**Propineglobal Task 1**

**AIM**

To improve the elevator experience to serve the passenger given a button input and to design a *solution* to best serve the passengers with the assumption of limited resources and time with modern day technologies.

**Problem**

Existing elevators find the shortest path to serve the passenger given a button input. It doesn’t provide any weightage to the number of people or their waiting time when serving.

**Assumptions**

We have cameras and sensors at every level and inside the elevator which can provide the following params

* The number of people waiting at each level.
* The waiting time of each person has waited.
* The number of people already in the lift.

**Solution factors**

To design the improved elevator let us consider the following factors as listed below

1. Distance\_weight
2. People\_outside\_weight
3. Available Quota
4. Direction\_weight
5. WaitingTime\_weight

Let’s see how each factor is calculated for each floor and each elevator upon clicking of a button(up/down) from nth floor.

# Distance\_weight

It is the positive integer value of the distance between the pressed button floor and the lift’s current floor and it is calculated for each elevator

1. Direction\_weight

If the lift is moving against the direction of the button pressed, then need to check whether it is surpassed the floor or not, if not then award as 1, else -1

If the lift is moving on the same direction of the button pressed, then need to check whether it is surpassed the floor or not, if not then award as 1, else -1

If the lift is stationary at any floor, then award as 0

It is calculated for each elevator from the floor

*Note: The stationary lift which boarding and already pressed towards a direction considered as moving*

# Available Quota (AQ)

Since we have the facility available to calculate the total weight of the people inside the elevator (WPIE), then this value can be calculated as the ratio by available weight over the maximum allowed weight of the lift (MAW)

***AQ= (MAW -*** ***WPIE) / MAW***

It is calculated for each elevator

# People\_outside\_weight

Since we have the facility available to count the number people waiting outside the lift in each floor (NPWF), then this value can be calculated as the ratio by number of people in the floor over the total number people can accommodate in an elevator (MNPAE)

***People\_outside\_weight= NPWF / MNPAE***

It is calculated for each floor upon sensing any changes on number of peoples

# Waitingtime\_weight

This is a maximum value of waiting time among the waiting timings of people on each floor.

It is calculated for each floor upon sensing any changes on number of peoples

**Solution**

Based on the first 3 factors we can able to choose the suitable elevator if it is available and moving in same direction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Lift | Distance\_weight | Direction\_weight | AQ | Available |
| 3 | 0 | 1 | 0.5 | Yes |
| 4 | 0 | 1 | 0 | No |
| 1 | 1 | -1 | 0.1 | No |
| 2 | 2 | 0 | 1 | Yes |

*Note: This is a sample illustration table for choosing an elevator*

Problem arises when there is no elevator is moving in same direction to pick up or when there is no available capacity to accommodate (refer: factor AQ).

Now the role of the last 2 factors comes to decide and hijack an elevator which is supplying the least priority floor with full capacity

|  |  |  |  |
| --- | --- | --- | --- |
| Floor | People\_outside\_weight | WaitingTime\_weight(seconds) | priority |
| 1 | 1.5 | 120 | 1 |
| 3 | 1 | 140 | 2 |
| 4 | 0.3 | 20 | 3 |
| 2 | 0.1 | 60 | 4 |
| 5 | 1 | 3 | 5 |

*Note: This is a sample illustration table for assigning priority floor*

After we found an elevator which is supplying the least priority floor with full capacity, compare the requested floor’s priority with the one we found. If the priority is more, then reassign it to the requested floor even if it is not in the direction. And keep look for an elevator to hijack until the priority table changes.