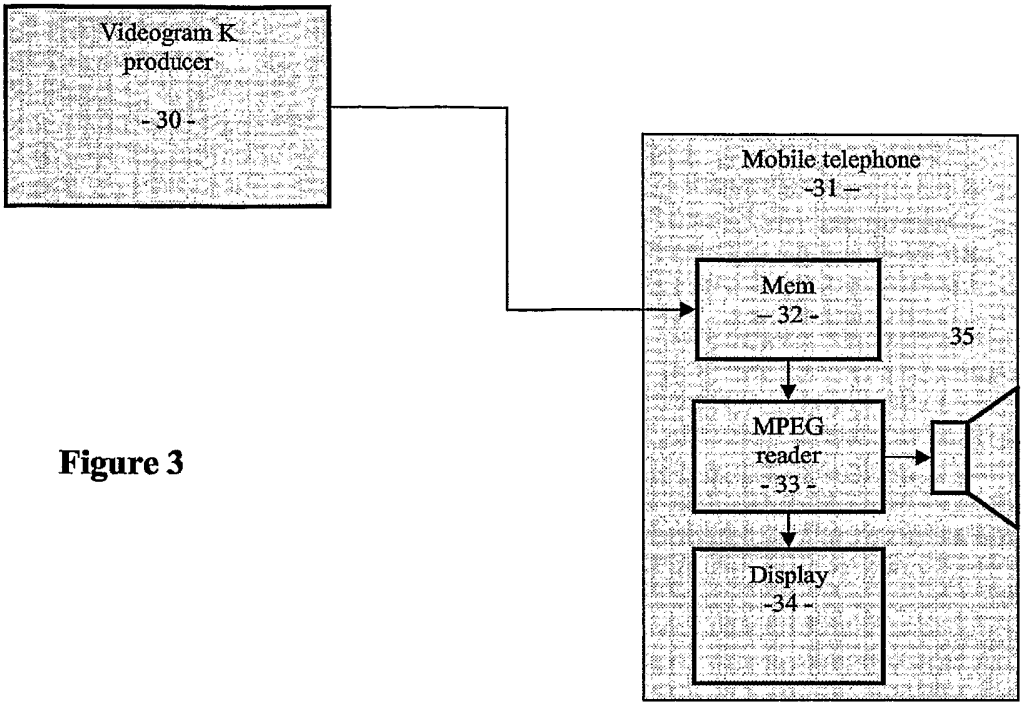


Figure 3

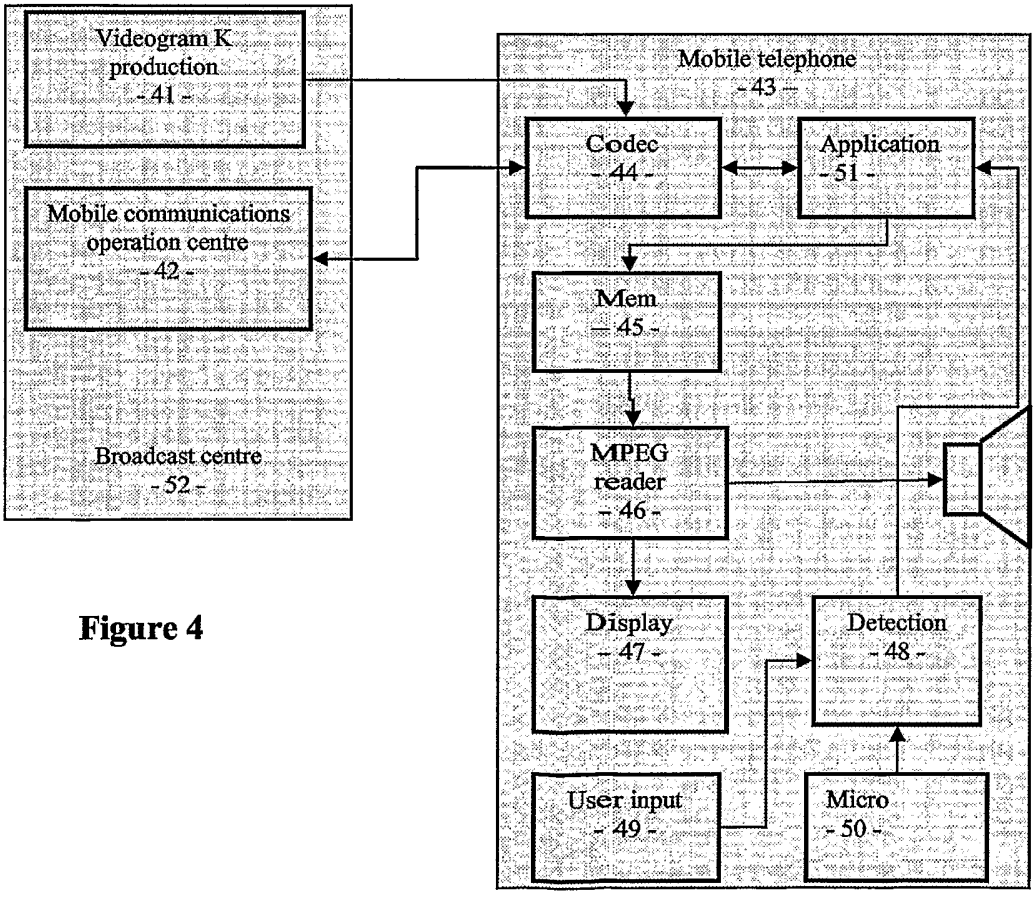


Figure 4

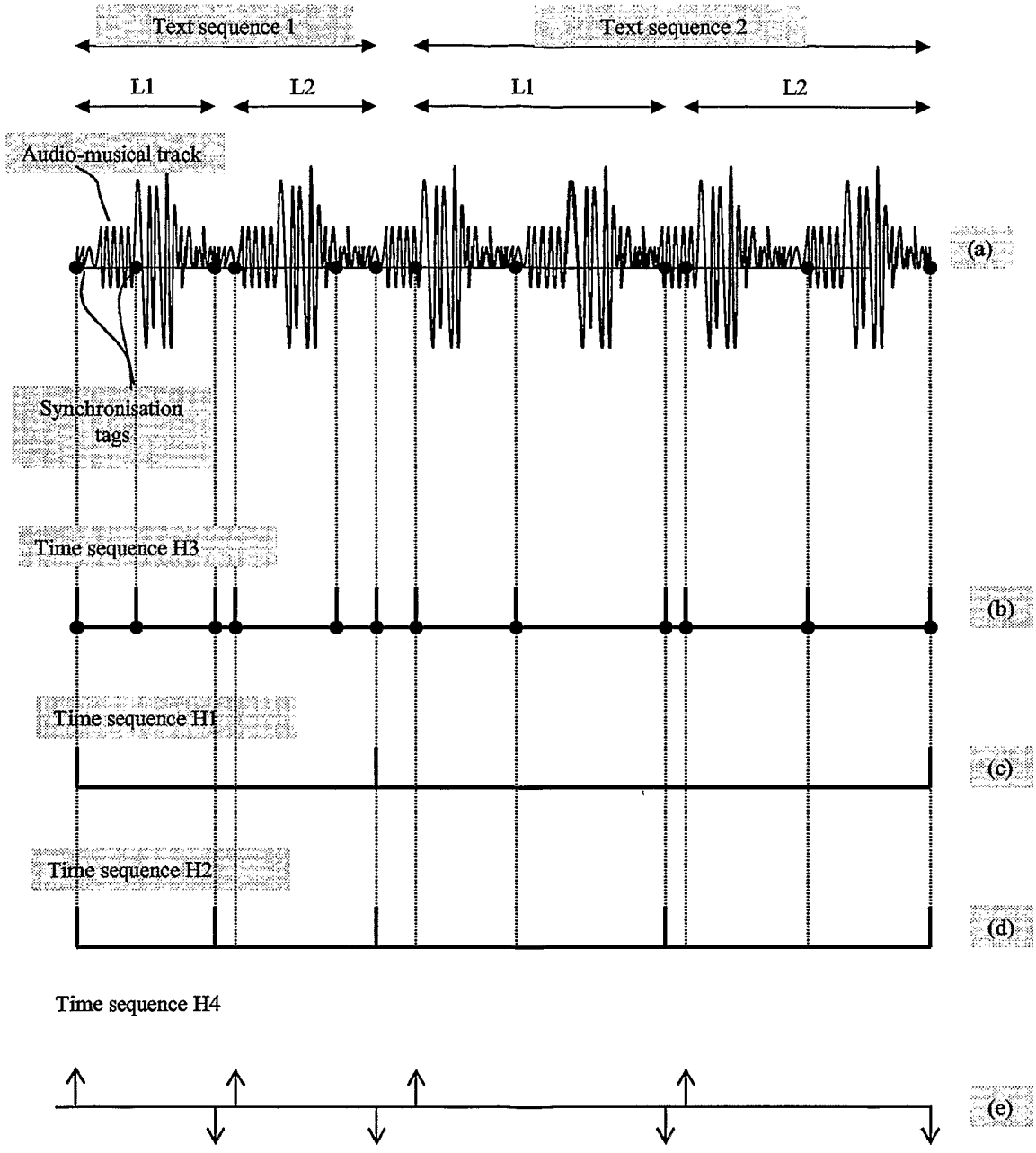

Text sequence 1
Text sequence 2
L1
L2
L1
L2
Audio-musical track
(a)
Synchronisation tags
Time sequence H3
(b)
Time sequence H1
(c)
Time sequence H2
(d)
Time sequence H4
(e)

Figure 5

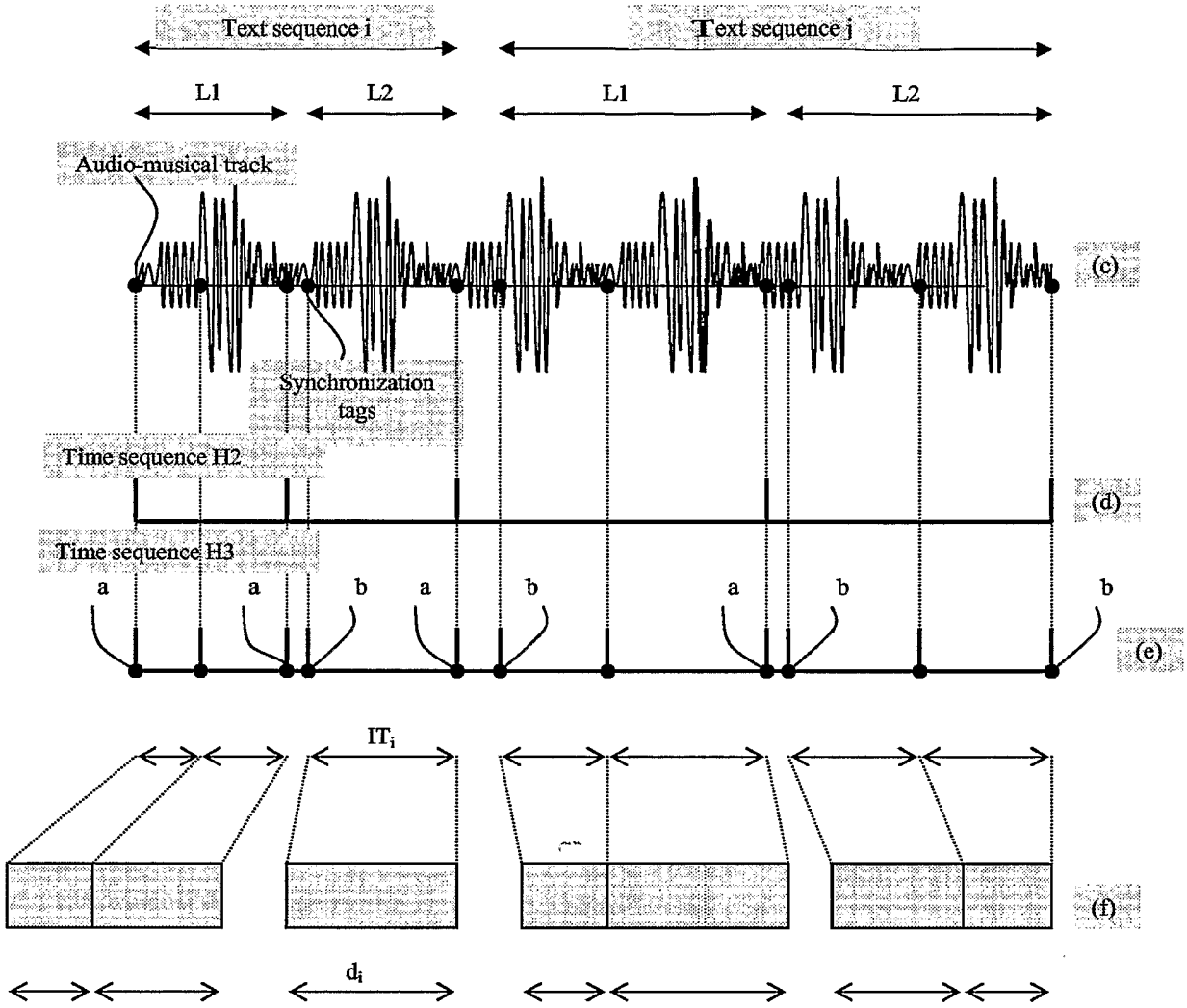

Text sequence i
Text sequence j
L1
L2
L1
L2
Audio-musical track
(c)
Synchronization tags
Time sequence H2
(d)
Time sequence H3
a
a
b
a
b
a
b
b
(e)
IT_i
(f)
d_i

Figure 6

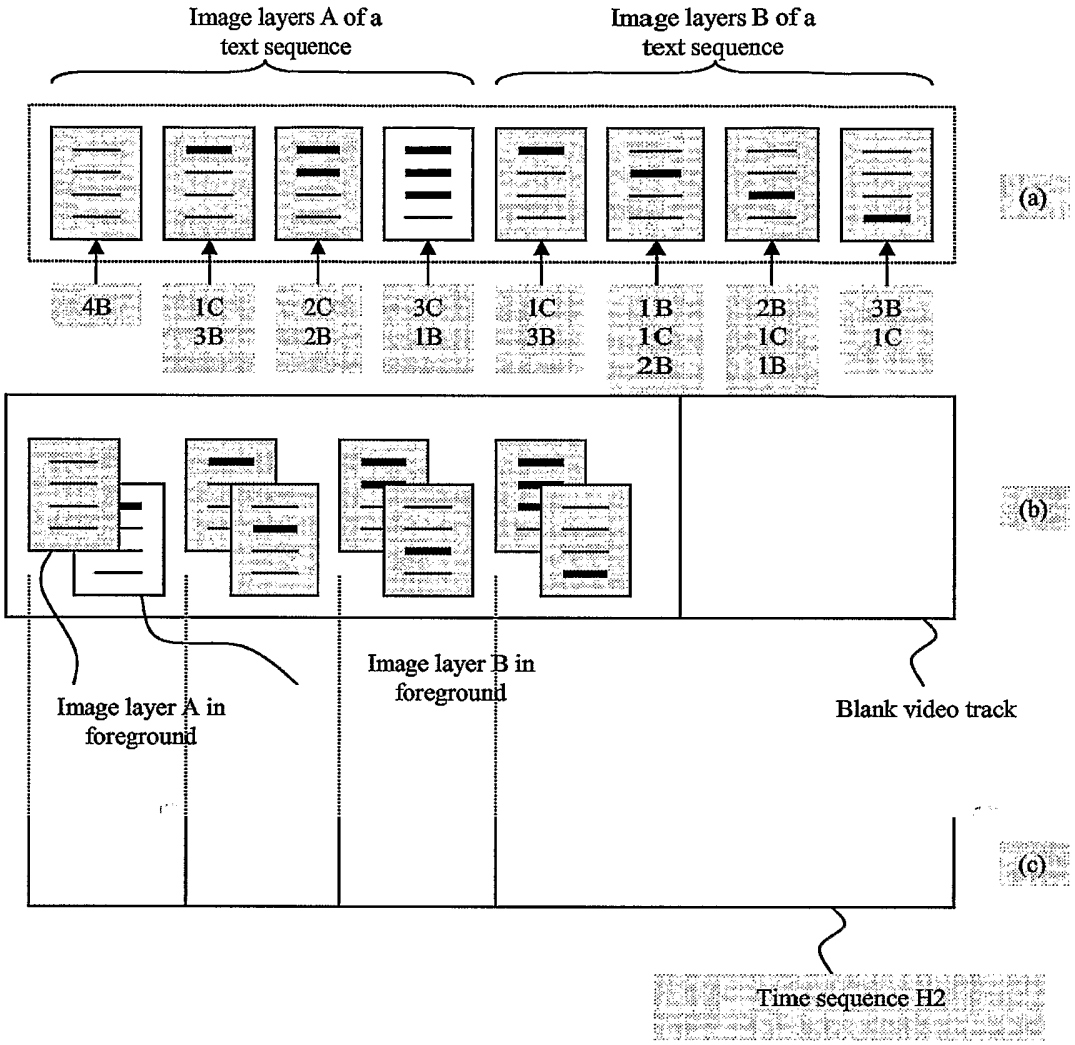
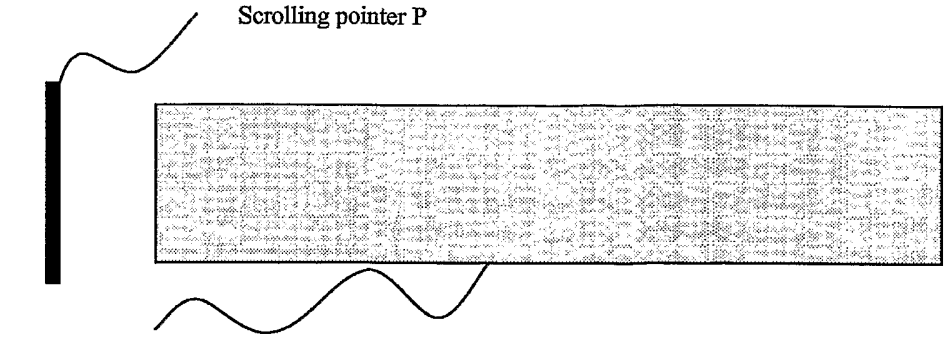


Image layers A of a text sequence
Image layers B of a text sequence
(a)
4B
1C 3B
2C 2B
3C 1B
1C 3B
1B 1C 2B
2B 1C 1B
3B 1C
(b)
Image layer A in foreground
Image layer B in foreground
Blank video track
(c)
Time sequence H2

Figure7



Type A image layer

Type B image layer

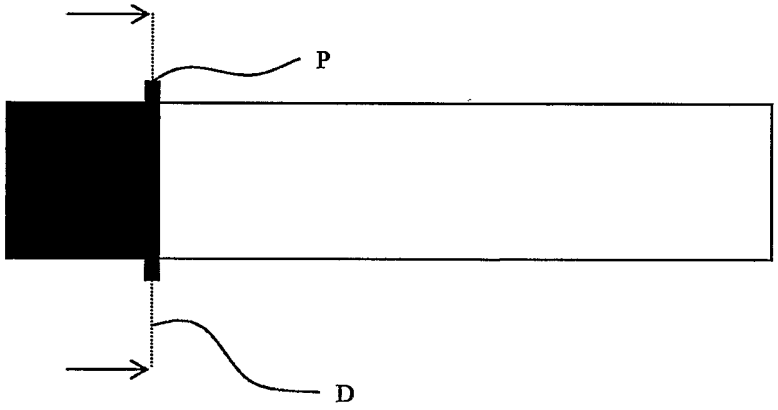


Figure 8

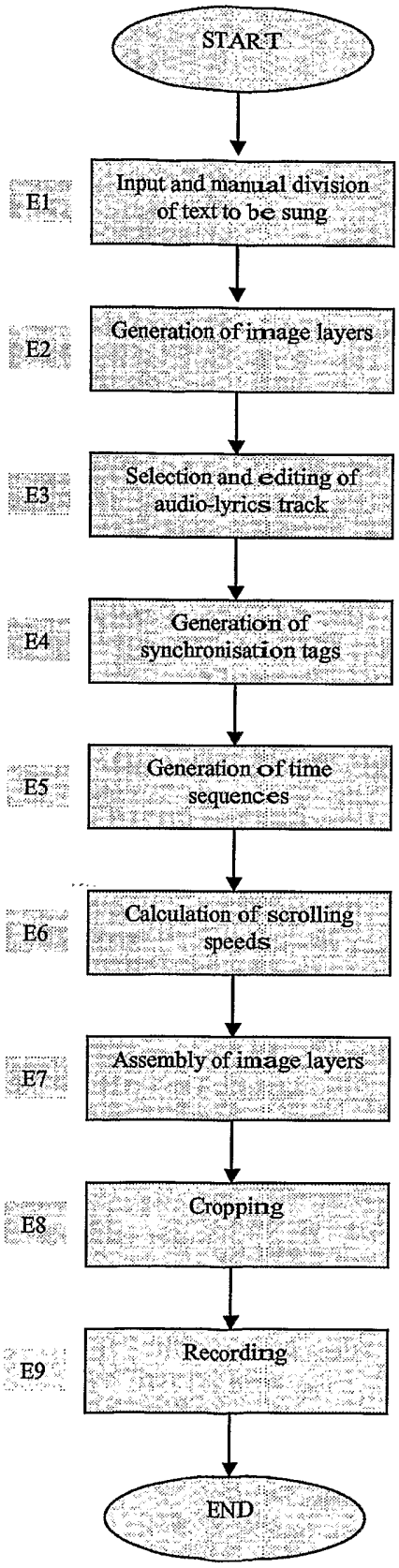

START
E1
Input and manual division of text to be sung
E2
Generation of image layers
E3
Selection and editing of audio-lyrics track
E4
Generation of synchronisation tags
E5
Generation of time sequences
E6
Calculation of scrolling speeds
E7
Assembly of image layers
E8
Cropping
E9
Recording
END

Figure 9

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/050861

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G11B27/34 G10H1/36

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 7 G11B G10H

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

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MTU.COM: "Karaoke Home Producer 4.103"'Online! 30 December 2003 (2003-12-30), XP002292076 Retrieved from the Internet: URL:www.mtu.com/support/karaoke-home-producer-version-details.htm> 'retrieved on 2004-08-10! page 3, paragraph 2 - page 4, paragraph 9 page 7, paragraph 4 -----	1-18
Y	US 5 931 680 A (SEMBA YOUJI) 3 August 1999 (1999-08-03) abstract column 6, line 1 - column 8, line 5 ----- -/--	1-18

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 May 2005	19/05/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Valencia, E

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2005/050861

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 465 240 A (MANKOVITZ ROY J) 7 November 1995 (1995-11-07) abstract column 1, line 26 - line 36 column 13, line 22 – column 14, line 52 -----	1-18
L	WILL CONNELLY: "CD+G=$"'Online! 1 June 2004 (2004-06-01), XP002292077 Retrieved from the Internet: URL:emusician.com/mag/emusic_cdg/> 'retrieved on 2004-08-10! -----	

INTERNATIONAL SEARCH REPORT

ormation on patent family members

International Application No
PCT/EP2005/050861

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5931680 A	03-08-1999	JP 3617113 B2	02-02-2005
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