Claims

[Claim 1]

A vehicle position measurement method, comprising:

a process of determining whether or not position information of an own vehicle is able to be acquired with predetermined quality from a satellite;

a process of acquiring position information of a nearby vehicle present in an area in which the own vehicle is capable of acquiring information when the position information is determined not to be able to be acquired with the predetermined quality; and

a process of replacing the position information of the own vehicle with the acquired position information of the nearby vehicle ;

wherein the process of determining whether or not position information of an own vehicle is able to be acquired with predetermined quality when a quality prediction information added to the map information at a current estimation position of the own vehicle is better than the predetermined reference, a determination of the quality is performed according to whether or not there is a communication abnormality in the acquisition of the position information from the satellite.

[Claim 2]

The vehicle position measurement method according to claim 1, comprising:

acquiring a plurality of pieces of position information of nearby vehicles through communications, and calculating the position information of the own vehicle from the plurality of pieces of acquired position information and received signal strength indicators in the respective communications used for the acquisition.

[Claim 3]

The vehicle position measurement method according to claim 1 or 2,

wherein the process of acquiring the position information of the nearby vehicles further includes a process of:

acquiring information indicating reliability of the position information, and

selecting position information having a reliability equal to or higher than that of the own vehicle from the position information of the nearby vehicles when the position information of the own vehicle is determined not to be able to be acquired with the predetermined quality.

[Claim 4]

The vehicle position measurement method according to any one of claims 1 to 3,

wherein the process of acquiring the position information of the nearby vehicles further includes a process of:

acquiring information indicating reliability of the position information, and

weighting the position information of the own vehicle and the nearby vehicles, calculating the position information, and replacing the position information of the own vehicle with the calculated position information when the position information of the own vehicle is determined not to be able to be acquired with the predetermined quality.

[Claim 5]

The vehicle position measurement method according to any one of claims 1 to 4,

wherein a determination of the quality is performed according to whether or not a variation of the position information acquired from the satellite is confirmed, while the own vehicle is stopped.

[Claim 6]

An own position measurement device, comprising:

a failure monitoring unit that determines whether or not position information of an own vehicle is able to be acquired with predetermined quality from a satellite;

a nearby vehicle position acquisition unit that acquires position information of a nearby vehicle present in an area in which the own vehicle is capable of acquiring information when the position information is determined not to be able to be acquired with the predetermined quality; and

a position estimation processing unit that estimates the position information of the own vehicle from the acquired position information of the nearby vehicle;

wherein the failure monitoring unit determining whether or not position information of an own vehicle is able to be acquired with predetermined quality when a quality prediction information added to the map information at a current estimation position of the own vehicle is better than the predetermined reference, a determination of the quality is performed according to whether or not there is a communication abnormality in the acquisition of the position information from the satellite.

[Claim 7]

The own vehicle position measurement device according to claim 6,

wherein the nearby vehicle position acquisition unit includes a radio wave intensity and position calculation unit that acquires a plurality of pieces of position information of nearby vehicles through communications, and calculates the position information of the own vehicle from the plurality of pieces of acquired position information and received signal strength indicators in the respective communications used for the acquisition.

[Claim 8]

The own vehicle position measurement device according to claim 6 or 7, comprising:

a reliability level check unit that acquires information indicating reliability of the position information of the nearby vehicles, and selects position information having a reliability equal to or higher than that of the own vehicle from the position information of the nearby vehicles.

[Claim 9]

The own vehicle position measurement device according to claim 8,

wherein the reliability level check unit acquires a weight according to a reliability level, applies the weight to the position information of the own vehicle and the nearby vehicles, and calculates the position information.

[Claim 10]

The own vehicle position measurement device according to any one of claims 6 to 9,

wherein the failure monitoring unit performs a determination of the quality according to whether or not a variation of the position information acquired from the satellite is confirmed, while the own vehicle is stopped.

[Claim 11]

An on-board unit comprising an own position measurement device that measures a current position of an own vehicle using the position measurement method according to any one of claims 1 to 5.