[CLAIMS]

What is claimed is:

[Claim 1]

A traffic information processing device comprising:

a position information calculating unit configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

a first transit point passage determining unit configured to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

a transit point type determining unit configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point; and

a first transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point.

[Claim 2]

The traffic information processing device according to claim 1, further comprising:

a traveling route specifying unit configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined

traveling routes of the vehicle and which the vehicle is estimated to passes through, when the vehicle is determined to have passed the transit point and the transit point is determined to be the defined point; and

a billing amount calculating unit configured to calculate a billing amount of the defined traveling route.

[Claim 3]

The traffic information processing device according to claim 2, further comprising:

a second transit point passage determining unit configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

a second transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 4]

The traffic information processing device according to claim 3, further comprising a traveling route type determining unit configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 5]

The traffic information processing device according to claim 3 or 4, wherein the

second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 6]

The traffic information processing device according to any one of claims 3 to 5, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 7]

The traffic information processing device according to any one of claims 2 to 6, further comprising a speed calculating unit configured to calculate a speed of the vehicle

based on a time each point of a plurality of points in the defined traveling route is passed in the defined traveling route outputted from the traveling route specifying unit and distances between each of the plurality of points.

[Claim 8]

The traffic information processing device according to any one of claims 1 to 7, further comprising a traffic information output unit configured to acquire the identification information of the current traveling route specified based on the current position and to read and output traffic information corresponding to the identification information of the current traveling route.

[Claim 9]

The traffic information processing device according to any one of claims 1 to 8, further comprising a current position output unit configured to output the current position which is calculated by the position information calculating unit.

[Claim 10]

A processing method of a traffic information processing device comprising:

causing a position information calculating unit to calculate a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

causing a first transit point passage determining unit to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

causing a transit point type determining unit to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point; and

causing a first transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point.

[Claim 11]

The processing method according to claim 10, further comprising:

causing a traveling route specifying unit to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the vehicle is estimated to have passed through, when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point; and

causing a billing amount calculating unit to calculate a billing amount of the defined traveling route.

[Claim 12]

The processing method according to claim 11, further comprising:

causing a second transit point passage determining unit to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

causing a second transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 13]

The processing method according to claim 12, further comprising causing a traveling route type determining unit to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 14]

The processing method according to claim 12 or 13, wherein the second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 15]

The processing method according to any one of claims 12 to 14, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the

position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 16]

A program causing a computer of a traffic information processing device to serve as:

position information calculating means configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

first transit point passage determining means configured to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

transit point type determining means configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point; and

first transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point.

[Claim 17]

The program according to claim 16, further causing the computer of the traffic

information processing device to serve as:

traveling route specifying means configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the vehicle is estimated to have passed through, when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point; and

billing amount calculating means configured to calculate a billing amount of the defined traveling route.

[Claim 18]

The program according to claim 17, further causing the computer of the traffic information processing device to serve as:

second transit point passage determining means configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying means when the transit point type determining means determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

second transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining means.

[Claim 19]

The program according to claim 18, further causing the computer of the traffic information processing device to serve as traveling route type determining means configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating means calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 20]

The program according to claim 18 or 19, wherein the second transit point passage determining means instructs the billing amount calculating means to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 21]

The program according to any one of claims 18 to 20, wherein each of the first transit point passage determining means and the second transit point passage determining means acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality

of traveling routes.

[CLAIMS]

What is claimed is:

[Claim 1] (Amended)

A traffic information processing device comprising:

a position information calculating unit configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

a first transit point passage determining unit configured to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

a transit point type determining unit configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle passes the transit point;

a first transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point;

a traveling route specifying unit configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the vehicle is estimated to have passed through based on a plurality of current positions of the vehicle which are calculated at predetermined time intervals; and

a billing amount calculating unit configured to calculate a billing amount of the defined traveling route.

[Claim 2] (Canceled)

[Claim 3] (Amended)

The traffic information processing device according to claim 1, further comprising:

a second transit point passage determining unit configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

a second transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 4] (Original)

The traffic information processing device according to claim 3, further comprising a traveling route type determining unit configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 5] (Original)

The traffic information processing device according to claim 3 or 4, wherein the second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point

passage determining unit.

[Claim 6] (Original)

The traffic information processing device according to any one of claims 3 to 5, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 7] (Amended)

The traffic information processing device according to any one of claims 3 to 6, further comprising a speed calculating unit configured to calculate a speed of the vehicle based on a time each point of a plurality of points in the defined traveling route is passed in the defined traveling route outputted from the traveling route specifying unit and distances between each of the plurality of points.

[Claim 8] (Amended)

The traffic information processing device according to any one of claims 1 and 3 to

7, further comprising a traffic information output unit configured to acquire the identification information of the current traveling route specified based on the current position and to read and output traffic information corresponding to the identification information of the current traveling route.

[Claim 9] (Amended)

The traffic information processing device according to any one of claims 1 and 3 to 8, further comprising a current position output unit configured to output the current position which is calculated by the position information calculating unit.

[Claim 10] (Amended)

A processing method of a traffic information processing device comprising:

causing a position information calculating unit to calculate a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

causing a first transit point passage determining unit to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

causing a transit point type determining unit to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point;

causing a first transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transmit point is determined to be the defined point;

causing a traveling route specifying unit to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes,

which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the vehicle is estimated to have passed through based on a plurality of current positions of the vehicle which are calculated at predetermined time intervals; and

causing a billing amount calculating unit to calculate a billing amount of the defined traveling route.

[Claim 11] (Canceled)

[Claim 12] (Amended)

The processing method according to claim 10, further comprising:

causing a second transit point passage determining unit to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route output ted from the traveling route specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

causing a second transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 13] (Original)

The processing method according to claim 12, further comprising causing a traveling route type determining unit to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 14] (Original)

The processing method according to claim 12 or 13, wherein the second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined

point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 15] (Original)

The processing method according to any one of claims 12 to 14, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 16] (Amended)

A program causing a computer of a traffic information processing device to serve as:

position information calculating means configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

first transit point passage determining means configured to determine whether the

vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

transit point type determining means configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point;

first transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point;

traveling route specifying means configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the vehicle is estimated to have passed through based on a plurality of current positions of the vehicle which are calculated at predetermined time intervals; and

billing amount calculating means configured to calculate a billing amount of the defined traveling route.

[Claim 17] (Canceled)

[Claim 18] (Amended)

The program according to claim 16, further causing the computer of the traffic information processing device to serve as:

second transit point passage determining means configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined

traveling route based on the defined traveling route outputted from the traveling route specifying means when the transit point type determining means determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

second transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining means.

[Claim 19] (Amended)

The program according to claim 18, further causing the computer of the traffic information processing device to serve as traveling route type determining means configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating means calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 20] (Original)

The program according to claim 18 or 19, wherein the second transit point passage determining means instructs the billing amount calculating means to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced-is input to the second transit point passage determining unit.

[Claim 21] (Original)

The program according to any one of claims 18 to 20, wherein each of the first transit point passage determining means and the second transit point passage determining means acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point

at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at a predetermined intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[CLAIMS]

[Claim 1]

A traffic information processing device comprising:

a position information calculating unit configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

a first transit point passage determining unit configured to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

a transit point type determining unit configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle passes the transit point;

a first transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point;

a traveling route specifying unit configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the traveling route specifying unit estimates that the vehicle has passed through based on a plurality of current positions of the vehicle which are calculated at predetermined time intervals, when the vehicle is determined to have passed the transit point and the transit point is determined to be the defined point; and

a billing amount calculating unit configured to calculate a billing amount based on the defined traveling route.

[Claim 2]

The traffic information processing device according to claim 1, further comprising:

a second transit point passage determining unit configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

a second transit point passage information output unit configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 3]

The traffic information processing device according to claim 2, further comprising a traveling route type determining unit configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 4]

The traffic information processing device according to claim 2 or 3, wherein the second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 5]

The traffic information processing device according to any one of claims 2 to 4, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information

of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 6]

The traffic information processing device according to any one of claims 2 to 5, further comprising a speed calculating unit configured to calculate a speed of the vehicle based on a time each point of a plurality of points in the defined traveling route is passed in the defined traveling route outputted from the traveling route specifying unit and distances between each of the plurality of points.

[Claim 7]

The traffic information processing device according to any one of claims 1 to 6, further comprising a traffic information output unit configured to acquire the identification information of the current traveling route specified based on the current position and to read and output traffic information corresponding to the identification information of the current traveling route.

[Claim 8]

The traffic information processing device according to any one of claims 1 to 7, further comprising a current position output unit configured to output the current position which is calculated by the position information calculating unit.

[Claim 9]

A processing method of a traffic information processing device comprising:

causing a position information calculating unit to calculate a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

causing a first transit point passage determining unit to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

causing a transit point type determining unit to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point;

causing a first transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transmit point is determined to be the defined point;

causing a traveling route specifying unit to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the traveling route specifying unit estimates that the vehicle has passed through based on a plurality of current positions of the vehicle which are calculated at predetermined time intervals, when the vehicle is determined to have passed the transit point and the transit point is determined to be the defined point; and

causing a billing amount calculating unit to calculate a billing amount based on the defined traveling route.

[Claim 10]

The processing method according to claim 9, further comprising:

causing a second transit point passage determining unit to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route output ted from the traveling route

specifying unit when the transit point type determining unit determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

causing a second transit point passage information output unit to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining unit.

[Claim 11]

The processing method according to claim 10, further comprising causing a traveling route type determining unit to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating unit calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 12]

The processing method according to claim 10 or 11, wherein the second transit point passage determining unit instructs the billing amount calculating unit to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road on which the distance billing is enforced is input to the second transit point passage determining unit.

[Claim 13]

The processing method according to any one of claims 10 to 12, wherein each of the first transit point passage determining unit and the second transit point passage determining unit acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at predetermined time

intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.

[Claim 14]

A program causing a computer of a traffic information processing device to serve as:

position information calculating means configured to calculate and output a current position of a vehicle based on sensed position information of the vehicle input from a sensor unit;

first transit point passage determining means configured to determine whether the vehicle has passed a transit point on a traveling route on which billing is enforced based on the current position and position information of the transit point;

transit point type determining means configured to determine whether the transit point is a defined point at which a billing amount is determined at the time point at which the passage of the vehicle through the transit point is detected or an undefined point at which the billing amount is not determined at the time point at which the vehicle has passed the transit point;

first transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point when the vehicle is determined to have passed through the transit point and the transit point is determined to be the defined point;

traveling route specifying means configured to specify and output an estimated traveling route including the transit point as a defined traveling route among estimated traveling routes, which indicate one or more traveling routes which are undefined traveling routes of the vehicle and which the traveling route specifying unit estimates that the vehicle has passed through based on a plurality of current positions of the vehicle which are

calculated at predetermined time intervals, when the vehicle is determined to have passed the transit point and the transit point is determined to be the defined point; and

billing amount calculating means configured to calculate a billing amount based on the defined traveling route.

[Claim 15]

The program according to claim 14, further causing the computer of the traffic information processing device to serve as:

second transit point passage determining means configured to detect a transit point which is the closest to the current position of the vehicle and is included in the defined traveling route based on the defined traveling route outputted from the traveling route specifying means when the transit point type determining means determines that the transit point is the undefined point and to determine that the current position is past the transit point; and

second transit point passage information output means configured to output passage information indicating the passage of the vehicle through the transit point which is determined by the second transit point passage determining means.

[Claim 16]

The program according to claim 15, further causing the computer of the traffic information processing device to serve as traveling route type determining means configured to determine a type of traveling route on which billing is enforced,

wherein the billing amount calculating means calculates the billing amount of the defined traveling route based on the type of traveling route.

[Claim 17]

The program according to claim 15 or 16, wherein the second transit point passage determining means instructs the billing amount calculating means to calculate the billing amount based on the distance traveled on the road when the transit point is the undefined point and information indicating that the transit point is a transit point at an entrance of a road

on which the distance billing is enforced-is input to the second transit point passage determining unit.

[Claim 18]

The program according to any one of claims 15 to 17, wherein each of the first transit point passage determining means and the second transit point passage determining means acquires identification information of a current traveling route which is specified based on the current position, determines whether the current position is past the transit point at predetermined time intervals based on the identification information of the current traveling route and the current position, determines whether the vehicle passes through a plurality of traveling routes based on identification information of the traveling route acquired when determining whether the previous transit point has been passed at a predetermined intervals and identification information of the traveling route acquired when determining whether the current transit point has been passed, and determines that the current position is past the transit point which is located between the position information at the time the previous transition point is determined to have been passed and the position information of the timing at which it is determined whether the current transit point has been passed the transit points included in the plurality of passed through traveling routes when the vehicle is detected to have passed through the plurality of traveling routes.