[0005] A roadside communication device of the present disclosure is a roadside communication device having a data relay function, and includes a communication unit that receives mobile object data whose generator is a mobile object; a determining unit that determines whether to perform a thinning process of an amount of the mobile object data received by the communication unit, based on a plurality of types of determination conditions; and a relay unit that relays the mobile object data with the thinning process when a result of the determination by the determining unit is positive, and relays the mobile object data without the thinning process when the result of the determination by the determining unit is negative wherein the relay unit is capable of performing a plurality of thinning processes having different processing contents, the plurality of thinning processes have processing contents with different thinning levels, each determination condition includes a plurality of different conditions set for the thinning levels, the determining unit determines whether to perform each thinning process in the corresponding determination condition of the plurality of types of determination conditions, based on the plurality of different conditions, and when two or more types of determination conditions among the plurality of types of determination conditions include a positive determination result determined by the determining unit, the relay unit sets a thinning level, based on the thinning levels corresponding to the positive determination determined in each of the two or more types of determination conditions, and performs a thinning process corresponding to the thinning level set.

[0006] A data relay method of the present disclosure is a data relay

method for a roadside communication device having a data relay function, and includes a first step of receiving, by a communication unit of the roadside communication device, mobile object data whose generator is a mobile object; a second step of determining, by a determining unit of the roadside communication device, whether to perform a thinning process of an amount of the mobile object data received by the communication unit, based on a plurality of types of determination condition; and a third step of relaying, by a relay unit of the roadside communication device, the mobile object data with the thinning process when a result of the determination by the determining unit is positive, and relaying the mobile object data without the thinning process when the result of the determination by the determining unit is negative, wherein in the third step, the relay unit is capable of performing a plurality of thinning processes having different processing contents, the plurality of thinning processes have processing contents with different thinning levels, each determination condition includes a plurality of different conditions set for the thinning levels, in the second step, the determining unit determines whether to perform each thinning process in the corresponding determination condition of the plurality of types of determination conditions, based on the plurality of different conditions, and in the third step, when two or more types of determination conditions among the plurality of types of determination conditions include a positive determination result determined by the determining unit, the relay unit sets a thinning level, based on the thinning levels corresponding to the positive determination determined in each of the two or more types of determination conditions, and performs a thinning

process corresponding to the thinning level set.

BRIEF DESCRIPTION OF DRAWINGS

CLAIMS

[Claim 1] A roadside communication device having a data relay function, the roadside communication device comprising:

a communication unit that receives mobile object data whose generator is a mobile object;

a determining unit that determines whether to perform a thinning process of an amount of the mobile object data received by the communication unit, based on a plurality of types of determination conditions; and

a relay unit that relays the mobile object data with the thinning process when a result of the determination by the determining unit is positive, and relays the mobile object data without the thinning process when the result of the determination by the determining unit is negative,

wherein the relay unit is capable of performing a plurality of thinning processes having different processing contents,

the plurality of thinning processes have processing contents with different thinning levels,

each determination condition includes a plurality of different conditions set for the thinning levels,

the determining unit determines whether to perform each thinning process in the corresponding determination condition of the plurality of types of determination conditions, based on the plurality of different conditions, and

when two or more types of determination conditions among the plurality of types of determination conditions include a positive determination result

determined by the determining unit, the relay unit sets a thinning level, based on the thinning levels corresponding to the positive determination determined in each of the two or more types of determination conditions, and performs a thinning process corresponding to the thinning level set.

[Claim 2] The roadside communication device according to claim 1, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on communication conditions of a communication line to be used when the mobile object data is transmitted to a relay destination.

[Claim 3] The roadside communication device according to claim 1 or 2, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on a communication processing load of the device.

[Claim 4] The roadside communication device according to any one of claims 1 to 3, wherein one type of determination condition among the plurality of types of determination conditions includes a

condition set based on a specific time slot.

[Claim 5] The roadside communication device according to any one of claims 1 to 4, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on traffic jam conditions on a road.

[Claim 6] The roadside communication device according to any one of claims 1 to 5, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on a specific mobile object.

[Claim 7] The roadside communication device according to any one of claims 1 to 6, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on a specific event occurring on a road.

[Claim 8] The roadside communication device according to any one of claims 1 to 7, wherein one type of determination condition among the plurality of types of determination conditions includes a condition set based on at least one of positioning accuracy, a location, and a state of the mobile object.

[Claim 9] The roadside communication device according to any one of claims 1 to 8, wherein

the communication unit is capable of receiving a control instruction including the plurality of types of determination condition from an external device, and

the determining unit determines whether to perform the thinning

process, based on the received control instruction.

[Claim 10] The roadside communication device according to any one of claims 1 to 9, wherein the plurality of thinning processes have processing contents, the processing contents being such that an amount of thinning increases gradually as the thinning level changes gradually.

[Claim 11] The roadside communication device according to any one of claims 1 to 10, wherein

the mobile object data received by the communication unit includes a plurality of data items,

the plurality of thinning processes include a process of removing a data item of a predetermined amount of data from the mobile object data, and

an amount of data of the data item serving as a removal target in the plurality of thinning processes is set so as to increase gradually as a thinning

level of each of the thinning processes changes gradually.

[Claim 12] The roadside communication device according to any one of claims 1 to 11, wherein

the relay unit transmits the mobile object data to the relay destination at a predetermined time interval,

the plurality of thinning processes include a process of discarding at least some of a plurality of pieces of mobile object data received by the communication unit, by increasing the time interval, and

the time interval of the plurality of thinning processes is set so as to increase gradually as the thinning level of each of the thinning processes changes gradually.

[Claim 13] The roadside communication device according to any one of claims 1to 12, wherein

the mobile object data received by the communication unit includes information indicating positioning accuracy of the mobile object, the mobile object being the generator of the mobile object data,

the plurality of thinning processes include a process of discarding at least some of a plurality of pieces of mobile object data received by the communication unit, by setting a level of the positioning accuracy as a transmission condition to the relay destination, and

the level of the positioning accuracy serving as the transmission condition in the plurality of thinning processes is set so as to increase gradually as the thinning level of each of the thinning processes changes gradually.

[Claim 14] The roadside communication device according to any one of claims 1 to 13, wherein

the mobile object data includes information indicating a location of the mobile object, the mobile object being the generator of the mobile object data,

the plurality of thinning processes include a process of discarding the mobile object data obtained from the mobile object, when the location of the mobile object is included in a predetermined region, and

a size of the predetermined region of the plurality of thinning processes is set so as to increase gradually as the thinning level of each of the thinning processes changes gradually.

[Claim 15] The roadside communication device according to any one of claims 1 to 14, wherein

the mobile object data includes information indicating an event of the mobile object, the mobile object being the generator of the mobile object data,

the plurality of thinning processes include a process of discarding mobile object data obtained, from the mobile object, in a predetermined number of event sections of the mobile object, and

a number of the event sections of the plurality of thinning processes is set so as to increase gradually as the thinning level of each of the thinning processes changes gradually.

[Claim 16] The roadside communication device according to any one of

claims 1to 15, wherein

the mobile object data includes information capable of identifying a moving route of the mobile object, the mobile object being the generator of the mobile object data,

the plurality of thinning processes include a process of discarding the mobile object data obtained from the mobile object, when the mobile object is moving on a predetermined number of moving routes, and

a number of the moving routes of the plurality of thinning processes is set so as to increase gradually as the thinning level of each of the thinning processes changes gradually.

[Claim 17] A data relay method for a roadside communication device having a data relay function, the data relay method comprising:

a first step of receiving, by a communication unit of the roadside communication device, mobile object data whose generator is a mobile object;

a second step of determining, by a determining unit of the roadside communication device, whether to perform a thinning process of an amount of the mobile object data received by the communication unit, based on a plurality of types of determination condition; and

a third step of relaying, by a relay unit of the roadside communication device, the mobile object data with the thinning process when a result of the determination by the determining unit is positive, and relaying the mobile object data without the thinning process when the result of the determination by the determining unit is negative

, wherein

in the third step, the relay unit is capable of performing a plurality of thinning processes having different processing contents,

the plurality of thinning processes have processing contents with different thinning levels,

each determination condition includes a plurality of different conditions set for the thinning levels,

in the second step, the determining unit determines whether to perform each thinning process in the corresponding determination condition of the plurality of types of determination conditions, based on the plurality of different conditions, and in the third step, when two or more types of determination conditions among the plurality of types of determination conditions include a positive determination result determined by the determining unit, the relay unit sets a thinning level, based on the thinning levels corresponding to the positive determination determined in each of the two or more types of determination conditions, and performs a thinning process corresponding to the thinning level set.