Form 4: Results and conclusion

1. Team No : 22

2. Project Title : Emergency Evacuation Simulation Using ABMS

3. Experiment Environment :

Programming Language : NetLogo
Version Control : Git
IDE : NetLogo 6.4.0

Parameters:

Force/Pressure :

$$F_p = \sum_{a \in A} mass_a \times speed_a$$

Health:

$$heath_a = mass_a \times speed_a \times threshold$$

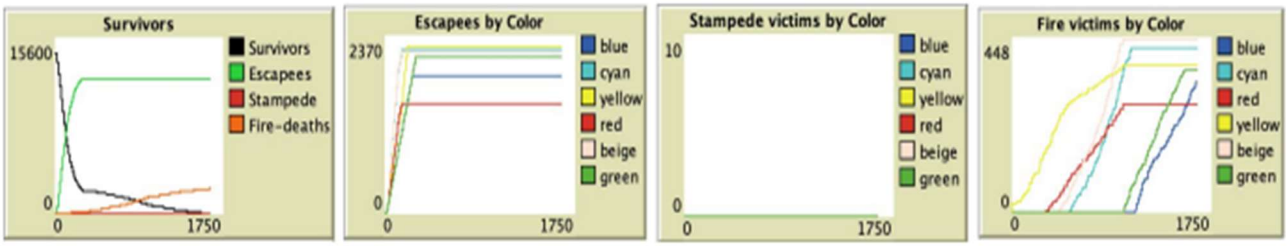
4. a Experiment 1:

Experiment Finding 1: 'Smart' strategy without panic.

Method: Uses Knowledge-Based Evacuation or Best-First Search Algorithm

Findings:

- When there is no sense of panic, there are zero deaths from stampedes. Red agents (VIPs) escape without casualties, achieving a 100% survival rate



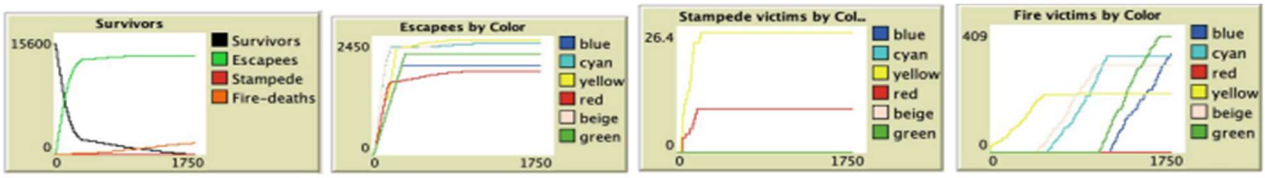
4. b Experiment 2:

Experiment Finding 2: ‘Smart’ strategy with panic

Method: Uses Knowledge-Based Evacuation

Findings:

- Panic leads to a higher sense of urgency and increased speed, resulting in fewer casualties.
- Red agents (VIPs) still have a 100% survival rate, showcasing the effectiveness of the "Smart" strategy.



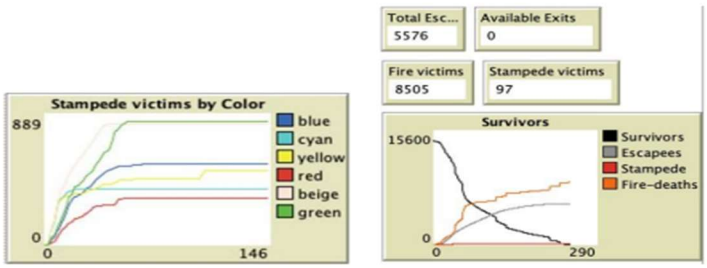
4. c Experiment 3:

Experiment Finding 3: ‘Follow’ strategy- Lack of knowledge

Method: Normal Evacuation(Guided by vision)

Findings:

- Higher stampede casualty rate compared to the "Smart" strategy.
- Lack of knowledge about layout and exit points contributes to the stampede effect.



5. Parameter comparison table

Parameter	Previous methods	Proposed method
Panic-induced fatalities in stampedes	Strategies based on exit familiarity	Enhancing panic mitigation strategies
Strategies based on exit familiarity	Modeling human movement diversity	Advanced exit location knowledge dissemination
Modeling human movement diversity	Collective group movement	Improved human movement modeling techniques
Collective group movement	Effects of panic on behavior	Optimized collective movement dynamics
Effects of panic on behavior	Pre-incident simulation	Addressing panic-induced irrational behavior
Pre-incident simulation	Environmental impact on evacuation (choke points)	Pre-emptive simulation for emergency preparedness
Environmental impact on evacuation (choke points)		Comprehensive analysis of environmental factors in evacuation planning

6. Final Conclusion Statements

- Panic is a critical factor leading to fatalities in stampedes.
- Survivors utilize various strategies based on their familiarity with exit locations.
- Further investigation is needed into diverse methods of modeling human movement.
- Consideration should be given to groups moving collectively.
- Panic often induces irrational behavior such as random wandering.
- Conducting simulations prior to emergencies can aid preparedness.
- Exploration of environmental factors impacting evacuation, such as choke points is crucial.

Signature Supervisor
Name: