AnyLogic pedestrian simulation for public buildings: museums and terminals

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Some information about authors

- SETEC is one of the most important engineering French company, near 2 thousands persons, more than 1, 5 thousands engineering staff
- Main activity touch the realisation of big public Building and Transportation systems projects
- SETEC is well known company in using the simulation tools in the life cycle of project: from design to operations
- ANYLOGIC EUROPE is a European branch of The Anylogic Company for purchase AnyLogic, consulting activity based on AnyLogic product and training sessions organisation
What is the Pedestrian Dynamics?

- Pedestrian Dynamics is a term used to define the movement and interaction of people, both with one another and the built environment.
- Analysis of pedestrian flows in a robust and scientific manner helps professionals like architects, transport planners, security advisors optimise the design and operation of a facility.
Why use micro scale agent based models?

Macroscopic pedestrians flow models are not well situated for:

- Buildings or spaces with exceptional architecture
- Dynamically changes in the displacement conditions
- Origin/Destination data is often missing
- Extreme conditions such as escape need to be evaluated
- Need to take in account the individual behaviour of moving persons
Milo's Venus in the Louvre Museum

Goals

The model was ordered by Louvre Museum for purposes of evaluation the architectural project of Milo’s Venus emplacement in the limited space room

Model elements: attractiveness of museum exhibits, obstacles, circulation space, individual and group behavior

The criteria of project choice: global and local density, time of visit, individual visitors comfort
Eiffel Tower

Background
- The current throughput of the tower is insufficient to handle visitor flows
- The bottleneck is in the two upper levels of the tower where visitors spend too much time, partially because of poor flow management

Goals
The model was ordered by Eiffel Tower Operation Society to test several alternative scenarios of visitor flow management to determine if the traffic capacity of the Tower can be improved

Model elements
- Floor plan
- Visitors routing policies
- Elevator number, capacities and travelling times,
- Visitors behavior (time spent at various attraction points)
Eiffel Tower simulation results
Paris railway station “Gare Saint Lazar” (with AREP collaboration)

**Goals**
The model was ordered by SNCF for purposes of evaluation the project of ticket control line installation on the platform of Gare St Lazar

**Model elements**: ticket control lines, controls transaction time, circulation space, obstacles, individual and group behavior, trains schedule

**The criteria**: (the project was given up): global and local density, platform transition time, queue lengths and waiting times
Terminal EUROSTAR (with AREP collaboration)

Background
- A high-speed passenger rail service connecting Paris with London. All trains traverse the Channel Tunnel between Britain and France
- The Paris terminal of EUROSTAR is located at Gare du Nord
- The terminal space is limited and increased demand is significant

Goals
- Find out how many trains the terminal can handle during rush hour (in particular, can two trains depart with 3–4 minute interval?)
- Optimize the number of control lines and their distribution by the types of passengers
- Optimize queue management policies
EUROSTAR. The layout and the passenger process

- Ticket control
- EU
- Ticket control non-EU and Business class (priority)
- All passengers wait here before registration is open

Waiting hall A

Waiting hall B

Waiting hall for Business Class
EUROSTAR. Simulator

INPUT (EXCEL Import)
- The terminal layout with control lines
- Train timetable
- Passenger distribution (business/economy, EU/non EU, etc)
- Passenger arrival time distributions
- Control passing times
- Controls number
- Passenger behavior in the waiting area
- Queue management policies

OUTPUT (EXCEL export)
- Waiting times
- Queue lengths
- Number of passengers who missed their trains
- Control lines utilization
Metro station project simulation “CNIT” in Paris
Metro station project simulation. Tickets Control level
Metro station project simulation. Train platform level
Paris big Shop “Printemps” simulation
Conclusion

A. Multi Level Pedestrian Behaviour

1. Reflex
2. Reactive
3. Motivated
4. Reasoned behaviors
5. Social behaviour

B. Questions

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