rebuffering event distortion quality, where

a parameter of the rebuffering event distortion quality includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

A method for evaluating media quality, where the method includes:

dividing a to-be-evaluated media file into a plurality of evaluation segments;

obtaining media reference quality and rebuffering event distortion quality of each of the evaluation segments, where a parameter of rebuffering event distortion quality of the evaluation segments includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity;

calculating media quality of each of the evaluation segments according to the obtained media reference quality and rebuffering event distortion quality of each of the evaluation segments; and

determining ~~final quality of the media~~final quality of the media file according to the media quality that is of each of the evaluation segments and obtained by calculation.

An embodiment of the present invention further provides an apparatus for evaluating media quality, where the apparatus includes:

an obtaining unit, configured to obtain media reference quality and rebuffering event distortion quality; and a determining unit, configured to determine final media quality according to the media reference quality and the rebuffering event distortion quality which are obtained by the obtaining unit, where

a parameter of the rebuffering event distortion quality includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

An embodiment of the present invention further provides an apparatus for evaluating media quality, where the apparatus includes:

an evaluation segment dividing unit, configured to divide a to-be-evaluated media file into a plurality of evaluation segments;

an obtaining unit, configured to obtain media reference quality and rebuffering event distortion quality of each of the evaluation segments that is obtained by dividing by the evaluation segment dividing unit, where a parameter of rebuffering event distortion quality of the evaluation

segments includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity;

a calculating unit, configured to calculate media quality of each of the evaluation segments that is obtained by dividing by the evaluation segment dividing unit according to the obtained media reference quality and rebuffering event distortion quality that are of each of the evaluation segments and obtained by the obtaining unit; and

a determining unit, configured to determine ~~final quality of the media~~final quality of the media file according to the media quality that is of each of the evaluation segments and is obtained by calculating by the calculating unit.

Beneficial Effects

It can be learned from the foregoing technical solutions that when media quality is calculated in the embodiments of the present invention, impact of a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity on the media quality is considered, thereby making a media quality evaluation result more accurate, and more consistent with subjective feelings of people.

BRIEF DESCRIPTION OF DRAWINGS

To describe the technical solutions in the embodiments of the present invention more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the prior art. Apparently, the accompanying drawings in the following description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a flowchart of implementation of a method for evaluating media quality according to Embodiment 1 of the present invention;

FIG. 2 is a histogram of rebuffering intervals according to Embodiment 1 of the present invention;

FIG. 3 is a flowchart of implementation of a method for evaluating media quality according to Embodiment 2 of the present invention;

FIG. 4 is a flowchart of implementation of a method for evaluating media quality according to Embodiment 3 of the present invention;

FIG. 5 is a flowchart of implementation of a method for evaluating media quality

The embodiments of the present invention are applicable to quality evaluation of video rebuffering, audio rebuffering, and audio-video rebuffering. Media according to the embodiments of the present invention includes video, audio, or audio-video.

In a practical application, a rebuffering event and packet loss distortion may simultaneously or separately appear in media.

To describe the technical solutions of the present invention, descriptions are provided in the following by using specific embodiments.

Embodiment 1

FIG. 1 shows an implementation procedure of a method for evaluating media quality according to Embodiment 1 of the present invention, where a process of the method is described in detail as follows:

~~In step~~Step S101, obtain media reference quality and rebuffering event distortion quality.

In this embodiment, the media reference quality may be obtained by using the prior art, which is not described in detail again herein. A parameter of the rebuffering event distortion quality includes, but is not limited to, at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity. Alternatively, the parameter of the rebuffering event distortion quality includes, but is not limited to, at least one of the following: the multiple rebuffering event interaction impact parameter, the initial media quality, and the factor describing media content complexity.

Specifically, the parameter of the rebuffering event distortion quality includes the initial media quality, the number of rebuffering events, and the duration of the rebuffering events, where $Q_{rebuf} = func(Video_Quality, Rebuf_Num, Rebuf_Len)$. Alternatively, the parameter of the rebuffering event distortion quality includes the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the multiple rebuffering event interaction impact parameter, where $Q_{rebuf} = func(Video_Quality, Rebuf_Num, Rebuf_Len, MultiRebuf_Factor)$. Q_{rebuf} represents the rebuffering event distortion quality, $Video_Quality$ represents the initial media quality, $Rebuf_Num$ represents the number of rebuffering events, $Rebuf_Len$ represents the duration of the rebuffering events, and $MultiRebuf_Factor$ represents the multiple rebuffering event interaction impact parameter.

$Rebuf_Num = n$, where n represents a total number of times the rebuffering events

quality (a constant greater than 0), $Rebuf_Num$ represents the number of rebuffering events within an evaluation segment (a media sequence within a preset period of time), $Rebuf_Len$ represents a duration for which the rebuffering events last within the evaluation segment, $MultiRebuf_Factor$ represents a weighted average duration of time intervals between rebuffering events within a preset time, and a_1, a_2, a_3, b_1, b_2 are constants.

~~In step~~Step S102, determine final media quality $Q_v = func(Q_{coding}, Q_{rebuf})$ according to the obtained media reference quality and rebuffering event distortion quality.

In this embodiment, a specific calculation formula of determining the final media quality according to the obtained media reference quality and rebuffering event distortion quality may be:

$Q_v = Q_{coding} - Q_{rebuf}$, where Q_v represents the final media quality, Q_{coding} represents the media reference quality, and Q_{rebuf} represents the rebuffering event distortion quality.

Embodiment 2

FIG. 3 shows an implementation procedure of a method for evaluating media quality according to Embodiment 2 of the present invention, where a process of the method is described in detail as follows:

~~In step~~Step S301, obtain media reference quality, and obtain packet loss distortion quality and rebuffering event distortion quality.

In this embodiment, the media reference quality and the packet loss distortion quality may be obtained by using the prior art, which is not described in detail again herein. The rebuffering event distortion quality is obtained by using the method in Embodiment 1.

A parameter of the rebuffering event distortion quality includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

~~In step~~Step S302, determine final media quality $Q_v = func(Q_{encoding}, Q_{pkt_lost}, Q_{rebuf})$ according to the obtained media reference quality, packet loss distortion quality, and rebuffering event distortion quality.

In this embodiment, a specific calculation formula of determining the final media quality according to the obtained media reference quality, packet loss distortion quality, and rebuffering

event distortion quality may be: $Q_v = Q_{coding} - Q_{pkt_lost} - Q_{rebuf}$, where $Q_{rebuf} = (Q_{coding} - MOS_{\min}) \cdot func(Rebuf_Num, Rebuf_Len, MultiRebuf_Factor)$, Q_v represents the final media quality, Q_{coding} represents the media reference quality, Q_{pkt_lost} represents the packet loss distortion quality, and Q_{rebuf} represents the rebuffering event distortion quality.

Preferably, the initial media quality may further be calculated according to the obtained media reference quality and packet loss distortion quality, and the final media quality is determined according to the obtained rebuffering event distortion quality $Q_{rebuf} = (Video_Quality - MOS_{\min}) \cdot func(Rebuf_Num, Rebuf_Len, MultiRebuf_Factor)$ and the initial media quality that is obtained by calculation. A specific calculation formula of determining the final media quality according to the obtained rebuffering event distortion quality and the initial media quality that is obtained by calculation may be: $Q_v = Video_Quality - Q_{rebuf}$, where Q_v represents the final media quality, $Video_Quality$ represents the initial media quality, and Q_{rebuf} represents the rebuffering event distortion quality.

Embodiment 3

FIG. 4 shows an implementation procedure of a method for evaluating media quality according to Embodiment 3 of the present invention, where a process of the method is described in detail as follows:

~~In step~~Step S401, obtain media reference quality and rebuffering event distortion quality.

When the media reference quality is the same, for a same rebuffering event, media of different content features has different subjective quality. For example, compared with media with a small motion, rebuffering has greater impact on media with a large motion. Therefore, in this embodiment, a parameter of the rebuffering event distortion quality includes initial media quality, the number of rebuffering events, a duration of the rebuffering events, and a factor describing media content complexity, where $Q_{rebuf} = func(Video_Quality, Rebuf_Num, Rebuf_Len, Complexity_Factor)$ or $Q_{rebuf} = (Video_Quality - MOS_{\min}) \cdot func(Rebuf_Len, Rebuf_Num) \cdot func2(Complexity_Factor)$. Alternatively, the parameter of the rebuffering event distortion quality includes the initial media quality, the number of rebuffering events, the duration of the rebuffering events, a multiple rebuffering event interaction impact parameter, and the factor describing media content complexity, where $Q_{rebuf} = (Video_Quality - MOS_{\min}) \cdot func(Rebuf_Len, Rebuf_Num) \cdot func2(Complexity_Factor)$

events within a preset time, $Complexity_Factor$ represents media content complexity within each preset period of time, and a_1, a_2, a_3, b_1, b_2 are constants.

~~In step~~Step S402, determine final media quality $Q_v = func\left(Q_{coding}, Q_{rebuf}\right)$ according to the obtained media reference quality and rebuffering event distortion quality.

Embodiment 4

FIG. 5 shows an implementation procedure of a method for evaluating media quality according to Embodiment 4 of the present invention, where a process of the method is described in detail as follows:

~~In step~~Step S501, obtain media reference quality, and obtain packet loss distortion quality and rebuffering event distortion quality.

In this embodiment, the media reference quality and the packet loss distortion quality may be obtained by using the prior art, which is not described in detail again herein. The rebuffering event distortion quality is obtained by using the method in Embodiment 3.

A parameter of the rebuffering event distortion quality includes initial media quality, the number of rebuffering events, a duration of the rebuffering events, and a factor describing media content complexity, where $Q_{rebuf} = func\left(Video_Quality, Rebuf_Num, Rebuf_Len, Complexity_Factor\right)$ or $Q_{rebuf} = \left(Video_Quality - MOS_{\min}\right) \cdot func\left(Rebuf_Len, Rebuf_Num\right) \cdot func2\left(Complexity_Factor\right)$.

Alternatively, the parameter of the rebuffering event distortion quality includes the initial media quality, the number of rebuffering events, the duration of the rebuffering events, a multiple rebuffering event interaction impact parameter, and the factor describing media content complexity, where $Q_{rebuf} = \left(Video_Quality - MOS_{\min}\right) \cdot func\left(Rebuf_Len, Rebuf_Num\right) \cdot func2\left(Complexity_Factor\right)$ or $Q_{rebuf} = \left(Video_Quality - MOS_{\min}\right) \cdot func\left(Rebuf_Len, Rebuf_Num, MultiRebuf_Factor\right) \cdot func2\left(Complexity_Factor\right)$.

Alternatively, the parameter of the rebuffering event distortion quality includes the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity, where $Q_{rebuf} = func\left(Rebuf_Num, Rebuf_Len, Complxity_Factor\right)$. Alternatively, the parameter of the rebuffering event distortion quality includes the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity, where $Q_{rebuf} = func\left(Rebuf_Num, Rebuf_Len, MultiRebuf_Factor, Complxity_Factor\right) \cdot$

In other words, the rebuffering event distortion quality may be obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity.

Alternatively, the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity.

Alternatively, the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity.

Alternatively, the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity.

~~In step~~Step S502, determine final media quality $Q_v = func\left(Q_{encoding}, Q_{pkt_lost}, Q_{rebuf}\right)$ according to the obtained media reference quality, packet loss distortion quality, and rebuffering event distortion quality.

Embodiment 5

FIG. 6 shows an implementation procedure of a method for evaluating media quality according to Embodiment 5 of the present invention, where a process of the method is described in detail as follows:

~~In step~~Step S601, divide a to-be-evaluated media file into a plurality of evaluation segments.

Preferably, the to-be-evaluated media file is divided into a plurality of evaluation segments according to a rebuffering event or a rebuffering duration.

~~In step~~Step S602, obtain media reference quality and rebuffering event distortion quality of each of the evaluation segments, where a parameter of rebuffering event distortion quality of the evaluation segments includes at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

~~In step~~Step S603, calculate media quality of each of the evaluation segments according to the obtained media reference quality and rebuffering event distortion quality of each of the evaluation segments.

In this embodiment, the media quality of each evaluation segment may be obtained by using the media quality calculation method according to Embodiment 1, 2, 3, or 4, where

$Q_i = func\left(Q_{i_{coding}}, Q_{i_{rebuf}}\right)$.

~~In step~~Step S604, determine ~~final quality of the media~~final quality of the media file $Q = func(Q_i)$ according to the media quality that is of each of the evaluation segments and obtained by calculation, where Q represents the final quality of the media file, and Q_i represents the media quality of each evaluation segment (a media sequence within a preset period of time).

Specifically, a weight for each evaluation segment is set according to a rebuffering duration of rebuffering events in each evaluation segment, or a weight for each evaluation segment is set according to a rebuffering quality score of each evaluation segment or a rebuffering model effect factor.

A weighting operation is performed on the media quality of each evaluation segment of the media file according to the set weight, and a weighted average value obtained after the weighting operation is used as the final quality of the media file (for example, $Q = Q_1 \times a_1 + Q_2 \times a_2 + ... + Q_n \times a_n$, where a_i represents a weight of an i^{th} evaluation segment). Alternatively,

when media quality of N evaluation segments is lower than preset media quality, lowest media quality of the N evaluation segments or average media quality of the N evaluation segments is used as the final quality of the media file, where N is an integer greater than or equal to 1.

Embodiment 6

FIG. 7 shows a composition structure of an apparatus 7 for evaluating media quality according to Embodiment 6 of the present invention, and for ease of description, only shows a part related to this embodiment of the present invention.

The apparatus 7 for evaluating media quality may be applied to various information terminals (a television set, a mobile phone, a computer, a personal digital assistant, and the like), may be a software unit, a hardware unit, or a unit combining software and hardware that operates in these terminals, and may also be integrated into these terminals as an independent add-on, or operate in an application system of these terminals.

The apparatus 7 for evaluating media quality includes an obtaining unit 71 and a determining unit 72. Specific functions of the units are as follows:

The obtaining unit 71 is configured to obtain media reference quality and rebuffering event distortion quality.

The determining unit 72 is configured to determine final media quality according to the media reference quality and rebuffering event distortion quality that are obtained by the obtaining

rebuffering events is a ratio of a total duration for which the rebuffering events last within the preset time to the preset time. Alternatively, the duration of the rebuffering events is the total duration for which the rebuffering events last within the preset time.

The multiple rebuffering event interaction impact parameter is a weighted average duration of time intervals between rebuffering events within a preset time, where the weighted average duration of the time intervals between the rebuffering events within the preset time is obtained according to a time interval between a rebuffering event and a previous rebuffering event of the rebuffering event within the preset time and a weighting coefficient of the rebuffering event.

The weighting coefficient is set according to a length of a time interval between rebuffering events or according to the number of times of a same rebuffering interval.

The apparatus for evaluating media quality provided in this embodiment can be used for the foregoing corresponding methods for evaluating media quality, and for details, refer to related description in Embodiment 1, 2, 3, and 4 of the foregoing methods for evaluating media quality, which are not described in detail again herein.

Embodiment 7

FIG. 8 shows a composition structure of an apparatus 8 for evaluating media quality according to Embodiment 7 of the present invention, and for ease of description, only shows a part related to this embodiment of the present invention.

The apparatus 8 for evaluating media quality may be applied to various information terminals (a television set, a mobile phone, a computer, a personal digital assistant, and the like), may be a software unit, a hardware unit, or a unit combining software and hardware that operates in these terminals, and may also be integrated into these terminals as an independent add-on, or operate in an application system of these terminals.

The apparatus 8 for evaluating media quality includes an evaluation segment dividing unit 81, an obtaining unit 82, a calculating unit 83, and a determining unit 84. Specific functions of the units are as follows:

The evaluation segment dividing unit 81 is configured to divide a to-be-evaluated media file into a plurality of evaluation segments.

The obtaining unit 82 is configured to obtain media reference quality and rebuffering event distortion quality of each of the evaluation segments that is obtained by dividing by the evaluation segment dividing unit 81, where a parameter of rebuffering event distortion quality of the evaluation segments includes at least one of the following: the number of rebuffering events, a

duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

The calculating unit 83 is configured to calculate media quality of each of the evaluation segments that is obtained by dividing by the evaluation segment dividing unit 81 according to the media reference quality and the rebuffering event distortion quality that are of each of the evaluation segments and obtained by the obtaining unit 82.

The determining unit 84 is configured to determine ~~final quality of the media~~final quality of the media file according to the media quality that is of each of the evaluation segments and is obtained by calculating by the calculating unit 83.

Further, the evaluation segment dividing unit 81 is specifically configured to divide the to-be-evaluated media file into the plurality of evaluation segments according to a rebuffering event or a rebuffering duration.

The determining unit 84 includes:

a weight setting module 841, configured to set a weight for each evaluation segment according to a rebuffering duration of rebuffering events in each evaluation segment, or set a weight for each evaluation segment according to a rebuffering quality score of each evaluation segment or a rebuffering model effect factor; and

a determining module 842, configured to perform a weighting operation on the media quality of ~~each evaluation segment of the media~~each evaluation segment of the media file according to the weight set by the weight setting module 841, and use a weighted average value obtained after the weighting operation as the ~~final quality of the media~~final quality of the media file.

Preferably, when media quality of N evaluation segments is lower than preset media quality, the determining unit 84 is configured to use lowest media quality of the N evaluation segments or average media quality of the N evaluation segments as the ~~final quality of the media~~final quality of the media file, where N is greater than or equal to 1.

The apparatus for evaluating media quality provided in this embodiment can be used for the foregoing corresponding method for evaluating media quality, and for details, refer to related description in Embodiment 5 of the foregoing method for evaluating media quality, which is not described in detail again herein.

A person of ordinary skill in the art may understand that classification of units and modules included in Embodiment 6 and Embodiment 7 is merely logical function classification, but the present invention is not limited to the above classification as long as corresponding functions can be implemented. In addition, the specific names of all functional units and modules are merely for facilitating the differentiation between each other, but are not intended to limit the protection

scope of the present invention.

In conclusion, in the embodiments of the present invention, when media quality is calculated, impact of a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity on the media quality is considered, thereby making a media quality evaluation result more accurate, and more consistent with subjective feelings of people.

A person of ordinary skill in the art may understand that all or a part of the steps of the methods in the embodiments may be implemented by a program instructing relevant hardware. The program may be stored in a computer readable storage medium, including a ROM, a RAM, a magnetic disk, or an optical disc.

The foregoing descriptions are merely exemplary embodiments of the present invention, but are not intended to limit the present invention. Any modification, equivalent replacement, or improvement made without departing from the ~~spirit and~~ principle of the present invention should fall within the protection scope of the present invention.

CLAIMS

What is claimed is:

1. A method for evaluating media quality, wherein the method comprises:

obtaining media reference quality and rebuffering event distortion quality; and

determining final media quality according to the obtained media reference quality and rebuffering event distortion quality, wherein

a parameter of the rebuffering event distortion quality comprises at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

2. The method according to claim 1, wherein before the determining final media quality according to the obtained media reference quality and rebuffering event distortion quality, the method further comprises:

obtaining packet loss distortion quality.

3. The method according to claim 2, wherein the determining final media quality according to the obtained media reference quality and rebuffering event distortion quality comprises:

determining the final media quality according to the obtained media reference quality, packet loss distortion quality, and rebuffering event distortion quality.

4. The method according to any one of claims 1 to 3, wherein the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, and the duration of the rebuffering events; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the multiple rebuffering event interaction impact parameter; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity; or

the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity;

or

the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity.

5. The method according to claim 4, wherein the duration of the rebuffering events is a weighted average duration of the rebuffering events within a preset time, wherein the weighted average duration of the rebuffering events within the preset time is obtained according to a duration for which a rebuffering event lasts within the preset time and a weighting coefficient of the rebuffering event; or

the duration of the rebuffering events is a ratio of a total duration for which the rebuffering events last within a preset time to the preset time; or

the duration of the rebuffering events is a total duration for which the rebuffering events last within a preset time.

6. The method according to claim 4, wherein the multiple rebuffering event interaction impact parameter is a weighted average duration of time intervals between rebuffering events within a preset time, wherein the weighted average duration of the time intervals between the rebuffering events within the preset time is obtained according to a time interval between a rebuffering event and a previous rebuffering event of the rebuffering event within the preset time and a weighting coefficient of the rebuffering event.

7. The method according to claim 5 or 6, wherein the weighting coefficient is set according to a length of a time interval between rebuffering events or according to the number of times of a same rebuffering interval.

8. The method according to any one of claims 3 to 7, wherein the determining final media quality according to the obtained media reference quality, packet loss distortion quality, and rebuffering event distortion quality comprises:

calculating the initial media quality according to the obtained media reference quality and packet loss distortion quality, and then determining the final media quality according to the obtained rebuffering event distortion quality and the initial media quality that is obtained by calculation.

9. A method for evaluating media quality, wherein the method comprises:

dividing a to-be-evaluated media file into a plurality of evaluation segments;

obtaining media reference quality and rebuffering event distortion quality of each of the evaluation segments, wherein a parameter of rebuffering event distortion quality of the evaluation segments comprises at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media

quality, and a factor describing media content complexity;

calculating media quality of each of the evaluation segments according to the obtained media reference quality and rebuffering event distortion quality of each of the evaluation segments; and

determining final quality of the media according to the media quality that is of each of the evaluation segments and obtained by calculation.

10. The method according to claim 9, wherein the dividing a to-be-evaluated media file into a plurality of evaluation segments specifically comprises:

dividing the to-be-evaluated media file into a plurality of evaluation segments according to a rebuffering event or a rebuffering duration.

11. The method according to claim 9 or 10, wherein the determining final quality of the media according to the media quality that is of each of the evaluation segments and obtained by calculation specifically comprises:

setting a weight for each evaluation segment according to a rebuffering duration of rebuffering events in each evaluation segment, or setting a weight for each evaluation segment according to a rebuffering quality score of each evaluation segment or a rebuffering model effect factor; and

performing a weighting operation on the media quality of each evaluation segment of the media according to the set weight, and using a weighted average value obtained after the weighting operation as the final quality of the media.

12. The method according to claim 9 or 10, wherein the determining final quality of the media according to the media quality that is of each of the evaluation segments and obtained by calculation specifically comprises:

when media quality of N evaluation segments is lower than preset media quality, using lowest media quality of the N evaluation segments or average media quality of the N evaluation segments as the final quality of the media, wherein N is greater than or equal to 1.

13. An apparatus for evaluating media quality, wherein the apparatus comprises:

an obtaining unit, configured to obtain media reference quality and rebuffering event distortion quality; and

a determining unit, configured to determine final media quality according to the media reference quality and the rebuffering event distortion quality which are obtained by the obtaining unit, wherein

a parameter of the rebuffering event distortion quality comprises at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity.

14. The apparatus according to claim 12, wherein the obtaining unit is further configured to obtain packet loss distortion quality.

15. The apparatus according to claim 14, wherein the determining unit is further configured to determine the final media quality according to the obtained media reference quality, packet loss distortion quality, and rebuffering event distortion quality.

16. The apparatus according to any one of claims 13 to 15, wherein the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, and the duration of the rebuffering events; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the multiple rebuffering event interaction impact parameter; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity; or

the rebuffering event distortion quality is obtained according to the initial media quality, the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity; or

the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, and the factor describing media content complexity; or

the rebuffering event distortion quality is obtained according to the number of rebuffering events, the duration of the rebuffering events, the multiple rebuffering event interaction impact parameter, and the factor describing media content complexity.

17. The apparatus according to claim 16, wherein the duration of the rebuffering events is a weighted average duration of the rebuffering events within a preset time, wherein the weighted average duration of the rebuffering events within the preset time is obtained according to a duration for which a rebuffering event lasts within the preset time and a weighting coefficient of the rebuffering event; or

the duration of the rebuffering events is a ratio of a total duration for which the rebuffering events last within a preset time to the preset time; or

the duration of the rebuffering events is a total duration for which the rebuffering events last within a preset time.

18. The apparatus according to claim 16, wherein the multiple rebuffering event interaction impact parameter is a weighted average duration of time intervals between rebuffering events

within a preset time, wherein the weighted average duration of the time intervals between the rebuffering events within the preset time is obtained according to a time interval between a rebuffering event and a previous rebuffering event of the rebuffering event within the preset time and a weighting coefficient of the rebuffering event.

19. The apparatus according to claim 17 or 18, wherein the weighting coefficient is set according to a length of a time interval between rebuffering events or according to the number of times of a same rebuffering interval.

20. The apparatus according to any one of claims 15 to 19, wherein the determining unit is specifically configured to calculate the initial media quality according to the obtained media reference quality and packet loss distortion quality, and then determine the final media quality according to the obtained rebuffering event distortion quality and the initial media quality that is obtained by calculation.

21. An apparatus for evaluating media quality, wherein the apparatus comprises:

an evaluation segment dividing unit, configured to divide a to-be-evaluated media file into a plurality of evaluation segments;

an obtaining unit, configured to obtain media reference quality and rebuffering event distortion quality of each of the evaluation segments that is obtained by dividing by the evaluation segment dividing unit, wherein a parameter of rebuffering event distortion quality of the evaluation segments comprises at least one of the following: the number of rebuffering events, a duration of the rebuffering event, a multiple rebuffering event interaction impact parameter, initial media quality, and a factor describing media content complexity;

a calculating unit, configured to calculate media quality of each of the evaluation segments according to the media reference quality and the rebuffering event distortion quality that are of each of the evaluation segments and obtained by the obtaining unit; and

a determining unit, configured to determine final quality of the media according to the media quality that is of each of the evaluation segments and is obtained by calculating by the calculating unit.

22. The apparatus according to claim 21, wherein the evaluation segment dividing unit is specifically configured to divide the to-be-evaluated media file into a plurality of evaluation segments according to a rebuffering event or a rebuffering duration.

23. The apparatus according to claim 21 or 22, wherein the determining unit comprises:

a weight setting module, configured to set a weight for each evaluation segment according to a rebuffering duration of rebuffering events in each evaluation segment, or set a weight for each evaluation segment according to a rebuffering quality score of each evaluation segment or a

rebuffering model effect factor; and

a determining module, configured to perform a weighting operation on the media quality of each evaluation segment of the media according to the weight set by the weight setting module, and use a weighted average value obtained after the weighting operation as the final quality of the media.

24. The apparatus according to claim 21 or 22, wherein when media quality of N evaluation segments is lower than preset media quality, the determining unit is configured to use lowest media quality of the N evaluation segments or average media quality of the N evaluation segments as the final quality of the media, wherein N is greater than or equal to 1.

CLAIMS:

1. A method for evaluating media quality, wherein the method comprises:

obtaining media reference quality and rebuffering event distortion quality (S101);

wherein, the media reference quality is distortion caused due to media encoding compression and is basic quality when different media streams are encoded into different bit rates in the case of different encoding types;

the rebuffering event distortion quality is obtained at least according to initial media quality, the number of rebuffering events, a duration of the rebuffering events and a multiple rebuffering event interaction impact parameter; wherein the multiple rebuffering event interaction impact parameter is a weighted average duration of time intervals between rebuffering events within a preset time, wherein the weighted average duration of the time intervals between the rebuffering events within the preset time is obtained according to a time interval between a rebuffering event and a previous rebuffering event of the rebuffering event within the preset time and a weighting coefficient of the rebuffering event;

wherein, the duration of the rebuffering events is a weighted average duration of the rebuffering events within a preset time, wherein the weighted average duration of the rebuffering events within the preset time is obtained according to a duration for which a rebuffering event lasts within the preset time and the weighting coefficient of the rebuffering event; or

the duration of the rebuffering events is a ratio of a total duration for which the rebuffering events last within a preset time to the preset time; or

the duration of the rebuffering events is a total duration for which the rebuffering events last within a preset time;

obtaining (S301) packet loss distortion quality;

calculating the initial media quality according to the obtained media reference quality and packet loss distortion quality, and

determining the final media quality according to the obtained rebuffering event distortion quality and the initial media quality that is obtained by calculation;

2. The method according to claim 1, wherein

the rebuffering event distortion quality is further obtained according to a factor describing media content complexity; the factor describing media content complexity represents description of complexity of media content from the perspective of time, space, or both time and space.

3. The method according to claim 1 or 2, wherein the weighting coefficient is set according to a length of a time interval between rebuffering events or according to the number of times of a same rebuffering interval.

4. An apparatus for evaluating media quality, wherein the apparatus comprises:

an obtaining unit (71), configured to obtain media reference quality and rebuffering event distortion quality and packet loss distortion quality; wherein, the media reference quality is distortion caused due to media encoding compression and is basic quality when different media streams are encoded into different bit rates in the case of different encoding types; wherein, the rebuffering event distortion quality is obtained at least according to initial media quality, the number of rebuffering events, a duration of the rebuffering events and a multiple rebuffering event interaction impact parameter; wherein the multiple rebuffering event interaction impact parameter is a weighted average duration of time intervals between rebuffering events within a preset time, wherein the weighted average duration of the time intervals between the rebuffering events within the preset time is obtained according to a time interval between a rebuffering event and a previous rebuffering event of the rebuffering event within the preset time and a weighting coefficient of the rebuffering event;

wherein, the duration of the rebuffering events is a weighted average duration of the rebuffering events within a preset time, wherein the weighted average duration of the rebuffering events within the preset time is obtained according to a duration for which a rebuffering event lasts within the preset time and the

weighting coefficient of the rebuffering event; or

the duration of the rebuffering events is a ratio of a total duration for which the rebuffering events last within a preset time to the preset time; or

the duration of the rebuffering events is a total duration for which the rebuffering events last within a preset time;

the determining unit (72) is specifically configured to calculate initial media quality according to the obtained media reference quality and packet loss distortion quality, and then determine the final media quality according to the obtained rebuffering event distortion quality and the initial media quality that is obtained by calculation.

5. The apparatus according to claim 4, wherein

the rebuffering event distortion quality is further obtained according to a factor describing media content complexity;

the factor describing media content complexity represents description of complexity of media content from the perspective of time, space, or both time and space.

6. The apparatus according to claim 4 or 5, wherein the weighting coefficient is set according to a length of a time interval between rebuffering events or according to the number of times of a same rebuffering interval.