[DESCRIPTION]

[Title of Invention]

RELATIONSHIP EXTRACTING APPARATUS, RELATIONSHIP EXTRACTING METHOD, AND STORAGE MEDIUM

[Technical Field]

[0001]

The present disclosure generally relates to relationship extracting apparatus, relationship extracting method, and storage medium.

[Background Art]

[0002]

There are techniques to provide information on an event of interest. PTL1 discloses a technique to detect a significant scene that is a part of an event from source video, and extract a key frame for the scene.

[Citation List]

[Patent Literature]

[0003]

[PTL1] International Patent Publication No. WO 2001/033863

[Summary of Invention]

[Technical Problem]

[0004]

The key frame provided by PTL1 represents a part of the event. Thus, PTL1 does not provide information that is not included in the event. Embodiments of the present disclosure are to provide a novel technique to provide information relevant to an event of interest.

[Solution to Problem]

[0005]

According to a first aspect of the present disclosure, there is provided a relationship extracting apparatus including: at least one memory that is configured to store instructions; and at least one processor. The at least one processor is configured to execute the instructions to: acquire event information that indicates one or more features of an event of interest; determine target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and extract, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken during the target duration, wherein the object relationship information indicates two or more pieces of the action-related relationship information

in association with time at which or during which the action indicated by action-related relationship information was taken.

[0006]

According to a second aspect of the present disclosure, there is provided a relationship extracting method including: acquiring event information that indicates one or more features of an event of interest; determining target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and extracting, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken during the target duration wherein the objection relationship information indicates two or more pieces of the action-related relationship in association with time at which or during which the action indicated by the action-related relationship information was taken.

[0007]

According to a third aspect of the present disclosure, there is provided a storage medium storing a program that causes a computer to execute: acquiring event information that indicates one or more features of an event of interest; determining target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and extracting, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken that exist during the target duration, wherein the object relationship information indicates two or more pieces of the action-related relationship information between objects in association with time at which or during which the action indicated by the action-related relationship information was taken.

[Advantageous Effects of Invention]

[0008]

Embodiments of the present disclosure present a novel technique to provide information relevant to an event of interest.

[Brief Description of Drawings]

[0009]

[Fig. 1]

Fig. 1 illustrates an overview of a relationship extracting apparatus.

[Fig. 2]

Fig. 2 is a block diagram illustrating an example of the functional configuration of the relationship extracting apparatus.

[Fig. 3]

Fig. 3 is a block diagram illustrating an example of the hardware configuration of a computer realizing the relationship extracting apparatus.

[Fig. 4]

Fig. 4 is a flowchart illustrating an example flow of processing performed by the relationship extracting apparatus.

[CLAIMS]

[Claim 1]

A relationship extracting apparatus comprising:

at least one memory that is configured to store instructions; and

at least one processor that is configured to execute the instructions to:

acquire event information that indicates one or more features of an event of interest;

determine target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and

extract, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken during the target duration,

wherein the object relationship information indicates two or more pieces of the action-related relationship information in association with time at which or during which the action indicated by the action-related relationship information was taken.

[Claim 2]

The relationship extracting apparatus according to Claim 1,

wherein the one or more features of the event of interest include a type of the event of interest and the event time, and

wherein the determination of the target duration includes:

determining a start time of the target duration by determining a length of time from the start time of the target duration to the event time based on the type of the event of interest; and

determining an end time of the target duration by determining a length of time from the event time to the end time of the target duration based on the type of the event of interest.

[Claim 3]

The relationship extracting apparatus according to Claim 2,

wherein the determination of the target duration includes:

acquiring duration information that indicates, for each one of two or more types of event, associations between the type of the event and a length of duration; and

determining the start time of the target duration and the end time of the target duration based on the length of duration indicated by the duration information in association with the type of the event of interest.

[Claim 4]

The relationship extracting apparatus according to Claim 3,

wherein the determination of the target duration includes:

acquiring an adjustment factor that is a positive real value; and

adjusting the length of time from the start of the target period to the event time, the length of time from the event time to the end of the target period, or both based on the adjustment factor.

[Claim 5]

The relationship extracting apparatus according to Claim 4,

wherein the adjustment factor is determined by a parameter representing how ambiguous the event of interest is for a user, how important the event of interest is for a user, or how curious the user is about the event of interest.

[Claim 6]

The relationship extracting apparatus according to any one of Claims 1 to 5,

wherein the extraction of the action-related relationships includes extracting, from the object relationship information, one or more action-related relationships that exist during the target duration and that involve an object relevant to the event of interest.

[Claim 7]

The relationship extracting apparatus according to any one of Claims 1 to 6,

wherein the object relationship information is generated by detecting each one of the action-related relationships from one or more video frames, and

wherein the at least one processor is configured to execute the instructions further to:

output output information that includes, for each one of the extracted action-related relationships, one or more video frames from which the extracted action-related relationship is detected.

[Claim 8]

The relationship extracting apparatus according to Claim 7,

wherein the output information includes, for each one of the extracted action-related relationships, a specific number of one or more video frames from which the extracted action-related relationship is detected.

[Claim 9]

A relationship extracting method comprising:

acquiring event information that indicates one or more features of an event of interest;

determining target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and

extracting, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken during the target duration

wherein the objection relationship information indicates two or more pieces of the action-related relationship information in association with time at which or during which the action indicated by the action-related relationship information was taken.

[Claim 10]

The relationship extracting method according to Claim 9,

wherein the one or more features of the event of interest include a type of the event of interest and the event time, and

wherein the determination of the target duration includes:

determining a start time of the target duration by determining a length of time from the start time of the target duration to the event time based on the type of the event of interest; and

determining an end time of the target duration by determining a length of time from the event time to the end time of the target duration based on the type of the event of interest.

[Claim 11]

The relationship extracting method according to Claim 10,

wherein the determination of the target duration includes:

acquiring duration information that indicates, for each one of two or more types of event, associations between the type of the event and a length of duration; and

determining the start time of the target duration and the end time of the target duration based on the length of duration indicated by the duration information in association with the type of the event of interest.

[Claim 12]

The relationship extracting method according to Claim 11,

wherein the determination of the target duration includes:

acquiring an adjustment factor that is a positive real value; and

adjusting the length of time from the start of the target period to the event time, the length of time from the event time to the end of the target period, or both based on the adjustment factor.

[Claim 13]

The relationship extracting method according to Claim 12,

wherein the adjustment factor is determined by a parameter representing how ambiguous the event of interest is for a user, how important the event of interest is for a user, or how curious the user is about the event of interest.

[Claim 14]

The relationship extracting method according to any one of Claims 9 to 13,

wherein the extraction of the action-related relationships includes extracting, from the object relationship information, one or more action-related relationships that exist during the target duration and that involve an object relevant to the event of interest.

[Claim 15]

A non-transitory computer-readable storage medium storing a program that causes a computer to execute:

acquiring event information that indicates one or more features of an event of interest;

determining target duration based on the one or more features of the event of interest, the target duration including, as a part thereof, an event time at which or during which the event of interest occurs; and

extracting, from objection relationship information, one or more pieces of action-related relationship information that indicates an action taken during the target duration,

wherein the object relationship information indicates two or more pieces of the action-related relationship information in association with time at which or during which the action indicated by the action-related relationship information was taken.

[Claim 16]

The storage medium according to Claim 15,

wherein the one or more features of the event of interest include a type of the event of interest and the event time, and

wherein the determination of the target duration includes:

determining a start time of the target duration by determining a length of time from the start time of the target duration to the event time based on the type of the event of interest; and

determining an end time of the target duration by determining a length of time from the event time to the end time of the target duration based on the type of the event of interest.

[Claim 17]

The storage medium according to Claim 16,

wherein the determination of the target duration includes:

acquiring duration information that indicates, for each one of two or more types of event, associations between the type of the event and a length of duration; and

determining the start time of the target duration and the end time of the target duration based on the length of duration indicated by the duration information in association with the type of the event of interest.

[Claim 18]

The storage medium according to Claim 17,

wherein the determination of the target duration includes:

acquiring an adjustment factor that is a positive real value; and

adjusting the length of time from the start of the target period to the event time, the length of time from the event time to the end of the target period, or both based on the adjustment factor.

[Claim 19]

The storage medium according to Claim 18,

wherein the adjustment factor is determined by a parameter representing how ambiguous the event of interest is for a user, how important the event of interest is for a user, or how curious the user is about the event of interest.