SIMWALK: Pedestrian Simulation

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SimWalk

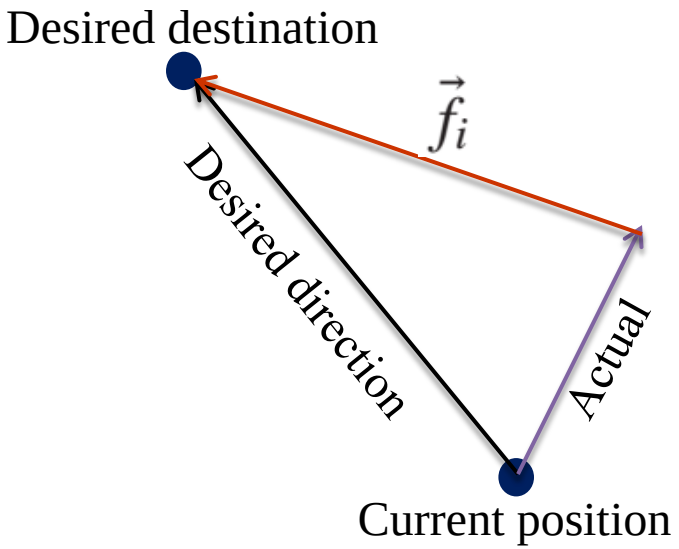
- A computer simulation software which simulates pedestrians' movement
- SimWalk is built based on the **Social force model** (SFM) that describes the walking behaviour of pedestrians and the **shortest-path algorithm**.

Social Force Model

- The speed $\vec{v}_i$ is governed by 4 force terms:

$$\frac{d\vec{v}_i}{dt} = \vec{f}_i + \vec{f}_{iB} + \sum_{j \neq i} \vec{f}_{ij} + \sum_{k} \vec{f}_{ik} + \zeta$$

  - $\vec{f}_i$ the driving force toward the destination



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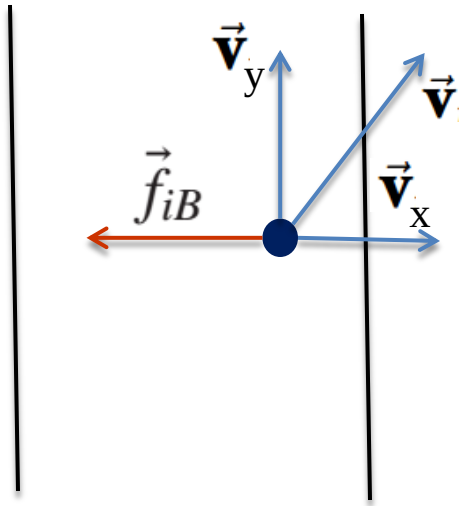
  - $\vec{f}_{iB}$ the repulsive force due to borders



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  - $\vec{f}_{iB}$ the repulsive force due to borders
  - $\vec{f}_{ij}$ the repulsive force due to pedestrian j
  - $\vec{f}_{ik}$ the attractive force due to objects, and events at position k
  - ζ fluctuations due to accidental or deliberate deviations from the optimal behavior

In SimWalk, the pedestrian's route is affected by his destination, speed, interaction with other pedestrians and existence of other pedestrians and obstacles.

Output of SimWalk

- Density
- Walking speed of pedestrians
- Count and flow rates
- Duration taken by each pedestrian to complete the simulation
- The distance traveled
- The start time and the exit time of the pedestrians.

Places in SimWalk Demo

- Airport Demo: 122m x 80m (2 layers)
- Bus Terminal: 164m x 80m (1 layer)
- Train Station: 231m x 110m (2 layers)

THANK YOU