

Crowd dynamics simulation: Improvements in psychological and kinetic description

D3 ZHOU Zixuan

- Increase the visual realism of crowd dynamics modeling by getting rid of hypothetical regulation.

Simulate the visual information perception of pedestrian instead of potential transmission

Plan the movement trajectory by dynamic window approach instead of cell transmission

Predict the exit selection by data-driven method instead of anthropomorphic regulation

- Extend the scope of the adaptability and investigate unexplored but significant factors.

Analyze the influence of obstacle distribution characteristics, spatial shape, etc. on the efficiency of crowd movement (physical level).

Analyze the weights of herd mentality and crowd aversion, distance cost and comfort in path planning.

- Bridge the gap between empirical analysis and simulation methods.

For a long time, the two research methods of empirical analysis and numerical simulation (analytical method) have been isolated from each other. In particular, the various phenomena observed in empirical research cannot be transformed into mathematical explanations in numerical simulations. Then, by simulating pedestrians' perception of visual information, an interface can be created to unify the input variables in these two studies. With consistent variables, with the adoption of machine learning algorithms, some decision-making behaviors can be transferred to simulation.

