

## DESCRIPTION

TITLE : CONVERSATION ANALYSIS SYSTEM

### TECHNICAL FIELD

[0001] The present invention relates to a conversation analysis system.

### BACKGROUND ART

[0002] JP2017-167368A discloses a voice recognition error correction device. In order to correct a character string to be corrected which is included in a first text, this device recognizes a second uttered voice and estimates a character string to be corrected on the basis of text matching between the first text and a second text. Such correction devices from the prior art corrected voice recognition errors using a general correction engine regardless of the field or content of the conversation. Therefore, the correction accuracy of such conventional correction devices was not sufficient.

### PRIOR ART DOCUMENTS

#### PATENT DOCUMENTS

[0003] Patent Document 1: JP2017-167368A

### SUMMARY OF INVENTION

#### TECHNICAL PROBLEM

[0004] An object of one invention disclosed in this specification is to provide a system with which voice recognition errors can be corrected by an easier operation compared to the prior art.

#### SOLUTION TO PROBLEM

[0005] One invention described in the present specification is based on the finding that if the field and summary of the conversation are ascertained, then speech terms which are easily misrecognized can also be ascertained, and thus more accurate and prompt correction of voice recognition errors can be achieved.

[0006] One invention described in the present specification relates to a conversation

analysis system 1. The conversation analysis system 1 includes a voice analysis unit 3, a topic-related correction term storage unit 7, a topic ascertaining unit 5, and a conversation correction unit 9.

The voice analysis unit 3 is an element for analyzing the content included in a conversation.

The topic ascertaining unit 5 is an element for ascertaining a topic of the conversation.

The topic-related correction term storage unit 7 is an element for storing, for each topic, pronunciations to be voice-recognized or terms that are voice-recognized, and candidates of correction terms related to the pronunciations to be voice-recognized or the terms that are voice-recognized.

The conversation correction unit 9 is an element for correcting the conversation analyzed by the voice analysis unit 3. The conversation correction unit 9 uses the topic of the conversation ascertained by the topic ascertaining unit 5 to read the correction term candidates from the topic-related correction term storage unit 7 and correct the conversation analyzed by the voice analysis unit 3.

**[0007]** A preferred example of the conversation analysis system further includes a topic-related term update unit 13 for updating the topic-related correction term storage unit 7. The topic-related term update unit 13 uses information related to each topic input into the system to update the correction term candidates.

**[0008]** A preferred example of the conversation analysis system further includes a topic information extraction unit 11 that extracts information related to a topic. The topic information extraction unit 11 uses voice information obtained when the voice analysis unit 3 analyzes a presentation input into the system 1 and a presentation material input into the system to extract the information related to each topic input into the system.

**[0009]** One invention described in the present specification relates to a program for a conversation analysis system. The program causes a computer to function as a voice analysis means, a topic-related term storage means, a topic ascertaining means, and a conversation

correction means. These means correspond respectively to the units described above.

## EFFECTS OF INVENTION

**[0010]** According to one invention described in the present specification, a system with which voice recognition errors can be corrected by an easier operation compared to the prior art can be provided.

## BRIEF DESCRIPTION OF DRAWINGS

**[0011]** [FIG. 1] FIG. 1 is block diagram illustrating an overview of a conversation analysis system.

[FIG. 2] FIG. 2 is a block diagram illustrating the basic configuration of a computer.

[FIG. 3] FIG. 3 is a schematic view illustrating an example of the system of the present invention.

[FIG. 4] FIG. 4 is a flowchart illustrating an example of the processing of the present invention.

## DESCRIPTION OF EMBODIMENTS

**[0012]** In the following, embodiments for carrying out the present invention shall be described using drawings. The present invention is not limited to the embodiments described below, and may be appropriately modified from the embodiments below within a scope that would be obvious to a person skilled in the art.

**[0013]** FIG. 1 is block diagram related to a conversation analysis system. As shown in FIG. 1, the conversation analysis system 1 includes a voice analysis unit 3, a topic ascertaining unit 5, a topic-related correction term storage unit 7, and a conversation correction unit 9. Further, as shown in FIG. 1, the system 1 may also include a topic information extraction unit 11 and/or a topic-related term update unit 13. The system 1 may also include other elements beside those above as appropriate.

**[0014]** FIG. 2 is a block diagram illustrating the basic configuration of a computer. As shown in FIG. 2, the computer includes an input unit 31, an output unit 33, a control unit 35, a calculation unit 37, and a storage unit 39, and these elements are connected by a bus 41 or

the like so that information can be exchanged therebetween. For example, in the storage unit, a control program may be stored, and various types of information may also be stored. If a prescribed piece of information is input from the input unit, the control unit reads the control program stored in the storage unit. The control unit then reads, as appropriate, the information stored in the storage unit, and transmits the information to the calculation unit. The control unit also transmits, to the calculation unit, information that has been input as appropriate. The calculation unit performs a calculation process using the various pieces of received information, and stores the result in the storage unit. The control unit reads the calculation result that was stored in the storage unit, and the result is output from the output unit. In this way, various processes are executed. Each element explained below may correspond to one of the elements of the computer.

**[0015]** FIG. 3 is a schematic view illustrating an example of the system of the present invention. As shown in FIG. 3, the system of the present invention (a system comprising a device of the present invention) may include a mobile terminal 45 that is connected to an internet or intranet 43, and a server 47 that is connected to the internet or intranet 43. Of course, a single computer or mobile terminal can function as a device of the present invention, and there may be a plurality of servers.

**[0016]** The voice analysis unit 3 is an element for analyzing the content included in a conversation. The voice analysis unit 3 is an element for analyzing the content of a conversation.

**[0017]** FIG. 4 is a flowchart illustrating an example of the processing of the present invention. When a conversation occurs, voice recognition is carried out by a voice recognition unit of the system (voice recognition step: S101).

The conversation is input into the system 1 from the input unit 31 such as a microphone of the system 1. The conversation which is input is stored, as appropriate, in the storage unit 39 of the system 1. The conversation may be converted to digital information and then stored in the storage unit 39. The voice analysis unit 3 is an element for reading the conversation stored in the storage unit 39, and analyzing the words or conversation sentences

included in the conversation. Such a voice analysis unit (voice analysis system) is publicly known.

[0018] For example, consider a case in which a certain conversation is conducted between a doctor and a patient. The conversation is converted to digital information and stored in the storage unit. The voice analysis unit 3 reads the conversation information from the storage unit and analyzes the conversation information as shown below. First, voice information based on the following conversation is input from a microphone which serves as the input unit 31 of the system, and the voice information is stored by voice recognition in the storage unit 39 as shown below.

[0019] “As a result of examination, there is a strong possibility that the disease you are suffering from is fibromyalgia. Fibromyalgia is an illness accompanied by aches and pains that occur at multiple places throughout the body. I am going to prescribe you Lyrica, which is an ingestible medicine that alleviates pain caused by fibromyalgia. Please take it two times per day, after breakfast and after dinner.”

[0020] Next, the conversation that was voice-recognized is voice analyzed (voice analysis step: S102).

For example, voice information based on the above conversation is analyzed as shown below by the voice analysis unit 3, and stored as a voice-analyzed conversation in the storage unit 39.

[0021] Doctor: “As a result of examination, there is a strong possibility that the disease you are suffering from is fiber my algae. Fiber my algae is an illness accompanied by aches and planes that occur at multiple places throughout the body. I am going to prescribe you rear a car, which is an ingestible medicine which alleviates pain caused by fiber my algae. Please bake it two times per day, after breakfast and after dinner.”

[0022] Next, a topic related to the conversation is ascertained (topic ascertaining step: S103).

In this step, the topic ascertaining unit 5 ascertains the topic of the conversation. Therein, if the system 1 is being used by a doctor, topics in which the conversation content is

medically related, such as topics related to psychiatry if the doctor is a psychiatrist, can be input into the system 1 in advance. In such a case, information related to the topics that have been input may be stored in advance in the storage unit 39 of the system 1, and when a conversation between the doctor and a patient begins, such topic-related information may be read from the storage unit. Further, topics related to a patient suffering from pain and fibromyalgia may be input into the system 1 by, for example, a receptionist, a nurse, or a doctor on the basis of the patient's diagnosis chart or the like. The system 1 may also include the topic information extraction unit 11 to be explained below, so that the conversation topic can be automatically extracted from the conversation content. In addition, the conversation topic can be automatically extracted from the conversation content using the correction term candidates stored in the topic-related correction term storage unit 7 or terms corresponding to these correction term candidates. In this case, even if terms representing the correct topic are not analyzed by the voice analysis alone, the topic can be surmised by using the pre-correction terms of the correction term candidates, and thereby the correct topic can be extracted (or determined). In other words, if pronunciations to be voice-recognized or terms that are voice-recognized are pre-correction terms of the correction terms, the topic can be accurately extracted by surmising candidates of the correction terms.

**[0023]** The system 1 may also include a topic dictionary in the storage unit. The topic ascertaining unit 5 can ascertain the topic from the conversation by reading topic words stored in the topic dictionary, and performing matching to determine whether a topic word matches a term included in a conversation that was input by the microphone, etc. or a conversation that was analyzed by the voice analysis unit 3.

**[0024]** Next, candidates of correction terms related to the topic are read from the storage unit (correction term reading step: S104).

For example, if a receptionist of a medical institution inputs fibromyalgia into the system 1 within the medical institution, in a terminal 1 near a doctor, fibromyalgia is read as the topic from the storage unit. The topic-related correction term storage unit 7 stores, for each topic, pronunciations to be voice-recognized or terms that are voice-recognized, and

candidates of correction terms related to the pronunciations to be voice-recognized or the terms that are voice-recognized.

In this example, “fibromyalgia” is stored as a correction term candidate for “fiber my algae”, “pains” is stored as a correction term candidate for “planes”, and “Lyrica®” is stored as a correction term candidate for “rear a car”.

In this way, pronunciations to be voice-recognized or terms that are voice-recognized, and candidates of correction terms related to the pronunciations to be voice-recognized or the terms that are voice-recognized are read, for each topic, from the storage unit.

[0025] Next, the conversation correction unit 9 uses the conversation topic ascertained by the topic ascertaining unit 5 to read correction term candidates from the topic-related correction term storage unit 7 and correct the conversation analyzed by the voice analysis unit 3 (conversation correction step: S105).

[0026] In the above-described example, the conversation is corrected, for example, as shown below.

“As a result of examination, there is a strong possibility that the disease you are suffering from is fibromyalgia. Fibromyalgia is an illness accompanied by aches and pains that occur at multiple places throughout the body. I am going to prescribe you Lyrica®, which is an ingestible medicine which alleviates pain caused by fibromyalgia. Please take it two times per day, after breakfast and after dinner.”

For example, “rear a car” is a correct term, and thus it could not be corrected by a normal correction engine. However, since the topic of fibromyalgia has been ascertained as described above, the system 1 can make an appropriate correction.

[0027] A preferred example of the conversation analysis system further includes the topic information extraction unit 11 which extracts information related to the topic. An example of the topic information extraction unit 11 extracts, from a conversation, terms related to the topic. Another example of the topic information extraction unit 11 reads various data including topic words from various information sites that are connected via the internet,

etc. to the system 1, and extracts information (terms) related to the topic from the terms included in the data that was read. Examples of topic-related information include terms that are frequently used in materials or presentations related to the topic. For example, terms which are used in such materials are likely to be accurate terms. Therefore, the topic, which is a term stored in the storage unit, may be read and terms included in a material which includes terms related to the topic may also be read and then stored as information (terms) related to the topic. These terms can also be stored as correction term candidates in the topic-related correction term storage unit 7, or the terms which are already stored therein can be updated.

**[0028]** A preferred example of the conversation analysis system further includes the topic-related term update unit 13 for updating the topic-related correction term storage unit 7. The topic-related term update unit 13 uses information related to each topic input into the system to update the correction term candidates.

**[0029]** For example, the system 1 includes a machine learning program. The machine learning program may store terms that are used often in relation to a topic on the basis of various information and data that has been input into the system in relation to the topic, and then store these terms in the storage unit as correction term candidates. In this way, changes in terminology can be automatically handled, and appropriate correction terms can be automatically updated.

**[0030]** One invention described in the present specification relates to a program for a conversation analysis system. The program causes a computer to function as a voice analysis means, a topic-related correction term storage means, a topic ascertaining means, and a conversation correction means. These means correspond respectively to the units described above.

**[0031]** One invention described in the present specification relates to a computer-readable information recording medium that stores the above-described program. Examples of the information recording medium include a CD-ROM, a DVD, a floppy disk, a memory card, and a memory stick.

#### INDUSTRIAL APPLICABILITY

**[0032]** The present invention relates to a conversation analysis system, and thus can be utilized in information-related industries.

#### REFERENCE SIGNS LIST

**[0033]**

1: conversation analysis system

3: voice analysis unit

5: topic ascertaining unit

7: topic-related correction term storage unit

9: conversation correction unit

11: topic information extraction unit

13: topic-related term update unit

## CLAIMS

1. A conversation analysis system comprising:
  - a voice analysis unit (3) that analyzes content included in a conversation;
  - a topic ascertaining unit (5) for ascertaining a topic of the conversation;
  - a topic-related correction term storage unit (7) that stores, for each topic, pronunciations to be voice-recognized or terms that are voice-recognized, and candidates of correction terms related to the pronunciations to be voice-recognized or the terms that are voice-recognized; and
  - a conversation correction unit (9) for correcting the conversation analyzed by the voice analysis unit (3),
  - wherein the conversation correction unit (9) uses the topic of the conversation ascertained by the topic ascertaining unit (5) to read the correction term candidates from the topic-related correction term storage unit (7) and correct the conversation analyzed by the voice analysis unit (3),
  - wherein the system further comprises a topic information extraction unit (11),
  - wherein the topic information extraction unit (11) extracts, from a conversation related to a certain topic, topic information which consists of terms related to the certain topic, and extracts, from a material related to the certain topic, topic information which consists of terms related to the certain topic, and
  - wherein the topic ascertaining unit (5) uses topic-related information extracted by the topic information extraction unit (11) to ascertain the topic of the conversation on the basis of the conversation analyzed by the voice analysis unit (3), wherein the conversation related to the certain topic is voice information obtained when the voice analysis unit (3) analyzes a presentation related to the certain topic that is input into the system, and the material related to the certain topic includes a presentation material related to the certain topic that is input into the system.

2. The conversation analysis system according to claim 1, further comprising a topic-related term update unit (13) for updating the topic-related correction term storage unit (7),

wherein the topic-related term update unit (13) uses information related to each topic input into the system to update the correction term candidates.

3. A program for a conversation analysis system, the program causing a computer to function as:

a voice analysis means that analyzes content included in a conversation;

a topic-related correction term storage means that stores, for each topic, pronunciations to be voice-recognized or terms that are voice-recognized, and candidates of correction terms related to the pronunciations to be voice-recognized or the terms that are voice-recognized;

a topic ascertaining means for ascertaining a topic of the conversation;

a conversation correction means for correcting the conversation analyzed by the voice analysis means; and

a topic information extraction means,

wherein the topic information extraction means extracts, from a conversation related to a certain topic, topic information which consists of terms related to the certain topic, and extracts, from a material related to the certain topic, topic information which consists of terms related to the certain topic,

wherein the topic ascertaining means uses topic-related information extracted by the topic information extraction means to ascertain the topic of the conversation on the basis of the conversation analyzed by the voice analysis means,

wherein the conversation correction means uses the topic of the conversation ascertained by the topic ascertaining means to read the correction term candidates from the topic-related correction term storage means and correct the conversation analyzed by the voice analysis means, and

wherein the conversation related to the certain topic is voice information obtained when the voice analysis means analyzes a presentation related to the certain topic that is input into the computer, and the material related to the certain topic includes a presentation material related to the certain topic that is input into the computer.