transmitting the waves until the last transmitter finishes transmitting the waves. Consequently, it is not easy to detect an object at high speed using the plurality of transmitters and the plurality of receivers.
[0006]

Accordingly, embodiments of the present disclosure provide a detection device and the like that can detect an object at high speed using a plurality of transmitters and a plurality of receivers.

[Solution to Problem]
[0007]

According to a first aspect of the present disclosure, there is provided a detection device including: a generator that generates a plurality of waves; a plurality of transmitters that emit the plurality of waves, the plurality of waves each being emitted by a corresponding one of the plurality of transmitters; a plurality of receivers each of which receives one or more of the plurality of waves as a composite wave; a deriver that derives individual data for each combination of one of the plurality of transmitters and one of the plurality of receivers by deriving, from received data of each of the plurality of receivers, the individual data corresponding to each of the plurality of transmitters; and a detector that detects an object that affects at least one of the plurality of waves, according to the individual data, wherein the generator: generates a plurality of pulse train groups and at least one carrier wave, the plurality of pulse train groups corresponding to a plurality of code groups each of which includes a reference code and one or more individual codes and that are different from each other; and modulates the plurality of pulse train groups using the at least one carrier wave, to generate a plurality of modulated waves as the plurality of waves, the deriver: demodulates data to be processed from the received data of each of the plurality of receivers, the data to be processed corresponding to the plurality of pulse train groups; and derives the individual data from the data to be processed, the reference code is common to the plurality of code groups, and a plurality of individual codes in the plurality of code groups are different from each other.
[0007a]

According to a second aspect of the present disclosure, there is provided a detection method including: generating a plurality of waves; emitting the plurality of waves from a plurality of transmitters, the plurality of waves each being emitted from a corresponding one of the plurality of transmitters; receiving, by each of a plurality of receivers, one or more of the plurality of waves as a composite wave; deriving individual data for each combination of one of the plurality of transmitters and one of the plurality of receivers by deriving, from received data of each of the plurality of receivers, the individual data corresponding to each of the plurality of transmitters; and detecting an object that affects at least one of the plurality of waves, according to the individual data, wherein in the generating: a plurality of pulse train groups and at least one carrier wave are generated, the plurality of pulse train groups corresponding to a plurality of code groups each of which includes a reference code and one or more individual codes

and that are different from each other; and the plurality of pulse train groups are modulated using the at least one carrier wave, to generate a plurality of modulated waves as the plurality of waves, in the deriving: data to be processed is demodulated from the received data of each of the plurality of receivers, the data to be processed corresponding to the plurality of pulse train groups; and the individual data is derived from the data to be processed, the reference code is common to the plurality of code groups, and a plurality of individual codes in the plurality of code groups are different from each other.

[0008]
It should be noted that these general or specific aspects may be implemented using a system, a device, a method, an integrated circuit, a computer program, or a non-transitory recording medium such as a computer-readable CD-ROM, or may be implemented using any combination of systems, devices, methods, integrated circuits, computer programs, and recording media.

[Advantageous Effects of Invention]
[0009]
According to embodiments of the present disclosure, it is possible to detect an object at high speed using the plurality of transmitters and the plurality of receivers.

[Brief Description of Drawings]
[0010]
[FIG. 1]
FIG. 1 is a conceptual diagram illustrating simultaneous transmission and simultaneous reception of a plurality of waves at a plurality of transmitters and a plurality of receivers.
[FIG. 2]
FIG. 2 is a conceptual diagram illustrating interference occurring by simultaneous transmission and simultaneous reception of the plurality of waves at the plurality of transmitters and the plurality of receivers.
[FIG. 3]
FIG. 3 is a conceptual diagram illustrating the plurality of transmitters, the plurality of receivers, and a deriver according to the embodiment.
[FIG. 4]
FIG. 4 is a block diagram illustrating a configuration example of a detection device according to the embodiment.
[FIG. 5]
FIG. 5 is a block diagram illustrating an entire configuration example of the detection device.
[FIG. 6]
FIG. 6 is a block diagram illustrating a configuration example of a generator.