

METHOD AND APPARATUS FOR GENERATING LYRICS, METHOD AND APPARATUS FOR DISPLAYING LYRICS, ELECTRONIC DEVICE, AND STORAGE MEDIUM

[0001] This application claims priority to Chinese Patent Application No. 201810513546.5, filed on May 25, 2018 and entitled "METHOD AND APPARATUS FOR GENERATING LYRICS, METHOD AND APPARATUS FOR DISPLAYING LYRICS, ELECTRONIC DEVICE, AND STORAGE MEDIUM", the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to the technical field of Internet, and in particular, relates to a method and apparatus for generating lyrics, a method and apparatus for displaying lyrics, and an electronic device and a storage medium.

BACKGROUND

[0003] With the development of the Internet technologies, music players not only support on-line playback of masses of songs, but also provide karaoke services for users. In the karaoke services, the music players play music accompaniments of songs while displaying lyrics of the songs, such that the users may sing the songs with the accompaniments while viewing the lyrics.

[0004] At present, on a current playing interface, a terminal generally displays a lyric sentence corresponding to the current playing moment in the form of karaoke, and dynamically annotates with a designated color a character of the lyrics that is being played. However, the lyrics may generally include some polyphonic characters. The polyphonic character refers to a character having different pronunciations in different

words or phrases. As such, the user may make a mistake in the singing. Therefore, a method for displaying lyrics is urgently desired, such that the user may correctly sing a proper pronunciation of each character.

SUMMARY

[0005] Embodiments of the present disclosure provide a method and apparatus for generating lyrics, a method and apparatus for displaying lyrics, and an electronic device and a storage medium, which may solve the problem that a user incorrectly sings pronunciations of characters of the lyrics in the related art.

[0006] In a first aspect, a method for generating lyrics is provided. The method includes:

[0007] acquiring lyrics of a target song;

[0008] determining a character to be annotated in a plurality of characters of the lyrics;

[0009] querying, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determining the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song; and

[0010] generating a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

[0011] In a second aspect, a method for displaying lyrics is provided. The method is applied on a terminal, and the method includes:

[0012] upon receipt of a lyric display instruction, acquiring a first lyric file of a target song, the lyric display instruction being intended to display lyrics of the target song;

[0013] acquiring the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric

file,

[0014] displaying the plurality of characters of the lyrics;

[0015] in displaying the character to be annotated, annotating the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated, the target position being defined as being over the character to be annotated.

[0016] In a third aspect, an apparatus for generating lyrics is provided. The apparatus includes:

[0017] an acquiring module, configured to acquire lyrics of a target song;

[0018] a determining module, configured to determine a character to be annotated in a plurality of characters of the lyrics;

[0019] a querying module, configured to query, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determine the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song; and

[0020] a generating module, configured to generate a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

[0021] In a fourth aspect, an apparatus for displaying lyrics is provided. The apparatus is applied on a terminal, and the apparatus includes:

[0022] an acquiring module, configured to, upon receipt of a lyric display instruction, acquire a first lyric file of a target song, the lyric display instruction being intended to display lyrics of the target song;

[0023] wherein the acquiring module is configured to acquire the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric file;

[0024] a displaying module, configured to display the plurality of characters of the lyrics;

[0025] an annotating module, configured to, in displaying the character to be

annotated, annotate the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated, the target position being defined as being over the character to be annotated.

[0026] In a fifth aspect, an electronic device is provided. The electronic device includes a processor and a memory with at least one instruction stored therein; wherein the at least one instruction, when being loaded and executed by the processor, causes the processor to perform the method for generating the lyrics as defined in the first aspect, or perform the method for displaying the lyrics as defined in the second aspect.

[0027] In a sixth aspect, a computer-readable storage medium is provided. The storage medium stores at least one instruction; wherein the at least one instruction, when being loaded and executed by a processor, causes the processor to perform the method for generating the lyrics as defined in the first aspect, or perform the method for displaying the lyrics as defined in the second aspect.

[0028] The technical solutions according to the embodiments of the present disclosure achieve the following beneficial effects:

[0029] In the embodiment of the present disclosure, a server may determine, based on lyrics of a target song, a pronunciation of each character to be annotated in the lyrics in the target song, and further generate a first lyric file of the target song according to a plurality of characters and the pronunciations of the characters to be annotated, such that a corresponding pronunciation is bound to each character to be annotated. In this way, in subsequent display of the lyrics, the pronunciations may be synchronously displayed, which ensures that a user is capable of correctly singing the pronunciation of each character in the target song. In addition, when the lyrics are being displayed on a terminal, the pronunciations may be provided over the corresponding character to be annotated, such that the pronunciations are clearly visible. As such, the user is capable of accurately and quickly finding the corresponding pronunciation of the character to be annotated, and accuracy of displaying the lyrics is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] For clearer descriptions of the technical solutions according to the embodiments of the present disclosure, drawings that are to be referred for description of the embodiments are briefly described hereinafter. Apparently, the drawings described hereinafter merely illustrate some embodiments of the present disclosure. Persons of ordinary skill in the art may also derive other drawings based on the drawings described herein without any creative effort.

[0031] FIG. 1 is a schematic diagram of an implementation environment according to an embodiment of the present disclosure;

[0032] FIG. 2 is a flowchart of a method for generating lyrics according to an embodiment of the present disclosure;

[0033] FIG. 3 is a flowchart of a method for displaying lyrics according to an embodiment of the present disclosure;

[0034] FIG. 4 is a schematic diagram of an interface for displaying lyrics according to an embodiment of the present disclosure;

[0035] FIG. 5 is a schematic diagram of an interface for displaying lyrics according to an embodiment of the present disclosure;

[0036] FIG. 6 is a schematic structural diagram of an apparatus for generating lyrics according to an embodiment of the present disclosure;

[0037] FIG. 7 is a schematic structural diagram of an apparatus for displaying lyrics according to an embodiment of the present disclosure;

[0038] FIG. 8 is a schematic structural diagram of a terminal according to an embodiment of the present disclosure; and

[0039] FIG. 9 is a schematic structural diagram of a server according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0040] The technical solutions contained in the embodiments of the present

disclosure are described in detail clearly and completely hereinafter with reference to the accompanying drawings for the embodiments of the present disclosure. Apparently, the described embodiments are only a portion of embodiments of the present disclosure, but not all the embodiments of the present disclosure. Based on the embodiments of the present disclosure, all other embodiments derived by persons of ordinary skill in the art without any creative efforts shall fall within the protection scope of the present disclosure.

[0041] FIG. 1 is a schematic diagram of an implementation environment according to an embodiment of the present disclosure. The implementation environment includes a terminal 101 and a server 102. The terminal 101 and the server 102 are connected to each other over a network. An application may be installed on the terminal 101, and the terminal 101 may acquire a target song from the server 102 based on the application, and play the target song and display lyrics of the target song.

[0042] The server 102 may query a pronunciation of a character to be annotated from a dictionary engine in advance based on the character to be annotated in a plurality of characters in the lyrics of the target song, such that the pronunciation of the character to be annotated in the target song is acquired. The server may store the lyrics and the corresponding pronunciation of the character to be annotated in the target song, and send the lyrics of the target song and the corresponding pronunciation of the character to be annotated to the terminal 101. When the target song is being played on the terminal 101, the lyrics of the target song is synchronously displayed, and the corresponding pronunciation of the character to be annotated may be provided over the character to be annotated.

[0043] The process of acquiring the pronunciation of the character to be annotated in the plurality of characters may be performed by terminal 101. That is, upon acquiring the lyrics of the target song from the server 102, the terminal 101 determines the pronunciation and annotates for the character to be annotated in the lyrics.

[0044] It should be noted that the application may be a music player or an application mounted with a music player plug-in, and the terminal may be a mobile terminal, a portable Android device (PAD), a computer, or the like. The server 102 may

be a background server of the application. The server 102 may be a server, or a server cluster formed of a plurality of servers, or a cloud computing service center.

[0045] FIG. 2 is a flowchart of a method for generating lyrics according to an embodiment of the present disclosure. The embodiment of the present disclosure may be carried out by a server or a terminal, and the embodiment of the present disclosure is described using the server as an example. Referring to FIG. 2, the method includes the following steps.

[0046] In a step 201, lyrics of a target song are acquired.

[0047] In the embodiment of the present disclosure, the server may firstly acquire a lyric file of the target song, and acquires the lyrics of the target song from the lyric file. The lyrics include a plurality of characters. The target song is any song whose lyrics need to be generated, and is generally a song whose lyrics include Chinese characters. The Chinese character includes: a Chinese simplified character, a Chinese traditional character, a Chinese simplified character used in Japanese, a Chinese traditional character used in Japanese, and the like. For example, the Chinese simplified character, the Chinese traditional character, and the traditional character used in Japanese corresponding to the character "隐" in the word "隐藏(hide)" are sequentially: "隐藏", "隱藏", and "隠す". It should be noted that the Chinese simplified characters and the Chinese traditional characters not only include characters used in Mandarin, but also include Chinese characters used in some dialects, for example, "冇" in Cantonese pertains to the Chinese simplified characters, is read as "mao", and corresponds to "没有" in Mandarin.

[0048] In lyric files of some songs, generally display times of a plurality of characters may also be included. The display time is intended to indicate when to display each of characters in the process of playing the songs. In addition, in the lyric file, each character and the display time of the character are spliced and stored, and the display time is generally present between the characters. For example, the lyrics "雨の空港" is actually stored as "(39112)雨(39803)の(40356)空(40606)港(41176)" in the lyric file. The numbers in the parenthesis represent the display time of the character, and the characters are spaced apart from each other by the display times. The server

may acquire a second lyric file of the target song, extract the lyrics of the target song and the display times of the plurality of characters of the lyrics from the second lyric file, and establish an index relationship between each character and the display time of each character, such that in the subsequent display, the characters may be displayed based on the display times thereof. The second lyric file is an original lyric file of the target song, and includes the lyrics of the target song and the display times of the plurality of characters of the lyrics.

[0049] The server may store the characters and the display times thereof respectively in the form of array, such that the characters one-to-one correspond to the display times thereof. In a possible design, the server may acquire the lyrics of the target song by: acquiring, by the server, the second lyric file of the target song, and establishing a first array and a third array, wherein the first array is configured to store the plurality of characters of the lyrics, and the third array is configured to store the display times of the plurality of characters. The server writes the plurality of characters into the first array, writes the display times of the plurality of characters into the third array, and determines the plurality of characters in the first array as the lyrics of the target song. In the third array, the server may store the display time of each character in the third array according to a storage sequence of each character in the first array, and cause, based on the storage sequence, each character in the first array to correspond to the display time of the character in the third array, such that accuracy of the lyrics and the display times is improved.

[0050] It should be noted that the server may determine, by extracting characters, pronunciations of the characters based on the characters; and in addition, the server may extract, by establishing the index relationship between each character and the display time of the character, the lyrics on the premise of not damaging original content of the second lyric file, such that an accurate lyric file may be finally obtained.

[0051] In the embodiment of the present disclosure, upon acquiring the lyrics, the server may firstly determine, by step 202, a character to be annotated from the plurality of characters, then conduct a query based on the character to be annotated, and finally queries out, by step 203, the pronunciation of the character to be annotated.

[0052] In a step 202, the server determines a character to be annotated in a plurality of characters of the lyrics.

[0053] In the embodiment of the present disclosure, the server may identify a Chinese character in the plurality of characters by a predetermined identification algorithm, and determine the Chinese character as the character to be annotated. The server generally store coding data after the plurality of characters are coded, and the predetermined identification algorithm may identify the plurality of characters based on a coding table based on a coding mode of the plurality of characters. Nevertheless, the embodiment of the present disclosure does not limit the coding mode of the characters, and the coding table may be a coding table based on the Unicode coding mode.

[0054] It should be noted that the server may identify the character to be annotated by firstly identifying the plurality of characters, and thus directly determine the pronunciation based on the character to be annotated in the plurality of the characters, such that the quantity of the characters to be processed subsequently is reduced, and the efficiency of determining the pronunciation is further improved. In addition, in the embodiment of the present disclosure, the Chinese character is used as the character to be annotated, and the pronunciation of the Chinese character in the lyrics is subsequently provided, which facilitates learning a foreign language by singing a song for a user whose native language is not Chinese or Japanese. In this way, auditory joy is satisfied, effect of learning the foreign language is achieved as well, the user experience is greatly enriched, and thus practical value of this method is significantly improved.

[0055] In a step 203, the server queries, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determines the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song.

[0056] In the embodiment of the present disclosure, the server may establish and store a dictionary engine in advance, wherein the dictionary engine includes a plurality

of characters and pronunciations thereof. In this step, the server acquires, according to the character to be annotated, the pronunciation of the character to be annotated from the dictionary engine, and determines the acquired pronunciation as the corresponding pronunciation in a terminal playing the target song. In some languages, a character may have a plurality of pronunciations, and the pronunciations of the character may be different in different words; or even if in the same word, since voices are different, the pronunciations may also be different. When performing pronunciation query, the server may further perform a query the pronunciation based on the word and/or voice to which the character to be annotated belongs. Therefore, this step may include the following three cases:

[0057] In a first case, the server inputs the character to be annotated into the dictionary engine, and outputs the corresponding pronunciation of the character to be annotated in the target song.

[0058] In this step, the server may directly input the character to be annotated into the dictionary engine; upon acquiring a unique determined pronunciation of the character to be annotated based on the dictionary engine, the server directly outputs the pronunciation of the character to be annotated, and determines the output pronunciation as the corresponding pronunciation of the character to be annotated in the target song.

[0059] It should be noted that when the character to be annotated is a non-heteronym in Chinese characters, or a Chinese character having a unique pronunciation in Japanese, the server may acquire, by querying, the unique pronunciation of the character to be annotated based on the character to be annotated.

[0060] In a second case, the server determines the pronunciation of the character to be annotated in the dictionary engine according to the word to which the character to be annotated belongs.

[0061] In some languages, one character may have a plurality of pronunciations, and the pronunciations of the character in different words are not the same. For example, the character in Japanese generally has two or more than two pronunciations. In the embodiment of the present disclosure, the server may further lock the pronunciation of the character to be annotated in the target song in the dictionary engine based on the

word to which the character to be annotated belongs.

[0062] In this step, the server performs phrase partitioning for the plurality of characters to determine a plurality of phrases; and the server inputs the plurality of phrases into the dictionary engine, and performs a character-by-character increase query on the plurality of phrases in the dictionary engine to acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and the server screens out a candidate word having a maximum quantity of characters from the plurality of candidate words according to quantities of characters included in the plurality of candidate words, and outputs the pronunciation of the character to be annotated in the screened-out candidate word having the maximum quantity of characters.

[0063] The plurality of phrases include the character to be annotated. The terminal may define a lyric sentence in the target song as one phrase, and each candidate word at least includes the character included in the word to which the character to be annotated belongs.

[0064] In a possible design, the process that the server performs a character-by-character increase query in the dictionary engine and performs screening in the plurality of acquired candidate words may be as follows: For each phrase, the server determines an initial pronunciation of the character to be annotated from a first character to be annotated of the phrase in the dictionary engine; determines the pronunciation by character-by-character increase based on subsequent characters of the phrase, uses the first character to be annotated and the increased character as the word to which the character to be annotated belongs, queries a candidate word matching the word to which the character to be annotated belongs in the dictionary engine, and during the query process, when the candidate word including the word to which the character to be annotated belongs is matched, determines the pronunciation of the character to be annotated based on the candidate word; and continuously determines the pronunciation by character-by-character increase based on the subsequent characters of the phrase, updates the word to which the character to be annotated belongs, continuously performs matching according to the above query process, when the candidate word having a

larger quantity of characters is matched, uses the candidate word having the larger quantity of characters to cover the previous candidate word having a smaller quantity of characters based on the principle that the longest item is preferentially matched, and determines the pronunciation of the character to be annotated based on the candidate word having the larger quantity of characters; and continuously performs the query according to the principle that the longest item is preferentially matched until the pronunciation of every character to be annotated in the phrase is queried.

[0065] For example, in Japanese lyrics "思い出を思い出してください", the characters to be annotated are two characters "思" and two characters "出", wherein the words where the two characters "出" are located are different, and the server performs query based on the dictionary engine by following process.

[0066] In a step a, firstly querying the character "思": the pronunciation of the character "思" may not be uniquely determined as one character, and the initial pronunciation of "思" is temporarily determined as "し";

[0067] In a step b, querying the word "思い" where the character "思" is located: the uniquely determined pronunciation "おも" is acquired based on the candidate word "思^{おも}う" stored in the dictionary engine;

[0068] In a step c, continuously querying the character "出" in the word "思い出": similarly, the pronunciation of the character "出" may not be uniquely determined, and as one character, the candidate pronunciation of the character "出" is temporarily determined as "で";

[0069] In a step d, querying a word "思い出を" where the character "出" is located: the uniquely determined pronunciation of the character "出" is "で" based on the candidate word "思^{おも}い出^で".

[0070] In a step e, querying the second character "思" in the word "思い出を思": similar to the first "思", the candidate pronunciation is temporarily determined as "し";

[0071] In a step f, continuously querying the word "思い" where a second character "思" is located based on the word "思い出を思い": the uniquely determined

pronunciation "おも" of the character "思" is acquired based on the candidate word "思^{おも}う" having a larger quantity of characters included in the dictionary engine;

[0072] In a step g, querying the second character "出" in the word "思い出を思い出": the candidate pronunciation is temporarily determined as "で" based on the candidate word "思^{おも}い出^で"; and

[0073] In a step h, continuously querying the word "思い出し" where the second "出" is located in the "思い出を思い出し": the candidate word "思^{おも}い出^だす" having a larger quantity of characters is acquired by query, and the uniquely determined pronunciation "だ" of the character "出" is acquired.

[0074] By steps a to h, the pronunciations of characters to be annotated in the lyric sentence, determined by the server, are respectively: "思^{おも}い出^でを思^{おも}い出^だしてください".

[0075] It should be noted that in Chinese, the pronunciation of the character to be annotated may be Chinese pinyin, and in Japanese, the pronunciation of the character to be annotated may be pseudonym.

[0076] In a third case, the server determines the pronunciation of the character to be annotated in the word in the dictionary engine according to the word to which the character to be annotated belongs and a voice key character of the character to be annotated.

[0077] In the embodiment of the present disclosure, in some languages, the pronunciation of a character may be affected by the voice, and the pronunciations corresponding to the character in different voices are also different. In this step, the server performs phrase partitioning for the plurality of characters to determine a plurality of phrases, and input the plurality of phrases into a dictionary engine; and the server performs a character-by-character increase query on the plurality of phrases to acquire a plurality of candidate words matching the word to which the character to be annotated belongs. The server screens out a candidate word having a maximum quantity of characters from the plurality of candidate words and having the same voice as the

character to be annotated according to quantities of characters included in the plurality of candidate words and a voice key character of the character to be annotated, and outputs the pronunciation of the character to be annotated in the screened-out candidate word having the maximum quantity of characters having the same voice as the character to be annotated. Each candidate word at least includes the character included in the word to which the character to be annotated belongs, and the plurality of phrases include the character to be annotated and the voice key character of the character to be annotated.

[0078] In this step, the server performs the query based on the word and voice to which the character to be annotated belongs; and the screened-out candidate word has a maximum quantity of characters and the voice is consistent with the character to be annotated, wherein the process that the server performs the query and screening in the dictionary engine is similar to the process of the second case, which is not described herein any further.

[0079] For example, in "瞬^{またた}いたと瞬^{まじろ}いだの振り仮名^がが違う^{ちが}のよ", the first "瞬" and the second "瞬" are both located in the word "瞬い". However, voice key characters "た" and "だ" of the "瞬" are present in this sentence. The server may further determine, based on the voice key characters, that the pronunciation of the first "瞬" is "またた", and the pronunciation of the second "瞬" is "まじろ".

[0080] It should be noted that in Japanese, the two characters "瞬" herein are both a five-segment verb, and are acquired by query in the dictionary engine; the "瞬" corresponds to two pronunciations, and the two pronunciations are respectively "またたく" and "まじろぐ"; and because the voices are different, the pronunciation may change as follows:

[0081] in regard to またたく: またたく加た is changed to またたき + た;
and

[0082] in regard to まじろぐ: まじろぐ加た is changed to まじろぎ + た;

[0083] Since き+た and ぎ+た of the five-segment verb need to generate sound change, the following results may be obtained:

[0084] in regard to またたく: またたき is changed to またたい + た; and

[0085] in regard to まじろぐ: まじろぎ is changed to まじろい + だ.

[0086] That is, an actual result enables a past particle to be subjected to opacification, such that た is changed to だ.

[0087] The pronunciations of the two "瞬" are respectively determined based on the pronunciation acquired after the sound change: the pronunciation of the "瞬" in "瞬い" is determined as "またた" in the first "瞬いた" based on the voice key character た, and the pronunciation of the "瞬" in "瞬い" is determined as "まじろ" in the second "まじろ" based on the voice key character だ.

[0088] Therefore, during the actual query, an accurate pronunciation of the character to be annotated may be further matched based on the voice key character.

[0089] It should be noted that in steps 202-203, the character to be annotated is firstly determined, and then the pronunciation of the character to be annotated is queried. However, the server may directly input the plurality of characters into the dictionary engine to query, and only store the pronunciation of the character in the dictionary engine. In regard to other characters except the character to be annotated, the dictionary engine may not output the pronunciations thereof. Therefore, the server may directly perform query based on the plurality of the characters, and may similarly acquire the corresponding pronunciation of the character to be annotated in the target song.

[090] In a step 204, the server generates a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

[091] In this step, the server creates the first lyric file, stores the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song in the first lyric file, and establishes an index relationship between the character to be annotated and the corresponding pronunciation of the character to be annotated in the target song. The server may establish an index relationship between the character and the pronunciation based on an array. The server may establish a second array, write the corresponding pronunciation of the character to be annotated in the target song into the second array, and add a first array and the second array to the first lyric file. For each character to be annotated, the server stores the pronunciation

corresponding to the character to be annotated in a second storage position of a third array according to a first storage position of the character to be annotated in the first array, wherein the first storage position and a third storage position are both associate bytes in the first array and the second array, for example, both the first byte.

[092] In the embodiment of the present disclosure, in step 201, the server may further acquire the display times of the plurality of characters; and in this step, the server may further add the display times to the first lyric file. Therefore, the server may generate, according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song, the first lyric file of the target song by: creating, by the server, the first lyric file and establishing the second array, and writing the corresponding pronunciation of the character to be annotated in the target song into the second array; and adding, by the server, the first array, the second array, and the third array to the first lyric file.

[093] In a possible design, in some languages, some cases where the quantities of characters are not equal to the quantities of pronunciations may be present, for example, two characters included in "瞬いた" actually correspond to three pronunciations. Therefore, when the lyrics include the target word, the server may also determine display time of the target word according to the display times of at least two adjacent characters to be annotated included in the target word, and update the third array according to the display time of the target word; and finally, the server add the first array, the second array and the updated third array to the first lyric file; wherein the target word induces at least two adjacent characters to be annotated, and a quantity of characters to be annotated included in the target word is not equal to a quantity of pronunciations of the target word. The server displays the display time of the target word by: combining the display times of the at least two adjacent characters to be annotated included in the target word, and determining a combined display time as the display time of the target word.

[094] In Japanese, with respect to most words, a quantity of pronunciations of a word is not equal to a quantity of characters included in this word. For example, 欠片^{かけら}、

明後日^{あちつて}, 一昨日^{おととい}, 黄昏^{なまがわ}, 彷徨^{さまよう}う, 躊躇^{ためらう}う, 煙草^{たばこ}, 大人^{おとな} and the like. Taking "欠片^{かけら}" as an example for description, prior to updating the third array, the display times stored in a second lyric file is illustrated in Table 1.

Table 1

Third array	39112	39803	40356	41176
First array	欠	片	の	色

[095] Obviously, the characters "欠" and "片" correspond to one display time respectively. However, in actual display, since the characters "欠" and "片" jointly correspond to three pronunciations, the characters "欠" and "片" are separately displayed according to their respective display times, which may obviously cause a display mistake. By combination of two display times, updated display time stored in the third array is listed in Table 2.

Table 2

Third array	39112		40356	41176
First array	欠	片	の	色
Second array	かけら			いろ

[096] It should be noted that the server enables a plurality of adjacent characters to be one word and correspond to individual display time by combining the display times of the plurality of adjacent characters included in the target word. This prevents the problem that the display time of each character does not match with the pronunciation of actual singing resulted from performing the display based on each character corresponding to one display time when the song is actually played, and further enables the display time of each character to match an actual pronunciation of the character, enables the display time of each word to match with the pronunciation of the word, and enables the display times of the lyrics in the first lyric file to accurately match with the pronunciation of the lyrics, such that accuracy of the finally acquired lyric file is further enhanced.

[097] In the embodiment of the present disclosure, the server may determine, based on lyrics of a target song, a pronunciation of each character to be annotated in the lyrics in the target song, and further generate a first lyric file of the target song according to a plurality of characters and the pronunciations of the characters to be annotated, such that a corresponding pronunciation is bound to each character to be annotated. In this way, in subsequent display of the lyrics, the pronunciations may be synchronously displayed, which ensures that a user is capable of correctly singing the pronunciation of each character in the target song.

[098] FIG. 3 is a flowchart of a method for displaying lyrics according to an embodiment of the present disclosure. The embodiment of the present disclosure may be carried out by a terminal. Referring to FIG. 3, the method includes the following steps.

[099] In a step 301, upon receipt of a lyric display instruction, the terminal acquires a first lyric file of a target song.

[0100] In the embodiment of the present disclosure, the lyric display instruction is intended to display lyrics of the target song; and upon receiving the lyric display instruction, the terminal may acquire the first lyric file of the target song from a local or a server according to an identifier of the target song. The lyric display instruction may be acquired when the user triggers the terminal to play the target song, or may be acquired when the user triggers the terminal to display the lyric file.

[0101] It should be noted that the first lyric file is the lyric file generated based on the lyrics and target pronunciations of the plurality of characters in advance; the specific generating process is as illustrated in steps 201 to 204; and the first lyric file at least includes the lyrics of the target song, and the corresponding pronunciation of the character to be annotated in the plurality of characters of the lyrics.

[0102] In a step 302, the terminal acquires the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric file.

[0103] In the embodiment of the present disclosure, in the first lyric file, the lyrics and the pronunciation of the character to be annotated may be respectively stored in the

form of an array. The terminal acquires a first array and a second array from the first lyric file, reads the plurality of characters in the lyrics from the first array, and reads the pronunciation of the character to be annotated in the plurality of characters from the second array. The terminal may determine, based on a first storage position of each character to be annotated in the first array, a second storage position associated with the second array, and read the pronunciation of the character to be annotated from the second storage position.

[0104] In a possible design, the first lyric file may further include display times of the plurality of characters in the lyrics, and the terminal may further acquire the display times of the plurality of characters from the first lyric file. The process may be: acquiring, by the terminal, a third array from the first lyric file, and acquiring the display times of the plurality of characters from the third array. The display times of the plurality of characters includes display time of the target word in the lyrics, and display time of each character except the target word.

[0105] The target word includes at least two adjacent characters to be annotated, a quantity of characters to be annotated included in the target word is not equal to a quantity of pronunciations of the target word, and the display time of the target word is a display time obtained by combining the display times of the at least two adjacent characters to be annotated included in the target word.

[0106] In a step 303, the terminal displays the plurality of characters of the lyrics.

[0107] In the embodiment of the present disclosure, the terminal highlights, according to the display time of the target word, the target word that is being currently played in the plurality of characters; and highlights, according to the display time of each character in the plurality of characters except the target word, a character that is currently being played in the plurality of characters except the target word. The terminal may highlight a character or the target word that is currently being played in a font color of the character. For example, the played character or the target word is displayed in a first color, and the character or the target word which has not played is displayed in a second color.

[0108] In a step 304, in displaying the character to be annotated, the terminal

annotates the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated.

[0109] In the embodiment of the present disclosure, the target position is defined as being over the character to be annotated. In displaying the character to be annotated, the terminal highlights, according to the display time of the character to be annotated, a character to be annotated that is being currently played and a corresponding pronunciation of the character to be annotated that is being currently played in the target song. Nevertheless, the character to be annotated may include the target word. The terminal may highlight, according to the display time of the target word, the target word that is being currently played and the corresponding pronunciation of the target word that is being currently played in the target song.

[0110] It should be noted that, in some related arts, for brevity of logic, for unique pronunciations of the lyrics, the pronunciations are annotated by using parenthesis, as illustrated in FIG. 4, for example, "誰でももし男女(ひと)が人間(ひと)で ありたいなら". However, such annotations may cause misunderstandings to the user. For example, with such annotations, the user may consider that the pronunciation of the character "女" is "ひと", whereas the pronunciation of "男" is unknown. Especially for a compound word, for example, in "時間旅行(タイムトリップ)", the user fails to determine whether the pronunciation in the parenthesis is for "旅行" or for "時間旅行". In the meantime, when the lyrics are being highlighted, it may not be ensured that the characters and the pronunciations thereof are highlighted in accordance with the same display rhythm. For example, for "男女(ひと)", only two syllables are present for "男女", and six syllables (including the parenthesis) are present when being placed into a line of texts. When the character "男" is highlighted based on the display time of "男", "男女" needs to be rendered to a first color; and when the character "女" is highlighted, the remaining part "ひと)" need to be rendered to the first color. As such, display errors may be caused, which gives a poor user experience.

[0111] In the embodiment of the present disclosure, as illustrated in FIG. 5, the terminal may display the pronunciation over the character to be annotated; and when

browsing the character to be annotated, the user is capable of clearly and accurately finding the pronunciation of the character to be annotated. As such, efficiency of knowing the pronunciation of the character to be annotated is increased and accuracy of displaying the lyrics is improved. In addition, the user sings based on the pronunciation, which ensures that the pronunciation of each character is accurately sung.

[0112] In the embodiment of the present disclosure, upon receiving a lyric display instruction, the terminal may display lyrics of a target song, a pronunciation of a character to be annotated in a plurality of characters of the lyrics in the target song, such that the user is capable of correctly singing the pronunciation of each character in the target song; in addition, when the lyrics are being displayed on the terminal, the pronunciations may be provided over the corresponding character to be annotated, such that the pronunciations are clearly visible. As such, the user is capable of accurately and quickly finding the corresponding pronunciation of the character to be annotated, and accuracy of displaying the lyrics is improved.

[0113] FIG. 6 is a schematic structural diagram of an apparatus for generating lyrics according to an embodiment of the present disclosure. Referring to FIG. 6, the apparatus includes an acquiring module 601, a determining module 602, a querying module 603, and a generating module 604.

[0114] The acquiring module 601 is configured to acquire lyrics of a target song.

[0115] The determining module 602 is configured to determine a character to be annotated in a plurality of characters of the lyrics.

[0116] The querying module 603 is configured to query, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determine the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song.

[0117] The generating module 604 is configured to generate a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

[0118] Optionally, the querying module 603 includes:

[0119] a determining unit, configured to perform phrase partitioning for the plurality of characters to determine a plurality of phrases, the plurality of phrases including the character to be annotated;

[0120] an inputting unit, configured to input the plurality of phrases into a dictionary engine, the dictionary engine including a plurality of characters and pronunciations of the plurality of characters;

[0121] a querying unit, configured to perform a character-by-character increase query on the plurality of phrases to acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and

[0122] a screening unit, configured to screen out a candidate word having a maximum quantity of characters from the plurality of candidate words according to quantities of characters included in the plurality of candidate words, and output the pronunciation of the character to be annotated in the screened-out candidate word having the maximum quantity of characters, each candidate word at least including the characters of the word to which the character to be annotated belongs.

[0123] Optionally, the querying module 603 includes:

[0124] a determining unit, configured to perform phrase partitioning for the plurality of characters to determine a plurality of phrases, the plurality of phrases including the character to be annotated and a voice key character of the character to be annotated;

[0125] an inputting unit, configured to input the plurality of phrases into a dictionary engine, the dictionary engine including a plurality of characters and pronunciations of the plurality of characters;

[0126] a querying unit, configured to perform a character-by-character increase query on the plurality of phrases to acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and

[0127] a screening unit, configured to screen out a candidate word having a maximum quantity of characters from the plurality of candidate words and having the same voice as the character to be annotated according to quantities of characters included in the plurality of candidate words and a voice key character of the character

to be annotated, and output the pronunciation of the character to be annotated in the screened-out candidate word having the maximum quantity of characters having the same voice as the character to be annotated, each candidate word at least including the characters of the word to which the character to be annotated belongs.

[0128] Optionally, the Chinese character includes: a Chinese simplified character, a Chinese traditional character, a Chinese simplified character used in Japanese, and a Chinese traditional character used in Japanese.

[0129] Optionally, the acquiring module 601 includes:

[0130] an acquiring unit, configured to acquire a second lyric file of the target song, the second lyric file including the lyrics of the target song and display times of the plurality of characters of the lyrics; and

[0131] an establishing unit, configured to establish a first array and a second array, writing the plurality of characters into the first array, writing the display times of the plurality of characters into the third array, and determine the plurality of characters in the first array as the lyrics of the target song.

[0132] Optionally, the generating module 602 is configured to establish a second array, and write the corresponding pronunciation of the character to be annotated in the target song into the second array; if a target word is present in the lyrics, determine a display time of the target word according to the display times of at least two adjacent characters to be annotated included in the target word, the target word including at least two adjacent characters to be annotated, and a quantity of characters to be annotated included in the target word being not equal to a quantity of pronunciations of the target word; write the display time of the target word into the third array; and add the first array, the second array, and the third array to the first lyric file;

[0133] wherein the display time of the target word is determined by: combining the display times of the at least two adjacent characters to be annotated included in the target word, and determining a combined display time as the display time of the target word.

[0134] Optionally, the generating module 602 is configured to establish a second array, and write the corresponding pronunciation of the character to be annotated in the

target song into the second array; and add a first array and the second array to the first lyric file, the first array being configured to store the plurality of characters of the lyrics.

[0135] In the embodiment of the present disclosure, the server may determine, based on lyrics of a target song, a pronunciation of each character to be annotated in the lyrics in the target song, and further generate a first lyric file of the target song according to a plurality of characters and the pronunciations of the characters to be annotated, such that a corresponding pronunciation is bound to each character to be annotated. In this way, in subsequent display of the lyrics, the pronunciations may be synchronously displayed, which ensures that a user is capable of correctly singing the pronunciation of each character in the target song.

[0136] FIG. 7 is a schematic structural diagram of an apparatus for displaying lyrics according to an embodiment of the present disclosure. The apparatus is applied to a terminal. Referring to FIG.7, the apparatus includes an acquiring module 701, a displaying module 702, and annotating module 703.

[0137] The acquiring module 701 is configured to, upon receipt of a lyric display instruction, acquire a first lyric file of a target song, the lyric display instruction being intended to display lyrics of the target song.

[0138] The acquiring module 701 is further configured to acquire the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric file,

[0139] The displaying module 702 is configured to display the plurality of characters of the lyrics.

[0140] The annotating module 703 is configured to, in displaying the character to be annotated, annotate the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated, the target position being defined as being over the character to be annotated.

[0141] Optionally, the displaying module 702 includes:

[0142] a first displaying unit, configured to highlight, according to a display time of a target word in the plurality of characters, a target word that is currently being played in the plurality of characters; and

[0143] a second displaying unit, configured to highlight, according to a display time of each character in the plurality of characters except the target word a character that is currently being played in the plurality of characters except the target word;

[0144] wherein the target word includes at least two adjacent characters to be annotated, a quantity of characters to be annotated included in the target word is not equal to a quantity of pronunciations of the target word, and the display time of the target word is a display time obtained by combining the display times of the at least two adjacent characters to be annotated included in the target word.

[0145] Optionally, the second displaying unit is configured to, in displaying the character to be annotated, highlight, according to the display time of the character to be annotated, a character to be annotated that is being currently played and a corresponding pronunciation of the character to be annotated that is being currently played in the target song.

[0146] In the embodiment of the present disclosure, upon receiving a lyric display instruction, the terminal may display lyrics of a target song, a pronunciation of a character to be annotated in a plurality of characters of the lyrics in the target song, such that a user is capable of correctly singing the pronunciation of each character in the target song; in addition, when the lyrics are being displayed on the terminal, the pronunciations may be provided over the corresponding character to be annotated, such that the pronunciations are clearly visible. As such, the user is capable of accurately and quickly finding the corresponding pronunciation of the character to be annotated, and accuracy of displaying the lyrics is improved

[0147] All the above optional technical solutions may form the optional embodiments of the present disclosure in any combination, which are not described herein any further.

[0148] It should be noted that, during generating lyrics by the apparatus for generating lyrics according to the above embodiment, or during displaying lyrics by the apparatus for displaying lyrics according to the above embodiment, the apparatuses are described by only using division of the above functional modules as examples. In practice, the functions may be assigned to different functional modules for

implementation as required. To be specific, the internal structure of the apparatus is divided into different functional modules to implement all or part of the above-described functions. In addition, the apparatus for generating lyrics and the method for generating lyrics are based on the same inventive concept as the apparatus for displaying lyrics and the method for displaying lyrics. The specific implementation is elaborated in the method embodiments, which is not described herein any further.

[0149] FIG. 8 is a schematic structural diagram of a terminal according to an embodiment of the present disclosure. The terminal 800 may be a smart phone, a tablet computer, a Moving Picture Experts Group Audio Layer III (MP3) player, a Moving Picture Experts Group Audio Layer IV (MP4) player, a laptop computer, or a desktop computer. The terminal 800 may also be referred to as a user equipment, a portable terminal, a laptop terminal, a desktop terminal, or the like.

[0150] Generally, the terminal 800 includes a processor 801 and a memory 802.

[0151] The processor 801 may include one or a plurality of processing cores, for example, a four-core processor, an eight-core processor, or the like. The processor 801 may be practiced based on a hardware form of at least one of digital signal processing (DSP), field-programmable gate array (FPGA), and programmable logic array (PLA). The processor 801 may further include a primary processor and a secondary processor. The primary processor is a processor configured to process data in an active state, and is also referred to as a central processing unit (CPU); and the secondary processor is a low-power consumption processor configured to process data in a standby state. In some embodiments, the processor 801 may be integrated with a graphics processing unit (GPU), wherein the GPU is configured to render and draw the content to be displayed on the screen. In some embodiments, the processor 801 may further includes an artificial intelligence (AI) processor, wherein the AI processor is configured to process calculate operations related to machine learning.

[0152] The memory 802 may include one or a plurality of computer-readable storage media, wherein the computer-readable storage medium may be non-transitory. The memory 802 may include a high-speed random access memory, and a non-volatile memory, for example, one or a plurality of magnetic disk storage devices or flash

storage devices. In some embodiments, the non-transitory computer-readable storage medium in the memory 802 may be configured to store at least one instruction, wherein the at least one instruction is executed by the processor 801 to perform the method for generating lyrics and the method for displaying lyrics according to the embodiments of the present disclosure.

[0153] In some embodiments, the terminal 800 may optionally include a peripheral device interface 803 and at least one peripheral device. The processor 801, the memory 802 and the peripheral device interface 803 may be connected to each other via a bus or a signal line. The at least one peripheral device may be connected to the peripheral device interface 803 via a bus, a signal line, or a circuit board. Specifically, the peripheral device includes at least one of a radio frequency circuit 804, a touch display screen 805, a camera assembly 806, an audio circuit 807, a positioning assembly 808, and a power source 809.

[0154] The peripheral device interface 803 may be configured to connect the at least one peripheral device related to input/output (I/O) to the processor 801 and the memory 802. In some embodiments, the processor 801, the memory 802 and the peripheral device interface 803 are integrated on the same chip or circuit board. In some other embodiments, any one or two of the processor 801, the memory 802, and the peripheral device interface 803 may be practiced on a separate chip or circuit board, which is not limited in this embodiment.

[0155] The radio frequency circuit 804 is configured to receive and transmit a radio frequency (RF) signal, which is also referred to as an electromagnetic signal. The radio frequency circuit 804 communicates with a communication network or another communication device via the electromagnetic signal. The radio frequency circuit 804 converts an electrical signal to an electromagnetic signal and sends the signal, or converts a received electromagnetic signal to an electrical signal. Optionally, the radio frequency circuit 804 includes an antenna system, an RF transceiver, one or a plurality of amplifiers, a tuner, an oscillator, a digital signal processor, a codec chip set, a subscriber identification module card, or the like. The radio frequency circuit 804 may communicate with another terminal based on a wireless communication protocol. The

wireless communication protocol includes, but not limited to: a web, a metropolitan area network, an intranet, generations of mobile communication networks (including 2G, 3G, 4G and 5G), a wireless local area network, and/or a wireless fidelity (WiFi) network. In some embodiments, the radio frequency circuit 804 may further include a near field communication (NFC)-related circuits, which is not limited in the present disclosure.

[0156] The display screen 805 may be configured to display a user interface (UI). The UI may include graphics, texts, icons, videos, and any combination thereof. When the display screen 805 is a touch display screen, the display screen 805 may further have the capability of acquiring a touch signal on a surface of the display screen 805 or above the surface of the display screen 805. The touch signal may be input to the processor 801 as a control signal, and further processed therein. In this case, the display screen 805 may be further configured to provide a virtual button and/or a virtual keyboard or keypad, also referred to as a soft button and/or a soft keyboard or keypad. In some embodiments, one display screen 805 may be provided, which is arranged on a front panel of the terminal 800. In some other embodiments, at least two display screens 805 are provided, which are respectively arranged on different surfaces of the terminal 800 or designed in a folded fashion. In still some other embodiments, the display screen 805 may be a flexible display screen, which is arranged on a bent surface or a folded surface of the terminal 800. Even, the display screen 805 may be further arranged to an irregular pattern which is non-rectangular, that is, a specially-shaped screen. The display screen 805 may be fabricated from such materials as a liquid crystal display (LCD), an organic light-emitting diode (OLED), or the like.

[0157] The camera assembly 806 is configured to capture an image or a video. Optionally, the camera assembly 806 includes a front camera and a rear camera. Generally, the front camera is arranged on a front panel of the terminal, and the rear camera is arranged on a rear panel of the terminal. In some embodiments, at least two rear cameras are arranged, which are respectively any one of a primary camera, a depth of field (DOF) camera, a wide-angle camera and a long-focus camera, such that the primary camera and the DOF camera are fused to implement the background

virtualization function, and the primary camera and the wide-angle camera are fused to implement the panorama photographing and virtual reality (VR) photographing functions or other fused photographing functions. In some embodiments, the camera assembly 806 may further include a flash. The flash may be a single-color temperature flash or a double-color temperature flash. The double-color temperature flash refers to a combination of a warm-light flash and a cold-light flash, which may be used for light compensation under different color temperatures.

[0158] The audio circuit 807 may include a microphone and a speaker. The microphone is configured to capture an acoustic wave of a user and an environment, and convert the acoustic wave to an electrical signal and output the electrical signal to the processor 801 for further processing, or output to the radio frequency circuit 804 to implement voice communication. For the purpose of stereo capture or noise reduction, a plurality of such microphones may be provided, which are respectively arranged at different positions of the terminal 800. The microphone may also be a microphone array or an omnidirectional capturing microphone. The speaker is configured to convert an electrical signal from the processor 801 or the radio frequency circuit 804 to an acoustic wave. The speaker may be a traditional thin-film speaker, or may be a piezoelectric ceramic speaker. When the speaker is a piezoelectric ceramic speaker, an electrical signal may be converted to an acoustic wave audible by human beings, or an electrical signal may be converted to an acoustic wave inaudible by human beings for the purpose of ranging or the like. In some embodiments, the audio circuit 807 may further includes a headphone plug.

[0159] The positioning assembly 808 is configured to determine a current geographical position of the terminal 800 to implement navigation or a local based service (LBS). The positioning assembly 808 may be the global positioning system (GPS) from the United States, the Beidou positioning system from China, the Grenas satellite positioning system from Russia or the Galileo satellite navigation system from the European Union.

[0160] The power source 809 is configured to supply power for the components in the terminal 800. The power source 809 may be an alternating current, a direct current,

a disposable battery, or a rechargeable battery. When the power source 809 includes a rechargeable battery, the rechargeable battery may support wired charging or wireless charging. The rechargeable battery may also support the supercharging technology.

[0161] In some embodiments, the terminal may further include one or a plurality of sensors 810. The one or plurality of sensors 810 include, but not limited to: an acceleration sensor 811, a gyroscope sensor 812, a pressure sensor 813, a fingerprint sensor 814, an optical sensor 815 and a proximity sensor 816.

[0162] The acceleration sensor 811 may detect accelerations on three coordinate axes in a coordinate system established for the terminal 800. For example, the acceleration sensor 811 may be configured to detect components of a gravity acceleration on the three coordinate axes. The processor 801 may control the touch display screen 805 to display the user interface in a horizontal view or a longitudinal view based on a gravity acceleration signal acquired by the acceleration sensor 811. The acceleration sensor 811 may be further configured to acquire motion data of a game or a user.

[0163] The gyroscope sensor 812 may detect a direction and a rotation angle of the terminal 800, and the gyroscope sensor 812 may collaborate with the acceleration sensor 811 to capture a 3D action performed by the user for the terminal 800. Based on the data acquired by the gyroscope sensor 812, the processor 801 may implement the following functions: action sensing (for example, modifying the UE based on an inclination operation of the user), image stabilization during the photographing, game control, and inertial navigation.

[0164] The force sensor 813 may be arranged on a side frame of the terminal and/or on a lowermost layer of the touch display screen 805. When the force sensor 813 is arranged on the side frame of the terminal 800, a grip signal of the user against the terminal 800 may be detected, and the processor 801 implements left or right hand identification or perform a shortcut operation based on the grip signal acquired by the force sensor 813. When the force sensor 813 is arranged on the lowermost layer of the touch display screen 805, the processor 801 implement control of an operable control on the UI based on a force operation of the user against the touch display screen 805.

The operable control includes at least one of a button control, a scroll bar control, an icon control, and a menu control.

[0165] The fingerprint sensor 814 is configured to acquire fingerprints of the user, and the processor 801 determines the identity of the user based on the fingerprints acquired by the fingerprint sensor 814, or the fingerprint sensor 814 determines the identity of the user based on the acquired fingerprints. When it is determined that the identity of the user is trustable, the processor 801 authorizes the user to perform related sensitive operations, wherein the sensitive operations include unlocking the screen, checking encrypted information, downloading software, paying and modifying settings, and the like. The fingerprint sensor 814 may be arranged on a front face a back face or a side face of the terminal 800. When the terminal 800 is provided with a physical key or a manufacturer's logo, the fingerprint sensor 814 may be integrated with the physical key or the manufacturer's logo.

[0166] The optical sensor 815 is configured to acquire the intensity of ambient light. In one embodiment, the processor 801 may control a display luminance of the touch display screen 805 based on the intensity of ambient light acquired by the optical sensor 815. Specifically, when the intensity of ambient light is high, the display luminance of the touch display screen 805 is up-shifted; and when the intensity of ambient light is low, the display luminance of the touch display screen 805 is down-shifted. In another embodiment, the processor 801 may further dynamically adjust photographing parameters of the camera assembly 806 based on the intensity of ambient light acquired by the optical sensor.

[0167] The proximity sensor 816, also referred to as a distance sensor, is generally arranged on the front panel of the terminal 800. The proximity sensor 816 is configured to acquire a distance between the user and the front face of the terminal 800. In one embodiment, when the proximity sensor 816 detects that the distance between the user and the front face of the terminal 800 gradually decreases, the processor 801 controls the touch display screen 805 to switch from an active state to a rest state; and when the proximity sensor 816 detects that the distance between the user and the front face of the terminal 800 gradually increases, the processor 801 controls the touch display screen

805 to switch from the rest state to the active state.

[0168] A person skilled in the art may understand that the structure of the terminal as illustrated in FIG. 8 does not construe a limitation on the terminal 800. The terminal may include more components over those illustrated in FIG. 8, or combinations of some components, or employ different component deployments.

[0169] FIG. 9 is a schematic structural diagram of a server 900 according to an embodiment of the present disclosure. The server 900 may greatly vary due to different configurations or performance, and may include one or more central processing units (CPUs) 901 and one or more memories 902. The memory 902 stores at least one instruction, wherein the at least one instruction, when being loaded and executed by the processor 901, may cause the processor 901 to perform the above method for generating lyrics according to the method embodiments. Nevertheless, the server may further have such components as a wired or wireless network interface, a keyboard, an input/output interface, and the like for inputs and outputs; and the server may further include other components configuring to implement device functions, which is not described herein any further.

[0170] An exemplary embodiment further provides a computer-readable storage medium storing instructions, for example, a memory including instructions. The instructions, when being executed by the processor of the apparatus, may cause the processor to perform the above method. For example, the computer-readable storage medium may be a read-only memory (ROM), a random access memory (RAM), a compact disc ROM (CD-ROM), a magnetic tape, a floppy disk, an optical data storage device, or the like.

[0171] Persons of ordinary skill in the art can understand that all or part of the steps described in the above embodiments can be completed through hardware, or through relevant hardware instructed by applications stored in a non-transitory computer readable storage medium, such as a read-only memory, a disk or a CD, etc.

[0172] The foregoing descriptions are merely preferred embodiments of the present disclosure, and are not intended to limit the present disclosure. Within the

spirit and principles of the disclosure, any modifications, equivalent substitutions, improvements, etc., are within the protection scope of the present disclosure.

CLAIMS

What is claimed is:

1. A method for generating lyrics, comprising:

acquiring a second lyric file of a target song, wherein the second lyric file comprises lyrics of the target song and display times of a plurality of characters of the lyrics, the characters and the display times have one-to-one correspondence, and each character and the display time of the character in the second lyric file are spliced and stored;

establishing a first array and a third array, writing the plurality of characters into the first array, writing the display times of the plurality of characters into the third array, and determining the plurality of characters in the first array as the lyrics of the target song;

determining a character to be annotated in the plurality of characters of the lyrics;

querying, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determining the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song; and

generating a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

2. The method according to claim 1, wherein querying, based on the predetermined query rule and according to the word to which the character to be annotated belongs, the pronunciation of the character to be annotated in the word comprises:

performing phrase partitioning for the plurality of characters to determine a plurality of phrases, the plurality of phrases comprising the character to be annotated;

inputting the plurality of phrases into a dictionary engine, the dictionary engine comprising a plurality of characters and pronunciations thereof;

performing a character-by-character increase query on the plurality of phrases to

acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and

screening out a candidate word having a maximum quantity of characters from the plurality of candidate words according to quantities of characters included in the plurality of candidate words, and outputting the pronunciation of the character to be annotated in the candidate word having the maximum quantity of characters, each candidate word at least comprising characters of the word to which the character to be annotated belongs.

3. The method according to claim 1, wherein querying, based on the predetermined query rule and according to the word to which the character to be annotated belongs, the pronunciation of the character to be annotated in the word comprises:

performing phrase partitioning for the plurality of characters to determine a plurality of phrases, the plurality of phrases comprising the character to be annotated and a voice key character of the character to be annotated;

inputting the plurality of phrases into a dictionary engine, the dictionary engine comprising a plurality of characters and pronunciations thereof;

performing a character-by-character increase query on the plurality of phrases to acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and

screening out a candidate word having a maximum quantity of characters from the plurality of candidate words and having the same voice as the character to be annotated according to quantities of characters included in the plurality of candidate words and a voice key character of the character to be annotated, and outputting the pronunciation of the character to be annotated in the candidate word having the maximum quantity of characters having the same voice as the character to be annotated, each candidate word at least comprising characters of the word to which the character to be annotated belongs.

4. The method according to claim 1, wherein the character to be annotated

comprises: a Chinese simplified character, a Chinese traditional character, a Chinese simplified character used in Japanese, and a Chinese traditional character used in Japanese.

5. The method according to claim 1, wherein generating the first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song comprises:

establishing a second array, and writing the corresponding pronunciation of the character to be annotated in the target song into the second array;

if a target word is present in the lyrics, determining a display time of the target word according to the display times of at least two adjacent characters to be annotated included in the target word, the target word comprising at least two adjacent characters to be annotated, and a quantity of characters to be annotated included in the target word being not equal to a quantity of pronunciations of the target word;

writing the display time of the target word into the third array; and

adding the first array, the second array, and the third array to the first lyric file;

wherein the display time of the target word is determined by: combining the display time of the at least two adjacent characters to be annotated included in the target word, and determining a combined display time as the display time of the target word.

6. The method according to claim 1, wherein generating the first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song comprises:

establishing a second array, and writing the corresponding pronunciation of the character to be annotated in the target song into the second array;

adding a first array and the second array into the first lyric file, the first array being configured to store the plurality of characters of the lyrics.

7. A method for displaying lyrics, wherein the method is applied on a terminal, and the method comprises:

upon receipt of a lyric display instruction, acquiring a first lyric file of a target song, wherein the lyric display instruction is intended to display lyrics of the target song, and the first lyric file is a lyric file generated by the method according to claim 1;

acquiring the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric file, displaying the plurality of characters of the lyrics;

in displaying the character to be annotated, annotating the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated, the target position being defined as being over the character to be annotated.

8. The method according to claim 7, wherein the first lyric file further comprises display times of the plurality of characters; and correspondingly, displaying the plurality of characters of the lyrics comprises:

highlighting, according to a display time of a target word in the plurality of characters, a target word that is currently being played in the plurality of characters; and

highlighting, according to a display time of each character in the plurality of characters except the target word, a character that is currently being played in the plurality of characters except the target word;

wherein the target word comprises at least two adjacent characters to be annotated, a quantity of characters to be annotated included in the target word is not equal to a quantity of pronunciations of the target word, and the display time of the target word is display time obtained by combining the display time of the at least two adjacent characters to be annotated included in the target word.

9. The method according to claim 7, wherein in displaying the character to be annotated, annotating the corresponding pronunciation of the character to be annotated in the target song in the target position of the character to be annotated comprises:

in displaying the character to be annotated, highlighting, according to the display

time of the character to be annotated, a character to be annotated that is being currently played and a corresponding pronunciation of the character to be annotated that is being currently played in the target song;

wherein the character to be annotated comprises: a Chinese simplified character, a Chinese traditional character, a Chinese simplified character used in Japanese, and a Chinese traditional character used in Japanese.

10. An apparatus for generating lyrics, comprising:

an acquiring module, comprising an acquiring unit and an establishing unit, wherein the acquiring unit is configured to acquire a second lyric file of a target song, wherein the second lyric file comprises lyrics of the target song and display times of a plurality of characters of the lyrics, the characters and the display times have one-to-one correspondence, and each character and the display time of the character in the second lyric file are spliced and stored; and the establishing unit is configured to establish a first array and a third array, write the plurality of characters into the first array, write the display times of the plurality of characters into the third array, and determine the plurality of characters in the first array as the lyrics of the target song;

a determining module, configured to determine a character to be annotated in the plurality of characters of the lyrics;

a querying module, configured to query, based on a predetermined query rule and according to a word to which the character to be annotated belongs, a pronunciation of the character to be annotated in the word, and determine the pronunciation of the character to be annotated in the word as a pronunciation of the character to be annotated in the target song; and

a generating module, configured to generate a first lyric file of the target song according to the plurality of characters and the corresponding pronunciation of the character to be annotated in the target song.

11. The apparatus according to claim 10, wherein the querying module comprises:

a determining unit, configured to perform phrase partitioning for the plurality of

characters to determine a plurality of phrases, the plurality of phrases comprising the character to be annotated;

an inputting unit, configured to input the plurality of phrases into a dictionary engine, the dictionary engine comprising a plurality of characters and pronunciations thereof;

a querying unit, configured to perform a character-by-character increase query on the plurality of phrases to acquire a plurality of candidate words matching the word to which the character to be annotated belongs; and

a screening unit, configured to screen out a candidate word having a maximum quantity of characters from the plurality of candidate words according to quantities of characters included in the plurality of candidate words, and output the pronunciation of the character to be annotated in the candidate word having the maximum quantity of characters, each candidate word at least comprising characters of the word to which the character to be annotated belongs.

12. An apparatus for displaying lyrics, the apparatus being applied on a terminal, and the apparatus comprising:

an acquiring module, configured to, upon receipt of a lyric display instruction, acquire a first lyric file of a target song, wherein the lyric display instruction is intended to display lyrics of the target song, and the first lyric file is a lyric file generated by the method according to claim 1;

wherein the acquiring module is configured to acquire the lyrics of the target song and a corresponding pronunciation of a character to be annotated in a plurality of characters of the lyrics from the first lyric file;

a displaying module, configured to display the plurality of characters of the lyrics;

an annotating module, configured to, in displaying the character to be annotated, annotate the corresponding pronunciation of the character to be annotated in the target song in a target position of the character to be annotated, the target position being defined as being over the character to be annotated.

13. An electronic device, comprising a processor and a memory with at least one instruction stored therein; wherein the at least one instruction, when being loaded and executed by the processor, causes the processor to perform the method for generating the lyrics according to any one of claims 1 to 6, or perform the method for displaying the lyrics according to any one of claims 7 to 9.

14. A computer-readable storage medium, storing at least one instruction; wherein the at least one instruction, when being loaded and executed by a processor, causes the processor to perform the method for generating the lyrics according to any one of claims 1 to 6, or perform the method for displaying the lyrics according to any one of claims 7 to 9.