CLAIMS

[Claim 1]

A human flow prediction device comprising:

a generated traffic amount extraction unit configured to acquire a generated traffic amount in a prediction target area;

a measure registration unit configured to reflect an evaluation target measure to a feature of an implementation point in the prediction target area in an implementation period of time; and

a human flow prediction unit configured to input a feature in the prediction target area in each period of time set by the measure registration unit and the generated traffic amount in a prediction target period of time acquired by the generated traffic extraction unit to a model trained by associating human flow information including movement and congestion in each period of time with a feature at each point in the prediction target area, and to predict a movement route of each prediction target or a traffic amount of each point of the prediction target area.

[Claim 2]

The human flow prediction device according to claim 1, wherein

the human flow prediction unit constructs a network graph that has intersections in the prediction target area as nodes and roads as links as the feature and handles each of the nodes or each of the links as each point,

the feature of the node is environment information associated with the node, the environment information including whether there is a signal of an intersection corresponding to the node or the number of roads connected to the node, and

the feature of the link is environment information associated with the link, the environment information including one of a width, a length of the road, the number of stores adjacent to the road, and the number of parks adjacent to the road of a road corresponding to the link.

[Claim 3]

The human flow prediction device according to claim 1, wherein the model is a recurrent neural network in which a relationship between periods of time is trained.

[Claim 4]

The human flow prediction device according to claim 2, wherein the model is a model that calculates an intermediate feature related to a relationship on a network graph from the feature of each point for each period of time

and is a model trained by associating the intermediate feature in each period of time with human flow information including movement and congestion in each period of time.

[Claim 5]

The human flow prediction device according to claim 4, wherein the model has a graph convolution layer for extracting the intermediate feature.

[Claim 6]

The human flow prediction device according to claim 1, further comprising a training unit configured to train the model.

[Claim 7]

The human flow prediction device according to claim 6, wherein the training unit constructs a network graph that has intersections in the prediction target area as nodes and roads as links and handles each of the nodes or each of the links as each point.

[Claim 8]

The human flow prediction device according to claim 7, wherein the training unit trains a first parameter indicating an influence of the feature of each point in each

period of time on a probability distribution indicating a probability of movement to an adjacent point from each point or stay at the point and a second parameter indicating an influence of a relationship between a feature of each point previous to a prediction target period of time and the probability in a period of time corresponding to the feature on the probability distribution in the prediction target period of time so that the probability distribution in the prediction target period of time predicted from a feature of each point matches the probability distribution in a target period of time obtained from information regarding an observed human flow that is training data for each period of time in a target area.

[Claim 9]

The human flow prediction device according to claim 8, wherein the training data is data in which a plurality of pieces of trajectory data indicating a time series of observation information including positional coordinates and a speed at each observation time are converted into a transition series of the nodes or the links in association with a position on the network graph.

[Claim 10]

The human flow prediction device according to any one

of claims 1 to 9, wherein the human flow prediction unit displays a measure registration screen in which information regarding the measure is able to be input on a map indicating the prediction target area.

[Claim 11]

The human flow prediction device according to any one of claims 1 to 9, wherein the human flow prediction unit displays a prediction result screen in which each link of the prediction target area is displayed on a map indicating the prediction target area in a display mode according to a traffic amount of each point for each predicted period of time.

[Claim 12]

The human flow prediction device according to any one of claims 1 to 9, wherein the human flow prediction unit displays a prediction result screen in which a movement route of each prediction target for each predicted period of time of the prediction target area is displayed on a map indicating the prediction target area in a display mode according to the movement route.

[Claim 13]

A human flow prediction program causing a computer to

perform:

a procedure of extracting a generated traffic amount in a prediction target area;

a procedure of reflecting an evaluation target measure to a feature of an implementation point in the prediction target area in an implementation period of time; and

a procedure of predicting a movement route of each prediction target or a traffic amount of each point of the prediction target area based on a model trained by associating human flow information including movement and congestion in each period of time with a feature at each point in the prediction target area and a generated traffic amount in the extracted prediction target period of time.

[Claim 14]

A human flow prediction method comprising:

a step of receiving measure information by an input device;

a step of accepting the measure information and a generated traffic amount in a prediction target area as an input and predicting a movement route of each prediction target or a traffic amount of each point of the prediction target area based on a model trained by associating human flow information including movement and congestion in each period of time with a feature at each point in the prediction

target area and a generated traffic amount in the extracted prediction target period of time; and

a step of displaying a prediction result screen in which a prediction target period of time is displayed in an explicit format in a display mode according to the movement route or the traffic amount predicted in the prediction target area on a map indicating the prediction target area so that the predicted movement route or traffic amount is displayed.

[Claim 15]

The human flow prediction method according to claim 14, wherein, in the display mode according to the movement route, the movement route is displayed using a point indicating a position at each time of the movement route and a trajectory to the position.

[Claim 16]

The human flow prediction method according to claim 14 or 15, wherein, in the display mode according to the traffic amount, a thickness or a change in color of a line is expressed on a road of a prediction location.