CLAIMS

[Claim 1]

A portable terminal comprising:

acceleration measuring means for measuring acceleration of the portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis on the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value.

[Claim 2]

The portable terminal according to Claim 1,

wherein the specifying means specifies the material of the object on the basis of the first feature value and the second feature value being calculated by the calculating means using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.

[Claim 3]

The portable terminal according to Claim 1 or 2,

wherein the first feature value includes amplitudes of acceleration measured by the acceleration measuring means for a first direction and a second direction in the in-plane directions, and

the second feature value includes an amplitude of acceleration measured by the acceleration measuring means for the out-of-plane direction.

[Claim 4]

The portable terminal according to any one of Claims 1 to 3,

wherein the portable terminal comprises vibration generating means for vibrating the portable terminal,

the calculating means calculates a coefficient of kinetic friction between the portable terminal and the object on the basis of force caused by the vibration

generating means in the in-plane directions, acceleration measured by the acceleration measuring means in the in-plane directions, and a mass of the portable terminal, and

the first feature value includes the coefficient of kinetic friction.

[Claim 5]

The portable terminal according to any one of Claims 1 to 3,

wherein the calculating means calculates a coefficient of restitution between the portable terminal and the object on the basis of a speed in the out-of-plane direction before the portable terminal collides with the object and a speed in the out-of-plane direction after the portable terminal collides with the object, the speeds before and after the portable terminal collides with the object being calculated on the basis of the acceleration measured by the acceleration measuring means, and

the second feature value includes the coefficient of restitution.

[Claim 6]

A portable-terminal condition determining system comprising:

a portable terminal including acceleration measuring means for measuring acceleration;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value.

[Claim 7]

A program causing a computer to function as:

acceleration measuring means for measuring acceleration in a portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value.

[Claim 8]

A computer-readable storage medium characterized by storing a program causing a computer to execute functions serving as:

acceleration measuring means for measuring acceleration in a portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value.

[Claim 9]

A portable-terminal condition determining method characterized by comprising:

measuring acceleration in a portable terminal;

calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying a material of the object on the basis of the first feature value and the second feature value.

Claims

[Claim 1]

A portable terminal comprising:

acceleration measuring means for measuring acceleration of the portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis on the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the specifying means specifies the material of the object on the basis of the first feature value and the second feature value being calculated by the calculating means using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.

[Claim 2]

The portable terminal according to Claim 1,

wherein the first feature value includes amplitudes of acceleration measured by the acceleration measuring means for a first direction and a second direction in the in-plane directions, and

the second feature value includes an amplitude of acceleration measured by the acceleration measuring means for the out-of-plane direction.

[Claim 3]

A portable terminal comprising:

acceleration measuring means for measuring acceleration of the portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis on the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the portable terminal comprises vibration generating means for vibrating the portable terminal,

the calculating means calculates a coefficient of kinetic friction between the portable terminal and the object on the basis of force caused by the vibration generating means in the in-plane directions, acceleration measured by the acceleration measuring means in the in-plane directions, and a mass of the portable terminal, and

the first feature value includes the coefficient of kinetic friction.

[Claim 4]

A portable terminal comprising:

acceleration measuring means for measuring acceleration of the portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis on the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the calculating means calculates a coefficient of restitution between the portable terminal and the object on the basis of a speed in the out-of-plane direction before the portable terminal collides with the object and a speed in the out-of-plane direction after the portable terminal collides with the object, the speeds before and after the portable terminal collides with the object being calculated on the basis of the acceleration measured by the acceleration measuring means, and

the second feature value includes the coefficient of restitution.

[Claim 5]

A portable-terminal condition determining system comprising:

a portable terminal including acceleration measuring means for measuring acceleration;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the specifying means specifies the material of the object on the basis of the first feature value and the second feature value being calculated by the calculating means using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.

[Claim 6]

A program causing a computer to function as:

acceleration measuring means for measuring acceleration in a portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the specifying means specifies the material of the object on the basis of the first feature value and the second feature value being calculated by the calculating means using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.

[Claim 7]

A computer-readable storage medium characterized by storing a program causing a computer to execute functions serving as:

acceleration measuring means for measuring acceleration in a portable terminal;

calculating means for calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured by the acceleration measuring means in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying means for specifying a material of the object on the basis of the first feature value and the second feature value,

wherein the specifying means specifies the material of the object on the basis of the first feature value and the second feature value being calculated by the calculating means using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.

[Claim 8]

A portable-terminal condition determining method characterized by comprising:

measuring acceleration in a portable terminal;

calculating a first feature value for in-plane directions in which the portable terminal is in contact with an object and a second feature value for an out-of-plane direction on the basis of the acceleration measured in a state in which the portable terminal is put on the object, when the portable terminal is vibrated; and

specifying a material of the object on the basis of the first feature value and the second feature value being calculated using memory means storing a range of the first feature value and a range of the second feature value for each of one or more materials in such a manner that the range of the first feature value and the range of the second feature value are associated with each other.