disclosure may be an aspect arrived at based on a viewpoint that is different from that described above, an aspect that achieves an a result that is different from that described above, or an aspect that enables obtaining an effect that is different from those described above.

[Solution to Problem]

[0009]

An acoustic processing device according to a first aspect understood based on the present disclosure includes a circuit and a memory, wherein using the memory, the circuit: obtains sound space information on a sound space; obtains, based on the sound space information, a sound volume ratio between a sound volume of a direct sound and a sound volume of a reflected sound, the direct sound being generated from a sound source in the sound space, the reflected sound being generated in the sound space in response to the direct sound; obtains information on additional processing; and controls whether to select the reflected sound, based on the information on the additional processing and the sound volume ratio.

[0009a]

According to a second aspect of the present disclosure, there is provided an acoustic processing device including: a circuit; and a memory, wherein using the memory, the circuit: obtains sound space information on a sound space; determines whether a sound source in the sound space is a point sound source, based on the sound space information; when the sound source is determined to be the point sound source, (i) obtains, based on the sound space information, a sound volume ratio between a sound volume of a direct sound and a sound volume of a reflected sound, the direct sound being generated from the sound source, the reflected sound being generated in the sound space in response to the direct sound, (ii) calculates, based on the sound space information, a time difference between an arrival time of the direct sound and an arrival time of the reflected sound, and (iii) controls whether to select the reflected sound, based on the

sound volume ratio and the time difference; and when the sound source is determined not to be the point sound source, selects the reflected sound regardless of the sound volume ratio and the time difference.

[0009b]

According to a third aspect of the present disclosure, there is provided a threshold value identifying device including: a circuit; and a memory, wherein using the memory, the circuit: obtains a time difference between an arrival time of a leading sound and an arrival time of a lagging sound generated in response to the leading sound; and identifies a threshold value of a sound volume ratio of a sound volume of the lagging sound to a sound volume of the leading sound, based on the time difference, and outputs the threshold value, the threshold value corresponding to a boundary as to whether the lagging sound is impacted by a precedence effect produced by the leading sound, in identifying the threshold value, on a boundary line in a region including a first axis of the time difference and a second axis of the sound volume ratio, the sound volume ratio corresponding to the time difference is identified as the threshold value, the boundary line being defined as a line indicating the boundary, and a domain of the boundary line on the first axis is a time range in which the precedence effect occurs.

[0009c]

According to a fourth aspect of the present disclosure, there is provided an acoustic processing method including: obtaining sound space information on a sound space; obtaining, based on the sound space information, a sound volume ratio between a sound volume of a direct sound and a sound volume of a reflected sound, the direct sound being generated from a sound source in the sound space, the reflected sound being generated in the sound space in response to the direct sound; obtaining information on additional processing; and controlling whether to select the reflected sound, based on the information on the additional processing and the sound volume ratio.

[0009d]

According to a fifth aspect of the present disclosure, there is provided a program for causing a computer to execute the above acoustic processing method.

[0010]

Note that these comprehensive or specific aspects may be implemented as a system, a device, a method, an integrated circuit, a computer program, or a non-transitory computer-readable recording medium such as a CD-ROM, or may be implemented as any combination of these.

[Advantageous Effects of Invention]

[0011]

For example, one aspect of the present disclosure may make it possible to provide processing that assigns new acoustic effects, a reduction in the amount of processing performed for acoustic processing, an improvement in the audio quality obtained by acoustic processing, a reduction in the amount of data for information used in performing acoustic processing, simplification of the acquisition or generation of information used in performing acoustic processing, or the like. Alternatively, one aspect of the present disclosure may make it possible to provide any combination of these. Consequently, one aspect of the present disclosure enables contributing to improving the acoustic experience of a listener by providing acoustic processing adapted to the listener's usage environment.

[0012]

In particular, the above-described effects can be obtained in apparatuses and services that allow a listener to freely move within a virtual space. However, the above-described effects are merely examples of the effects of various aspects that are understood based on the present disclosure. Each of one or more aspects identified based on the present disclosure may be an aspect arrived at based on a viewpoint that is different from that described above, an aspect

that achieves a result that is different from that described above, or an aspect that enables an effect different from those described above to be obtained.

[Brief Description of Drawings]

[0013]

[FIG. 1]

FIG. 1 is a diagram for illustrating a first example of a direct sound and reflected sounds generated in a sound space.

[FIG. 2]

FIG. 2 is a diagram for illustrating a three-dimensional sound reproduction system according to an embodiment.

[FIG. 3A]

FIG. 3A is a block diagram for illustrating a configuration example of an encoding device according to an embodiment.

[FIG. 3B]

FIG. 3B is a block diagram for illustrating a configuration example of a decoding device according to an embodiment.

[FIG. 3C]

FIG. 3C is a block diagram for illustrating another configuration example of an encoding device according to an embodiment.

[FIG. 3D]

FIG. 3D is a block diagram for illustrating another configuration example of a decoding device according to an embodiment.

[FIG. 4A]