Emotion contagion model for dynamical crowd path planning

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Collective behaviour and artificial life
group project, 2024/25

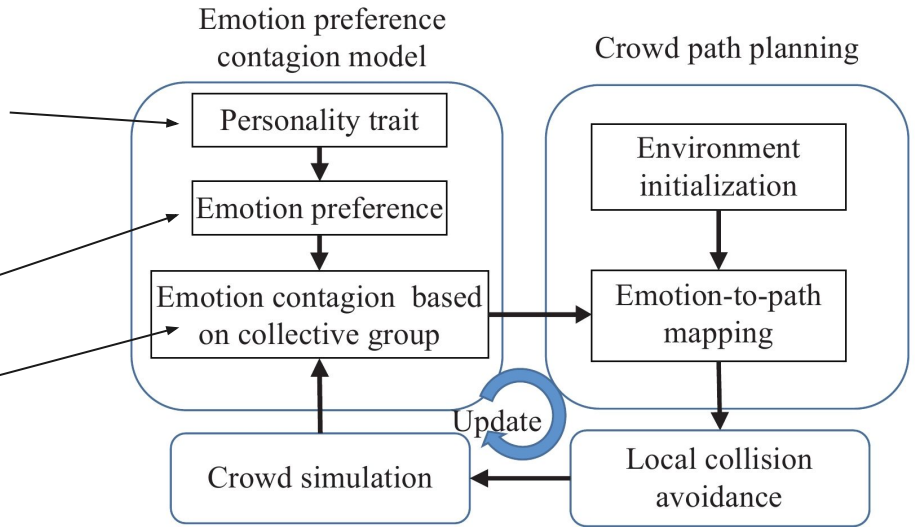
Emotion contagion model for crowd path planning

Exploring how people's **personality** traits affect their movement in such situations as well as others around them

Efficient **crowd path planning** crucial for urban **transportation** management or emergency **evacuations**

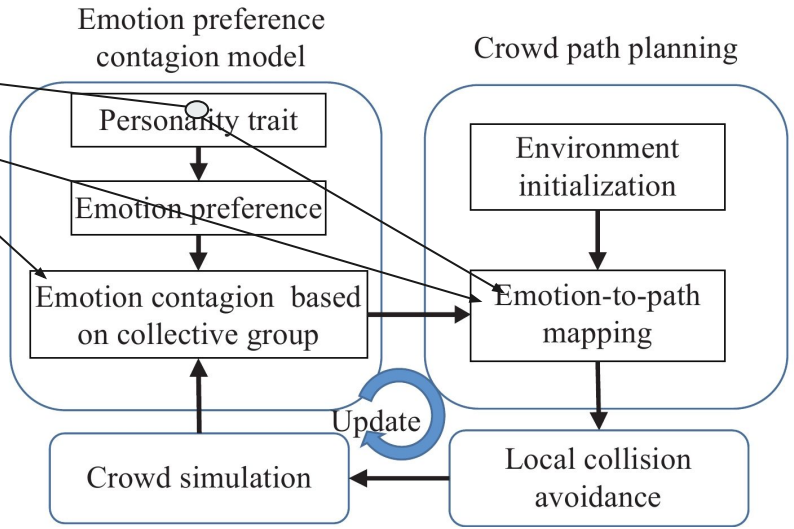
Methods

- Five key traits: **O**penness to experience, **C**onscientiousness, **E**xtraversion, **A**greeableness, and **N**euroticism
- Translated to **distance** or **velocity preference**
- **Contagion** of emotion
- Corrected orientation similarity calculation



Proposed improvements

1. **Panic** contagion
2. Enhanced **navigation** graph
3. **Clustering** algorithm evaluation

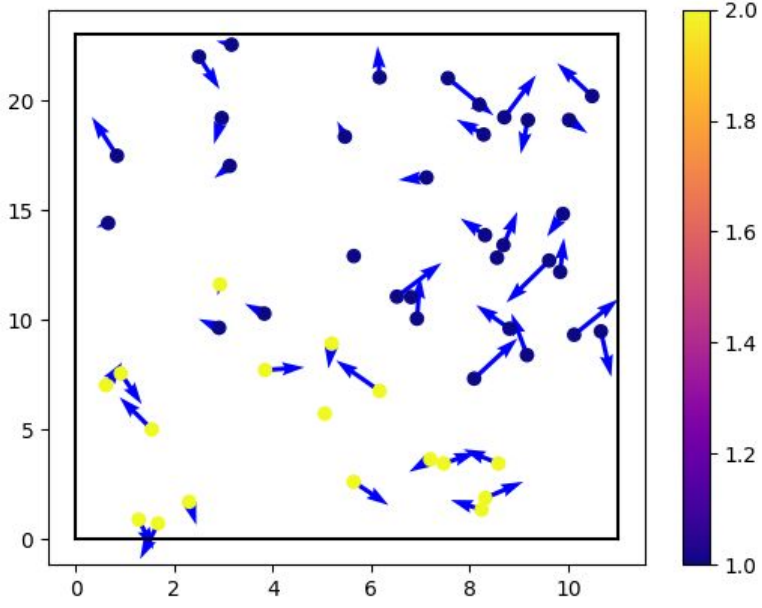


1 Panic contagion

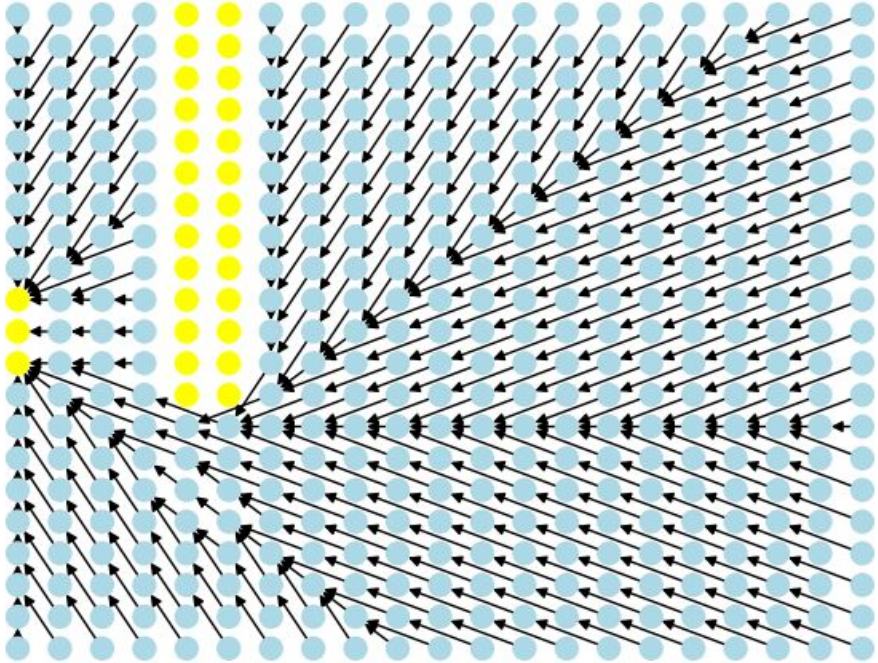
- Panic parameter; agents will **freeze** or **move randomly**, decreases with time
- Panic increases by **contagion** or when agent is near a **source of panic** (e.g. fire)

$$panic\_susceptibility = -w_O * O_0 - w_C * C_0 - w_A * A_0 + w_N * N_0 + 0.5,$$
$$\text{where } w_O^2 + w_C^2 + w_A^2 + w_N^2 = 1$$

2 Clustering

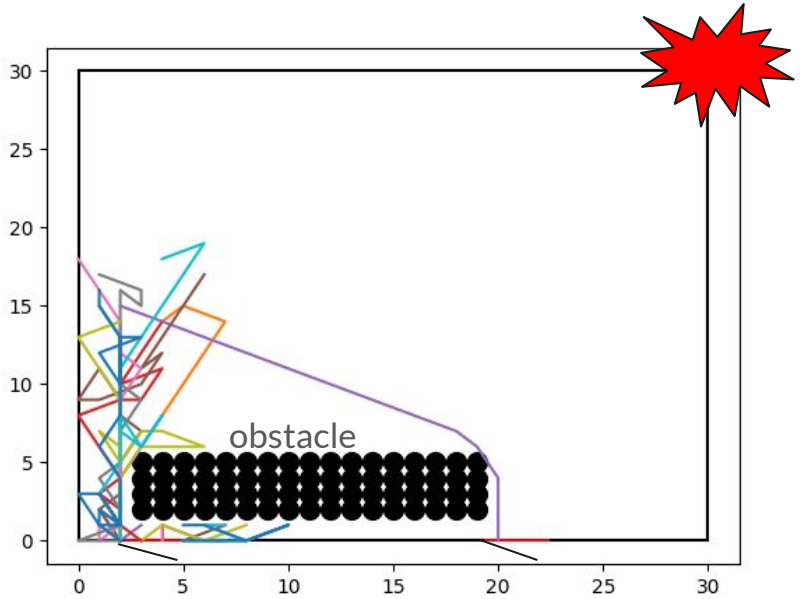


3 Navigation graph

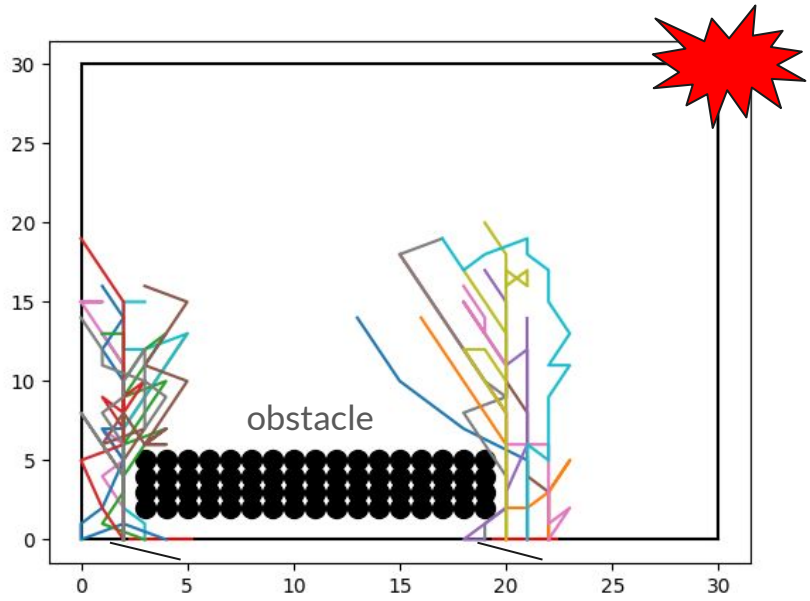


Results

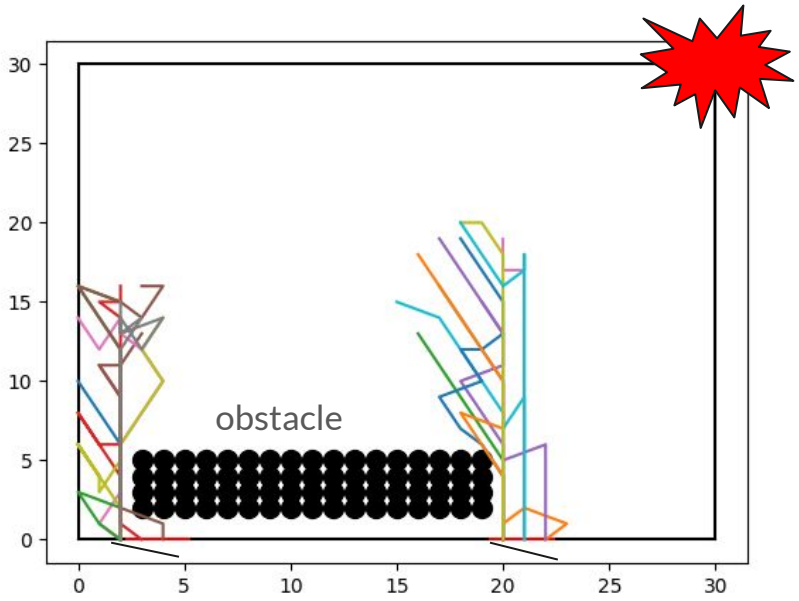
- Navigation graph produces more **natural shaped paths**
- Change of clustering algorithm appears to have **no influence on** the result
- Experiment
- Panic parameter induces **erratic movement**



Panic



No panic



Discussion

- Change of clustering algorithm had no visible influence
- Many components had to be reinvented
- Alternatives for the navigation graph or implementation of continuous time