Claims

[Claim 1]

A monitoring device comprising:

an acceleration acquisition unit that acquires acceleration data of a vehicle traveling along a track;

an acceleration effective value acquisition unit that acquires a plurality of acceleration effective values obtained by applying a bandpass filter for each of a plurality of constant ratio bandwidths to the acceleration data;

a corrected acceleration calculation unit that calculates corrected acceleration based on each acceleration effective value of each of the constant ratio bandwidths and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths; and

an abnormality detection unit that detects abnormality in the vehicle or the track based on magnitude of the corrected acceleration,

wherein the track is divided into a plurality of sections, and

the abnormality detection unit detects abnormality in the vehicle or the track based on the magnitude of the corrected acceleration for each section.

[Claim 2]

The monitoring device according to claim 1,

wherein each correction coefficient is defined to be suitable for evaluating comfort or vehicle sickness of a person in the vehicle.

[Claim 3]

The monitoring device according to claim 1 or 2,

wherein the acceleration acquisition unit acquires the acceleration data for each of three-axis components,

the acceleration effective value acquisition unit acquires, for each of the three-axis components, a plurality of the acceleration effective values obtained by applying the bandpass filter for each of the constant ratio bandwidths to the acceleration data of the three-axis components, and

the corrected acceleration calculation unit calculates the corrected acceleration as a composite value of the three-axis components based on each acceleration effective value of each constant ratio bandwidth for each of the three-axis components, each correction coefficient determined in advance corresponding to each constant ratio bandwidth, and a directional magnification for each of the three-axis components.

[Claim 4]

The monitoring device according to claim 1 or 2,

wherein the acceleration acquisition unit acquires the acceleration data for each of three-axis components,

the acceleration effective value acquisition unit acquires, for each of the three-axis components, a plurality of the acceleration effective values obtained by applying the bandpass filter for each of the constant ratio bandwidths to the acceleration data of the three-axis components,

the corrected acceleration calculation unit calculates the corrected acceleration for each of the three-axis components based on each acceleration effective value of each of the constant ratio bandwidths for each of the three-axis components and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths, and

the abnormality detection unit detects abnormality in the vehicle or the track for each of the three-axis components based on the magnitude of the corrected acceleration.

[Claim 5]

The monitoring device according to any one of claims 1 to 4,

wherein the abnormality detection unit detects abnormality in the vehicle or the track based on the magnitude of the corrected acceleration based on the acceleration data acquired in a case where a speed of the vehicle is within a predetermined speed range.

[Claim 6]

A monitoring device comprising:

an acceleration acquisition unit that acquires acceleration data of a vehicle traveling along a track;

an acceleration effective value acquisition unit that acquires a plurality of acceleration effective values obtained by applying a bandpass filter for each of a plurality of constant ratio bandwidths to the acceleration data;

a corrected acceleration calculation unit that calculates corrected acceleration based on each acceleration effective value of each of the constant ratio bandwidths and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths; and

an abnormality detection unit that detects abnormality in the vehicle or the track based on magnitude of the corrected acceleration,

wherein the corrected acceleration calculation unit calculates each piece of corrected acceleration for each type based on each of the acceleration effective values of one or a plurality of constant ratio bandwidths of a plurality of types and each of the correction coefficients determined in advance corresponding to each of the constant ratio bandwidths, and

the abnormality detection unit detects abnormality in the vehicle or the track based on the magnitude of each piece of corrected acceleration for each type.

[Claim 7]

A monitoring device comprising:

an acceleration acquisition unit that acquires acceleration data of a vehicle traveling along a track;

an acceleration effective value acquisition unit that acquires a plurality of acceleration effective values obtained by applying a bandpass filter for each of a plurality of constant ratio bandwidths to the acceleration data;

a corrected acceleration calculation unit that calculates corrected acceleration based on each acceleration effective value of each of the constant ratio bandwidths and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths; and

an abnormality detection unit that detects abnormality in the vehicle or the track based on magnitude of the corrected acceleration,

wherein the abnormality detection unit detects abnormality in the vehicle or the track based on a Mahalanobis distance from a unit space having a plurality of pieces of corrected acceleration calculated in the past as one parameter.

[Claim 8]

A monitoring method comprising:

a step of acquiring acceleration data of a vehicle traveling along a track;

a step of acquiring a plurality of acceleration effective values obtained by applying a bandpass filter for each of a plurality of constant ratio bandwidths to the acceleration data;

a step of calculating corrected acceleration based on each acceleration effective value of each of the constant ratio bandwidths and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths; and

a step of detecting abnormality in the vehicle or the track based on magnitude of the corrected acceleration,

wherein the track is divided into a plurality of sections, and

wherein, in the step of detecting abnormality, detecting abnormality in the vehicle or the track based on the magnitude of the corrected acceleration for each section.

[Claim 9]

A program causing a computer to execute:

a step of acquiring acceleration data of a vehicle traveling along a track;

a step of acquiring a plurality of acceleration effective values obtained by applying a bandpass filter for each of a plurality of constant ratio bandwidths to the acceleration data;

a step of calculating corrected acceleration based on each acceleration effective value of each of the constant ratio bandwidths and each correction coefficient determined in advance corresponding to each of the constant ratio bandwidths; and

a step of detecting abnormality in the vehicle or the track based on magnitude of the corrected acceleration,

wherein the track is divided into a plurality of sections, and

wherein, in the step of detecting abnormality, detecting in the vehicle or the track based on the magnitude of the corrected acceleration for each section.