CLAIMS

[Claim 1]

An elevator apparatus that assigns one of in-service units providing a service to each of users, on the basis of an origin floor and a destination floor of the user and the number of users, the origin floor, the destination floor, and the number of users being registered before entering an elevator, the elevator apparatus comprising:

a prediction section that predicts a distribution of waiting times of all the users on the basis of arrival-at-hall times of the users and predicted arrival times of the individual in-service units to be assigned;

an evaluation section that evaluates a long-wait ratio by calculating, on the basis of the distribution of waiting times of all the users, the number of waiting users whose waiting time exceeds a long-wait judgment time and a long waiting time beyond the long-wait judgment time, for each of the in-service units to be assigned in each hall; and

a to-be-assigned unit determination section that assigns one of the in-service units providing a service to each of the users, on the basis of an evaluation result generated by the evaluation section,

wherein the long-wait judgment time is set on the basis of a time created for each traffic flow mode from a past learning result,

wherein the distribution of waiting times of all the users is calculated from destination floor registration times of the

individual users, hall call durations on individual floors, and predicted arrival times of the individual in-service units at the individual floors,

wherein the evaluation section evaluates a waiting time on each floor and equality of time intervals of each in-service unit in the future and calculates a long waiting time and the number of long-waiting users on each floor, on the basis of the waiting time of each user and the number of waiting users on each floor, predicted by the prediction section, and operation information on each in-service unit, and evaluates the long-wait ratio by normalizing the number of users waiting beyond the long-wait judgment time with a capacity of an in-service unit to be assigned, the long-wait ratio being a ratio of elevator users whose waiting time exceeds the long-wait judgement time, and

wherein the evaluation section sets the long-wait judgment time to a minimum judgment time to increase priority in service if the user is a special user satisfying a condition registered in advance.

[Claim 2]

The elevator apparatus according to Claim 1, wherein if an identical destination floor is consecutively registered a predetermined number of times within a predetermined period with an identical registration device at a time of registration of the origin floor and the destination floor of the user and the number of users, the number of users is reset to one under

presumption that an identical user has performed registration a plurality of times.

[Claim 3]

The elevator apparatus according to Claim 1, wherein, in a case of registering the origin floor and the destination floor of the user and the number of users by using a hall registration device installed in a hall, the number of users per registration is learned for each floor and each traffic flow mode on the basis of the number of times of registration in the hall registration device and the number of users, and the number of users per registration is changed.

[Claim 4]

The elevator apparatus according to Claim 1, wherein the prediction section records past waiting times of the users, and if a user is detected whose waiting time in a past predetermined period exceeds the long-wait judgment time a number of times, the number of times is set as the number of long waits of the user, and priority in service for the user is increased.

[Claim 5]

The elevator apparatus according to Claim 1, wherein the total number of users whose waiting time exceeds the long-wait judgment time and the number of the users on each floor are presented to the users.

[Claim 6]

The elevator apparatus according to Claim 1, wherein the number of past users whose waiting time exceeds the long-wait judgment time and a past time slot in which the waiting time exceeds the long-wait judgment time, or a future time slot in which the waiting time exceeds the long-wait judgment time is presented to the users.

[Claim 7]

The elevator apparatus according to Claim 1, wherein if a waiting time is predicted to exceed the long-wait judgment time when a destination floor is registered by the user, a notification indicating a possibility of becoming a long-waiting user or an estimated number of long-waiting users is presented to the user together with an in-service unit.

[Claim 8]

A method for controlling an elevator apparatus that assigns one of in-service units providing a service to each of users, on the basis of an origin floor and a destination floor of the user and the number of users, the origin floor, the destination floor, and the number of users being registered before entering an elevator, the method comprising:

predicting a distribution of waiting times of all the users on the basis of arrival-at-hall times of the users and predicted arrival times of the individual in-service units to be assigned;

evaluating a long-wait ratio by calculating, on the basis of the distribution of waiting times of all the users, the number of waiting users whose waiting time exceeds a long-wait judgment time and a long waiting time beyond the long-wait judgment time, for each of the in-service units to be assigned in each hall; and

assigning one of the in-service units providing a service to each of the users, on the basis of an evaluation result generated through the evaluating,

wherein a waiting time on each floor and equality of time intervals of each in-service unit in the future are evaluated and a long waiting time and the number of long-waiting users on each floor are calculated, on the basis of the waiting time of each user and the number of waiting users on each floor, predicted by the prediction section, and operation information on each in-service unit, and the long-wait ratio is evaluated by normalizing the number of users waiting beyond the long-wait judgment time with a capacity of an in-service unit to be assigned, the long-wait ratio being a ratio of elevator users whose waiting time exceeds the long-wait judgement time, and

wherein the long-wait judgment time is set to a minimum judgment time to increase priority in service if the user is a special user satisfying a condition registered in advance.