[7B] In another aspect defined in Claim 6, there is provided an automatic recognition method for the automatic recognition of source media content from a source signal by comparison to reference media content, the method including: generating a spectrogram from the source signal by applying a Fourier transform to the source signal, the spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the source signal; generating at least one source vector for a time slice of the source signal by calculating ratios of magnitudes of selected frequency bins from the column for the time slice and quantising the ratios to generate digits of a source vector~~, wherein generating at least one vector for a time slice includes, for at least one selected frequency bin of a time slice, calculating ratios of that bin and an adjacent or a near adjacent frequency bin from the column for the time slice, and dividing the ratios into ranges to generate at least one selected digit for each ratio~~; performing a primary evaluation by exact matching of digits of first vectors to entries in a look-up table, wherein each entry in the look-up table is associated with a group of second vectors and wherein the number of digits of the first vectors used to perform the exact match differs between entries in the look-up table; and performing a secondary evaluation to determine a degree of similarity between the first vectors and each of the group of second vectors to identify any second vectors that are candidates for matching the source media content to the reference media content, wherein a database stores the look-up table and the second vectors, and wherein the first vectors are either source vectors or reference vectors and the second vectors are the other of the source vectors and the reference vectors, each reference vector representing a time slice of the reference media content; the method further including generating a further source vector for a time slice by: generating a further spectrogram from the first signal by applying a Fourier transform to the source signal, the further spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the first signal; applying a further Fourier transform to the respective frequency bins from the column for the time slice to generate a respective set of coefficients; generating the further source vector such that, for a set of N coefficients in a column for a time slice, for each of elements 2 to N-1 of the further source vector, an nth element is formed by the square of the nth coefficient divided by the product of the (n-1)th

Claims

1. An automatic recognition method for the automatic recognition of source media content from a source signal by comparison to reference media content, the method including:

generating a spectrogram from the source signal by applying a Fourier transform to the source signal, the spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the source signal;

generating at least one source vector for a time slice of the source signal by calculating ratios of magnitudes of selected frequency bins from the column for the time slice and quantising the ratios to generate digits of a source vector, wherein generating at least one vector for a time slice includes, for at least one selected frequency bin of a time slice, calculating ratios of that bin and an adjacent or a near adjacent frequency bin from the column for the time slice, and dividing the ratios into ranges to generate at least one selected digit for each ratio;

performing a primary evaluation by exact matching of digits of first vectors to entries in a look-up table, wherein each entry in the look-up table is associated with a group of second vectors and wherein the number of digits of the first vectors used to perform the exact match differs between entries in the look-up table; and

performing a secondary evaluation to determine a degree of similarity between the first vectors and each of the group of second vectors to identify any second vectors that are candidates for matching the source media content to the reference media content,

wherein a database stores the look-up table and the second vectors, and

wherein the first vectors are either source vectors or reference vectors and the second vectors are the other of the source vectors and the reference vectors, each reference vector representing a time slice of the reference media content.

2. The method of claim 1, wherein generating at least one vector for a time slice includes:

for at least one selected frequency bin of a time slice, calculating ratios of that bin and an adjacent or near adjacent frequency bin from the column for the time slice; and

dividing the ratios into ranges to generate two binary digits for each ratio.

3. The method of claim 1 or claim 2, wherein:

the ranges differ between selected ratio bins to equalise distribution of ratio values between ranges.

4. The method of any one of claims 1 to 3, including:

generating a said source vector using frequency bins selected from at least one of a frequency band from 400Hz to 1100Hz and a frequency band from 1100Hz to 3000Hz.

5. The method of any one of claims 1 to 4, including generating a further source vector for a time slice by:

generating a further spectrogram from the first signal by applying a Fourier transform to the source signal, the further spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the first signal;

applying a further Fourier transform to the respective frequency bins from the column for the time slice to generate a respective set of coefficients;

generating the further source vector such that, for a set of N coefficients in a column for a time slice, for each of elements 2 to N-1 of the further source vector, an nth element is formed by the square of the nth coefficient divided by the product of the (n-1)th coefficient and the (n+1)th coefficient and quantising the elements of the resulting vector to generate at least one digit for each element.

6. An automatic recognition method for the automatic recognition of source media content from a source signal by comparison to reference media content, the method including:

generating a spectrogram from the source signal by applying a Fourier transform to the source signal, the spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the source signal;

generating at least one source vector for a time slice of the source signal by calculating ratios of magnitudes of selected frequency bins from the column for the time slice and quantising the ratios to generate digits of a source vector~~, wherein generating at least one vector for a time slice includes, for at least one selected frequency bin of a~~

~~time slice, calculating ratios of that bin and an adjacent or a near adjacent frequency bin from the column for the time slice, and dividing the ratios into ranges to generate at least one selected digit for each ratio~~;

performing a primary evaluation by exact matching of digits of first vectors to entries in a look-up table, wherein each entry in the look-up table is associated with a group of second vectors and wherein the number of digits of the first vectors used to perform the exact match differs between entries in the look-up table; and

performing a secondary evaluation to determine a degree of similarity between the first vectors and each of the group of second vectors to identify any second vectors that are candidates for matching the source media content to the reference media content,

wherein a database stores the look-up table and the second vectors, and

wherein the first vectors are either source vectors or reference vectors and the second vectors are the other of the source vectors and the reference vectors, each reference vector representing a time slice of the reference media content;

the method further including generating a further source vector for a time slice by:

generating a further spectrogram from the first signal by applying a Fourier transform to the source signal, the further spectrogram including a plurality of columns, each column being representative of a time slice and including a plurality of frequency bins each representative of a respective range of frequency components for the time slice of the first signal;

applying a further Fourier transform to the respective frequency bins from the column for the time slice to generate a respective set of coefficients;

generating the further source vector such that, for a set of N coefficients in a column for a time slice, for each of elements 2 to N-1 of the further source vector, an nth element is formed by the square of the nth coefficient divided by the product of the (n-1)th coefficient and the (n+1)th coefficient and quantising the elements of the resulting vector to generate at least one digit for each element.

7. The method of any one of claims 1 to 6, wherein the source signal is an audio signal and the frequencies of the spectrogram bins are allocated according to a logarithmic scale.