An Improved Intelligent Elevator Control Model Using Image Processing and Fuzzy Logic

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Elevators are an efficient method of transporting passengers and goods in high rise buildings. But with increased complexity of the operational context, an elevator control system should consider user preferences and their behaviours, while addressing existing inadequacies. As per the results obtained from a statistical survey, above 70% expected modifying the existing system. Accordingly, a novel Elevator Group Control Model is introduced, based on a Destination Control Optimization algorithm. This algorithm directs passengers to elevators, concerning the weights of requesting passenger, other waiting passengers and passengers inside the destined elevator. Image processing has been proposed to detect passengers inside and outside the elevator. This avoids accepting requests in the absence of passengers. Unnecessary power is also turned off inside elevators in the absence of passengers. A mobile application reserves elevators for special purposes, only when absolutely necessary, as they can contribute on growing traffic. Fuzzy logic is used to determine the optimum elevator from a list of available elevators. A proof of concept is used to test the feasibility of proposed functions in the algorithm. Arduino platform is used to model elevator operating environment, while a haar cascade classifier is used as the image processing technique for passenger detection. The mobile application is based on Android technology. Finally the model was tested for user acceptance by conducting a simple survey. Each feature of the model was accepted by more than 80% of the respondents. Control algorithm tracks details of each elevator request, which can be used for predictive analysis on decision making with dynamic elevator traffic.

Keywords: Elevator, Destination control algorithm, Haar cascade classifier, Image processing, Fuzzy logic