

[DESCRIPTION]

[Title of Invention] COMMUNICATION ANALYSIS SYSTEM AND COMMUNICATION ANALYSIS METHOD

[Technical Field]

[0001]

The present invention relates to a communication analysis system and a communication analysis method.

[Background Art]

[0002]

In an organization such as a company, it is important for employees to communicate closely with each other and work on their own tasks. For example, Patent Literature (PTL) 1 discloses a communication evaluation system that determines and analyzes communication among people.

[Citation List]

[Patent Literature]

[0003]

[PTL 1] International Patent Publication No. 2019/155629

[Summary of Invention]

[Technical Problem]

[0004]

Embodiments of the present invention provide a communication analysis system and a communication analysis method that can help improve the quality of communication.

[Solution to Problem]

[0005]

According to a first aspect of the present invention, there is provided a communication analysis system including: a voice obtainer that obtains voice information in which conversations among a plurality of people during a target period are recorded; a video obtainer that obtains video information in which states of the plurality of people during the target period are recorded; an identifier; and a visualizer, wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifier identifies at least one of: (a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent; (b) a total number of people who participated in the question-and-answer session; (c) a tempo of the question-and-answer session; (d) a total number of question-and-answer sessions; (e) a ratio of speaking times of the plurality of people during the period of the question-and-answer

session; (f) the length of the silent period; or (g) a total number of overlapping periods of speech by the plurality of people, by performing, on the video information obtained, information processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifier identifies at least one of: (h) a length of a period during which a reporter among the plurality of people was watched by others; (i) a total number of times the plurality of people nodded; (j) a total number of times the plurality of people yawned; (k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off; (l) a length of a period during which the plurality of people were working; (m) a total number of times the plurality of people smiled; or (n) a length of a period during which the plurality of people were operating personal computers, the visualizer visualizes at least one of (a) to (g) identified and at least one of (h) to (n) identified, and when identifying at least one of (a) to (g), the identifier: defines, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time; defines, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and defines, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[0006]

According to a second aspect of the present invention, there is provided a communication analysis system including: a voice obtainer that obtains voice information in which conversations among a plurality of people during a target period are recorded; a video obtainer that obtains video information in which states of the plurality of people during the target period are recorded; an identifier; and a calculator, wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifier identifies at least one of: (a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent; (b) a total number of people who participated in the question-and-answer session; (c) a tempo of the question-and-answer session; (d) a total number of question-and-answer sessions; (e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session; (f) the length of the silent period; or (g) a total number of overlapping periods people of speech by the plurality of people, by performing, on the video information obtained, information

processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifier identifies at least one of: (h) a length of a period during which a reporter among the plurality of people was watched by others; (i) a total number of times the plurality of people nodded; (j) a total number of times the plurality of people yawned; (k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off; (l) a length of a period during which the plurality of people were working; (m) a total number of times the plurality of people smiled; or (n) a length of a period during which the plurality of people were operating personal computers, the calculator calculates a score indicating a quality of communication among the plurality of people during the target period based on at least one of (a) to (g) identified and at least one of (h) to (n) identified, and when identifying at least one of (a) to (g), the identifier: defines, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time; defines, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and defines, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[0007]

According to a third aspect of the present invention, there is provided a communication analysis method including: obtaining voice information in which conversations among a plurality of people during a target period are recorded; obtaining video information in which states of the plurality of people during the target period are recorded; identifying; and visualizing, wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifying includes at least one of: (a) a ratio of a length of a period of a presentation, a length of a silent period of a question-and-answer session, and a length of a period during which all the plurality of people were silent; (b) a total number of people who participated in the question-and-answer session; (c) a tempo of the question-and-answer session; (d) a total number of question-and-answer sessions; (e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session; (f) the length of the silent period; or (g) a total number of overlapping periods people of speech by the plurality of people, by performing, on the video information obtained, information processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifying includes at

least one of: (h) a length of a period during which a reporter among the plurality of people was watched by others; (i) a total number of times the plurality of people nodded; (j) a total number of times the plurality of people yawned; (k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off; (l) a length of a period during which the plurality of people were working; (m) a total number of times the plurality of people smiled; or (n) a length of a period during which the plurality of people were operating personal computers, the visualizing includes visualizing at least one of (a) to (g) identified and at least one of (h) to (n) identified, and identifying at least one of (a) to (g) includes: defining, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time; defining, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and defining, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[0008]

According to a fourth aspect of the present invention, there is provided a communication analysis method including: obtaining voice information in which conversations among a plurality of people during a target period are recorded; obtaining video information in which states of the plurality of people during the target period are recorded; identifying; and calculating, wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifying includes at least one of: (a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent; (b) a total number of people who participated in the question-and-answer session; (c) a tempo of the question-and-answer session; (d) a total number of question-and-answer sessions; (e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session; (f) the length of the silent period; or (g) a total number of overlapping periods of speech by the plurality of people, the identifying includes identifying, based on the video information obtained, at least one of: (h) a length of a period during which a reporter among the plurality of people was watched by others; (i) a total number of times the plurality of people nodded; (j) a total number of times the plurality of people yawned; (k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off; (l) a length of a period during which the plurality of people were working; (m) a total number of

times the plurality of people smiled; or (n) a length of a period during which the plurality of people were operating personal computers, the calculating includes calculating a score indicating a quality of communication among the plurality of people during the target period based on at least one of (a) to (g) identified and at least one of (h) to (n) identified, and identifying at least one of (a) to (g) includes: defining, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time; defining, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and defining, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[0009]

According to a fifth aspect of the present invention, there is provided a program for causing a computer to execute the communication analysis method.

[Advantageous Effects of Invention]

[0010]

The communication analysis system and communication analysis method according to embodiments of the present invention can help improve the quality of communication.

[Brief Description of Drawings]

[0011]

[FIG. 1]

FIG. 1 is a diagram showing a schematic configuration of a communication analysis system according to an embodiment.

[FIG. 2]

FIG. 2 is a block diagram showing a functional configuration of the communication analysis system according to the embodiment.

[FIG. 3]

FIG. 3 is a flow chart of the operation of identifying parameters related to the quality of communication.

[FIG. 4]

FIG. 4 is a diagram showing an example of the division of the target period.

[FIG. 5A]

FIG. 5A is a first diagram showing parameters that can be identified based on voice information among parameters related to the quality of communication.

[CLAIMS]

[Claim 1]

A communication analysis system comprising:

a voice obtainer that obtains voice information in which conversations among a plurality of people during a target period are recorded;

a video obtainer that obtains video information in which states of the plurality of people during the target period are recorded;

an identifier; and

a visualizer,

wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifier identifies at least one of:

(a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent;

(b) a total number of people who participated in the question-and-answer session;

(c) a tempo of the question-and-answer session;

(d) a total number of question-and-answer sessions;

(e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session;

(f) the length of the silent period; or

(g) a total number of overlapping periods of speech by the plurality of people,

by performing, on the video information obtained, information processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifier identifies at least one of:

(h) a length of a period during which a reporter among the plurality of people was watched by others;

(i) a total number of times the plurality of people nodded;

(j) a total number of times the plurality of people

yawned;

(k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off;

(l) a length of a period during which the plurality of people were working;

(m) a total number of times the plurality of people smiled; or

(n) a length of a period during which the plurality of people were operating personal computers,

the visualizer visualizes at least one of (a) to (g) identified and at least one of (h) to (n) identified, and

when identifying at least one of (a) to (g), the identifier:

defines, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time;

defines, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and

defines, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[Claim 2]

The communication analysis system according to claim 1, further comprising:

a calculator that calculates a score indicating a quality of communication among the plurality of people during the target period based on at least one of (a) to (g) identified and at least one of (h) to (n) identified,

wherein the visualizer further visualizes the score calculated.

[Claim 3]

A communication analysis system comprising:

a voice obtainer that obtains voice information in which conversations among a plurality of people during a target period are

recorded;

a video obtainer that obtains video information in which states of the plurality of people during the target period are recorded;

an identifier; and

a calculator,

wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifier identifies at least one of:

(a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent;

(b) a total number of people who participated in the question-and-answer session;

(c) a tempo of the question-and-answer session;

(d) a total number of question-and-answer sessions;

(e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session;

(f) the length of the silent period; or

(g) a total number of overlapping periods people of speech by the plurality of people,

by performing, on the video information obtained, information processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifier identifies at least one of:

(h) a length of a period during which a reporter among the plurality of people was watched by others;

(i) a total number of times the plurality of people nodded;

(j) a total number of times the plurality of people yawned;

(k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off;

(l) a length of a period during which the plurality of

people were working;

(m) a total number of times the plurality of people smiled; or

(n) a length of a period during which the plurality of people were operating personal computers,

the calculator calculates a score indicating a quality of communication among the plurality of people during the target period based on at least one of (a) to (g) identified and at least one of (h) to (n) identified, and

when identifying at least one of (a) to (g), the identifier:

defines, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time;

defines, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and

defines, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[Claim 4]

The communication analysis system according to claim 2 or 3, further comprising:

a controller that controls an environment of a space where the plurality of people are positioned based on the score calculated.

[Claim 5]

The communication analysis system according to any one of claims 1 to 4, further comprising:

a controller that identifies (e) based on the voice information obtained, and controls an environment around a person whose speaking time is determined to be relatively long among the plurality of people based on (e) identified.

[Claim 6]

The communication analysis system according to any one of

claims 1 to 5, further comprising:

a controller that identifies (e) based on the voice information obtained, and controls an environment around a person whose speaking time is determined to be relatively short among the plurality of people based on (e) identified.

[Claim 7]

The communication analysis system according to any one of claims 1 to 6, further comprising:

a controller that identifies (k) based on the video information obtained, and controls an environment around a person who is dozing off among the plurality of people based on (k) identified.

[Claim 8]

The communication analysis system according to any one of claims 1 to 7, further comprising:

a controller that identifies (l) based on the video information obtained, and controls an environment around a person who is working among the plurality of people based on (l) identified.

[Claim 9]

The communication analysis system according to any one of claims 1 to 8,

wherein the voice obtainer obtains the voice information output by a voice collecting device provided in a space where the plurality of people are positioned, and

the video obtainer obtains the video information output by a photographing device provided in the space where the plurality of people are positioned.

[Claim 10]

The communication analysis system according to any one of claims 1 to 8,

wherein the plurality of people are positioned in a plurality of spaces different from one another, the plurality of spaces each

accommodating at least one person,

a voice collecting device and a photographing device are provided in each of the plurality of spaces,

the voice obtainer obtains the voice information output by each of the voice collecting devices, and

the video obtainer obtains the video information output by each of the photographing devices.

[Claim 11]

The communication analysis system according to any one of claims 1 to 10,

wherein the identifier identifies (a), (d), (e), (g), (h), (i), (m), and (n).

[Claim 12]

The communication analysis system according to any one of claims 1 to 10,

wherein the identifier identifies (e), (f), (g), (h), (i), and (m).

[Claim 13]

The communication analysis system according to any one of claims 1 to 10,

wherein the identifier identifies (e) or (m) and further identifies who each of the plurality of people are based on at least one of the voice information or the video information.

[Claim 14]

A communication analysis method comprising:

obtaining voice information in which conversations among a plurality of people during a target period are recorded;

obtaining video information in which states of the plurality of people during the target period are recorded;

identifying; and

visualizing,

wherein by performing, on the voice information obtained,

information processing for identifying a speaker and a speaking period of the speaker, the identifying includes at least one of:

(a) a ratio of a length of a period of a presentation, a length of a silent period of a question-and-answer session, and a length of a period during which all the plurality of people were silent;

(b) a total number of people who participated in the question-and-answer session;

(c) a tempo of the question-and-answer session;

(d) a total number of question-and-answer sessions;

(e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session;

(f) the length of the silent period; or

(g) a total number of overlapping periods people of speech by the plurality of people,

by performing, on the video information obtained, information processing including processing for extracting a person, processing for detecting a line-of-sight of the person, and processing for identifying a behavior of the person, the identifying includes at least one of:

(h) a length of a period during which a reporter among the plurality of people was watched by others;

(i) a total number of times the plurality of people nodded;

(j) a total number of times the plurality of people yawned;

(k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off;

(l) a length of a period during which the plurality of people were working;

(m) a total number of times the plurality of people smiled; or

(n) a length of a period during which the plurality of people were operating personal computers,

the visualizing includes visualizing at least one of (a) to (g)

identified and at least one of (h) to (n) identified, and

identifying at least one of (a) to (g) includes:

defining, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time;

defining, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and

defining, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[Claim 15]

A communication analysis method comprising:

obtaining voice information in which conversations among a plurality of people during a target period are recorded;

obtaining video information in which states of the plurality of people during the target period are recorded;

identifying; and

calculating,

wherein by performing, on the voice information obtained, information processing for identifying a speaker and a speaking period of the speaker, the identifying includes at least one of:

(a) a ratio of a length of a period of a presentation, a length of a period of a question-and-answer session, and a length of a silent period during which all the plurality of people were silent;

(b) a total number of people who participated in the question-and-answer session;

(c) a tempo of the question-and-answer session;

(d) a total number of question-and-answer sessions;

(e) a ratio of speaking times of the plurality of people during the period of the question-and-answer session;

(f) the length of the silent period; or

(g) a total number of overlapping periods of speech by the plurality of people,

the identifying includes identifying, based on the video

information obtained, at least one of:

(h) a length of a period during which a reporter among the plurality of people was watched by others;

(i) a total number of times the plurality of people nodded;

(j) a total number of times the plurality of people yawned;

(k) a total number of times the plurality of people dozed off or a length of a period during which the plurality of people dozed off;

(l) a length of a period during which the plurality of people were working;

(m) a total number of times the plurality of people smiled; or

(n) a length of a period during which the plurality of people were operating personal computers,

the calculating includes calculating a score indicating a quality of communication among the plurality of people during the target period based on at least one of (a) to (g) identified and at least one of (h) to (n) identified, and

identifying at least one of (a) to (g) includes:

defining, as the silent period, a period during which none of the plurality of people spoke for at least a first predetermined time;

defining, as the period of the presentation, a period during which one of the plurality of people spoke continuously for at least a second predetermined time; and

defining, as the period of the question-and-answer session, a period obtained by removing the silent period and the period of the presentation from the target period.

[Claim 16]

A program for causing a computer to execute the communication analysis method according to claim 14 or 15.