

Intelligent exit-selection behaviors during a room evacuation

A modified version of the existing cellular automata (CA) model is proposed to simulate an evacuation procedure in a classroom with and without obstacles. Based on the numerous literature on the implementation of CA in modeling evacuation motions, it is notable that most of the published studies do not take into account the pedestrian's ability to select the exit route in their models. To resolve these issues, we develop a CA model incorporating a probabilistic neural network for determining the decision-making ability of the pedestrians, and simulate an exit-selection phenomenon in the simulation. Intelligent exit-selection behavior is observed in our model. From the simulation results, it is observed that occupants tend to select the exit closest to them when the density is low, but if the density is high they will go to an alternative exit so as to avoid a long wait. This reflects the fact that occupants may not fully utilize multiple exits during evacuation. The improvement in our proposed model is valuable for further study and for upgrading the safety aspects of building designs.