Public Transit Stations

A NetLogo approach and methodology

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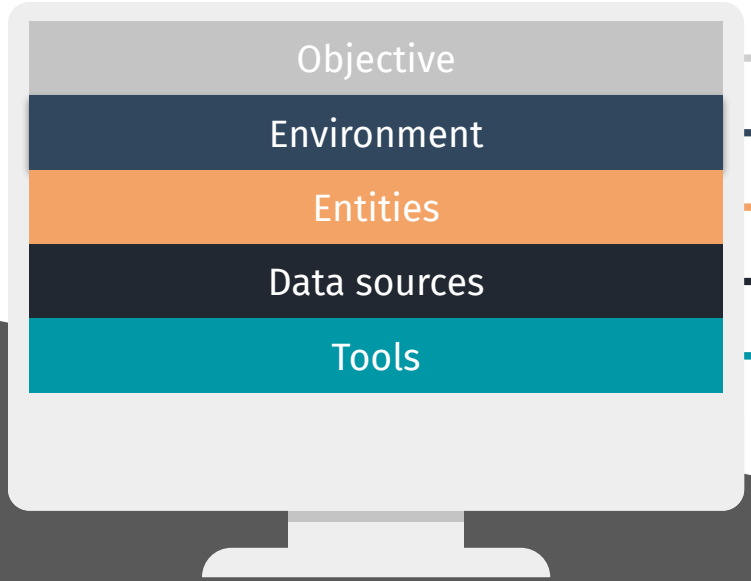
Problem Formalisation

Simulate and draw conclusions from the passengers' behavior in a multimodal transit station.



01 Simulate a multimodal transit station.

02 Floors; Platforms; Trains; Entries/exits; Elevators; Stairs.

03 Passengers.

04 Pictures of the layout of various stations.

05 Netlogo.

Motivation

01

Interest in public transportation.

02

Learning a new technology and programming paradigm.

03

Improvements by considering other environments, scenarios or passenger behavior.

04

Conclusions, including practical, real-world applications.

Goals

Education

Gain knowledge on simulation paradigms.

Framework

Develop a NetLogo methodology that can be expanded by the community.

Solutions

Ideate solutions to possible problems.

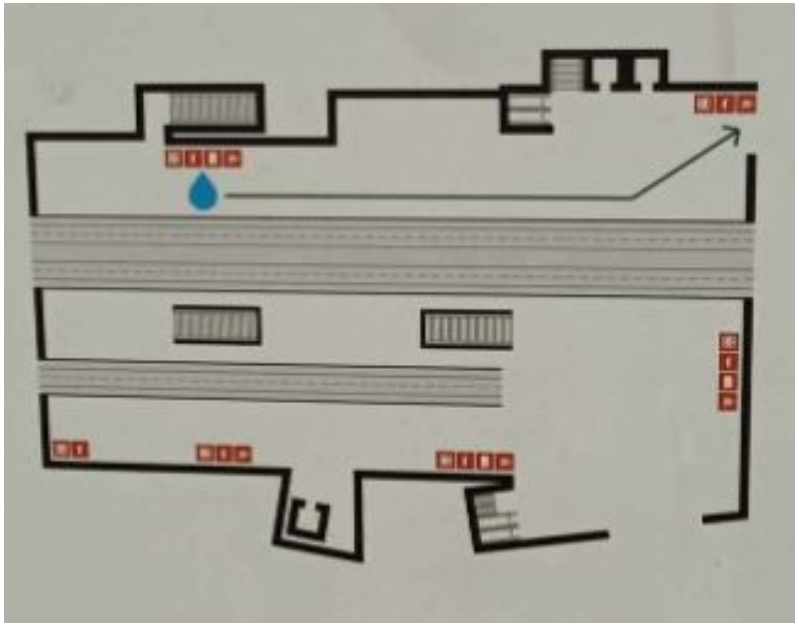
Data

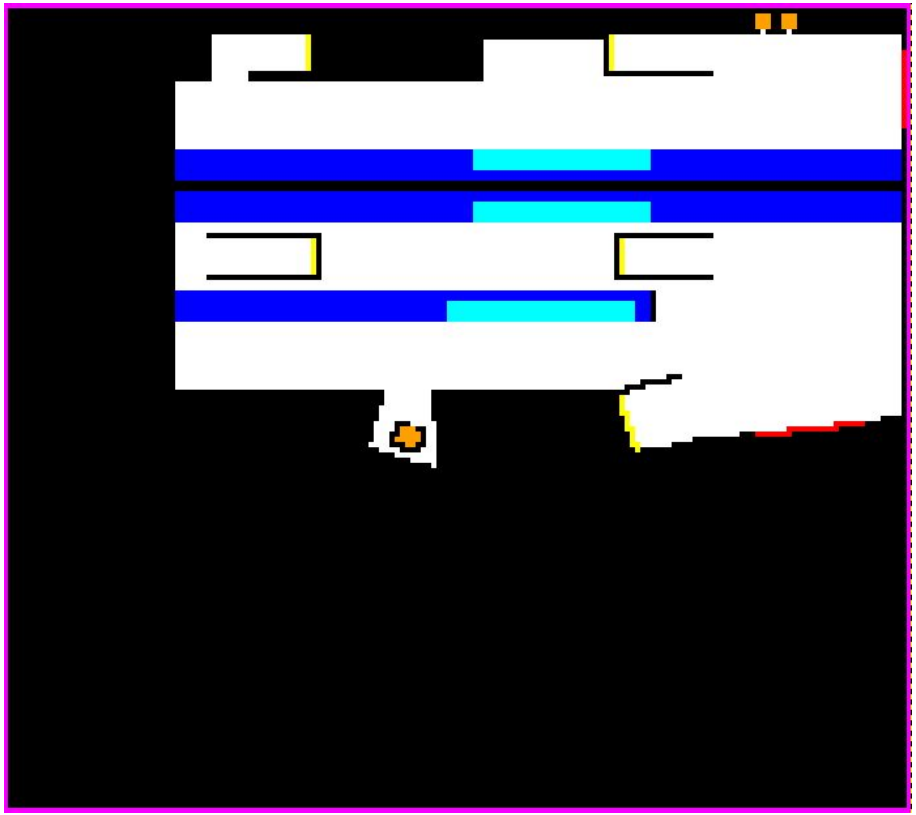
Gather knowledge from the data, specifically behavior patterns.

Sources

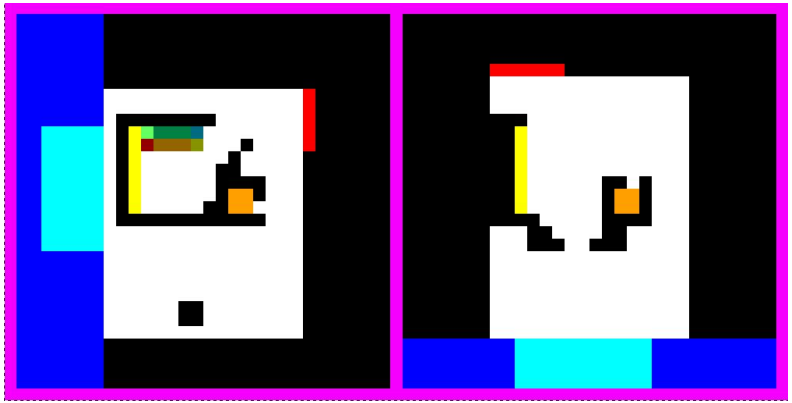
Real Life Stations

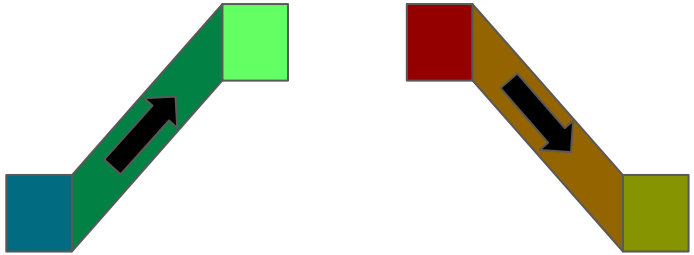
We collected real station plants and recreated them.





Model



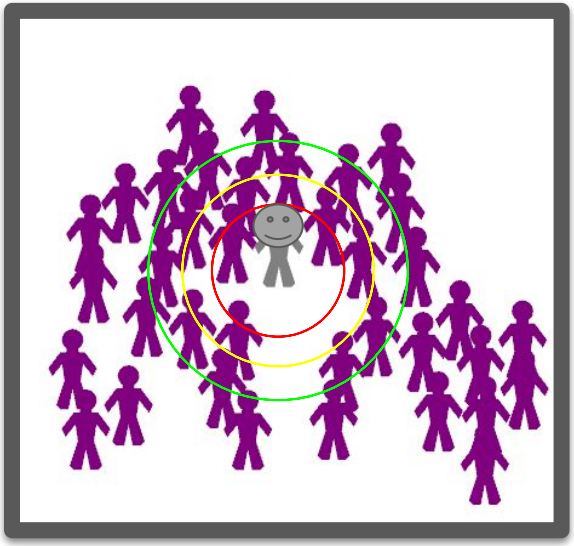


1. Train line
2. Train
3. Stairs
4. Elevator
5. Entries/Exits

Data

Crowdedness

The model was trained with simulations of crowdedness.

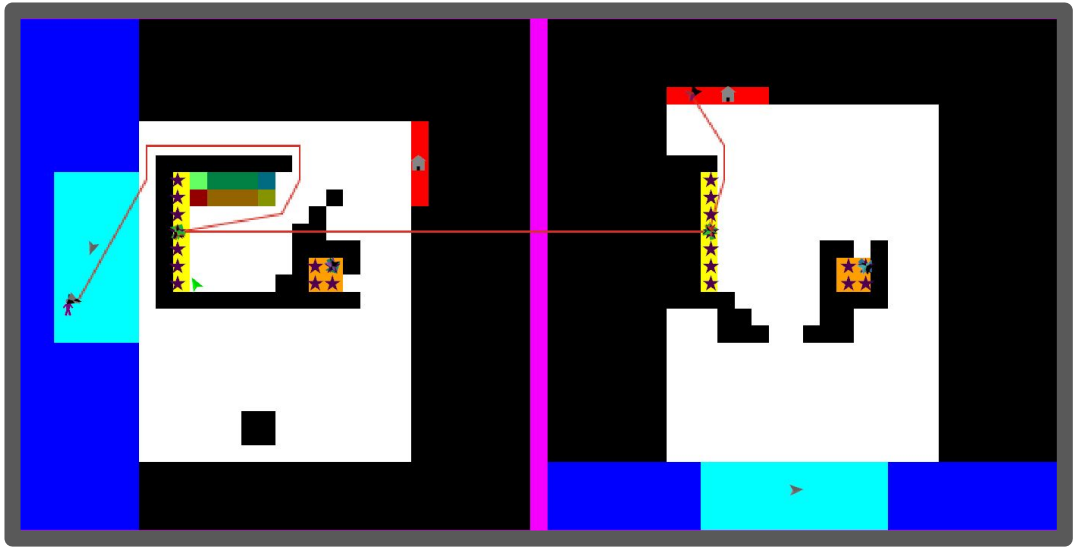


Path

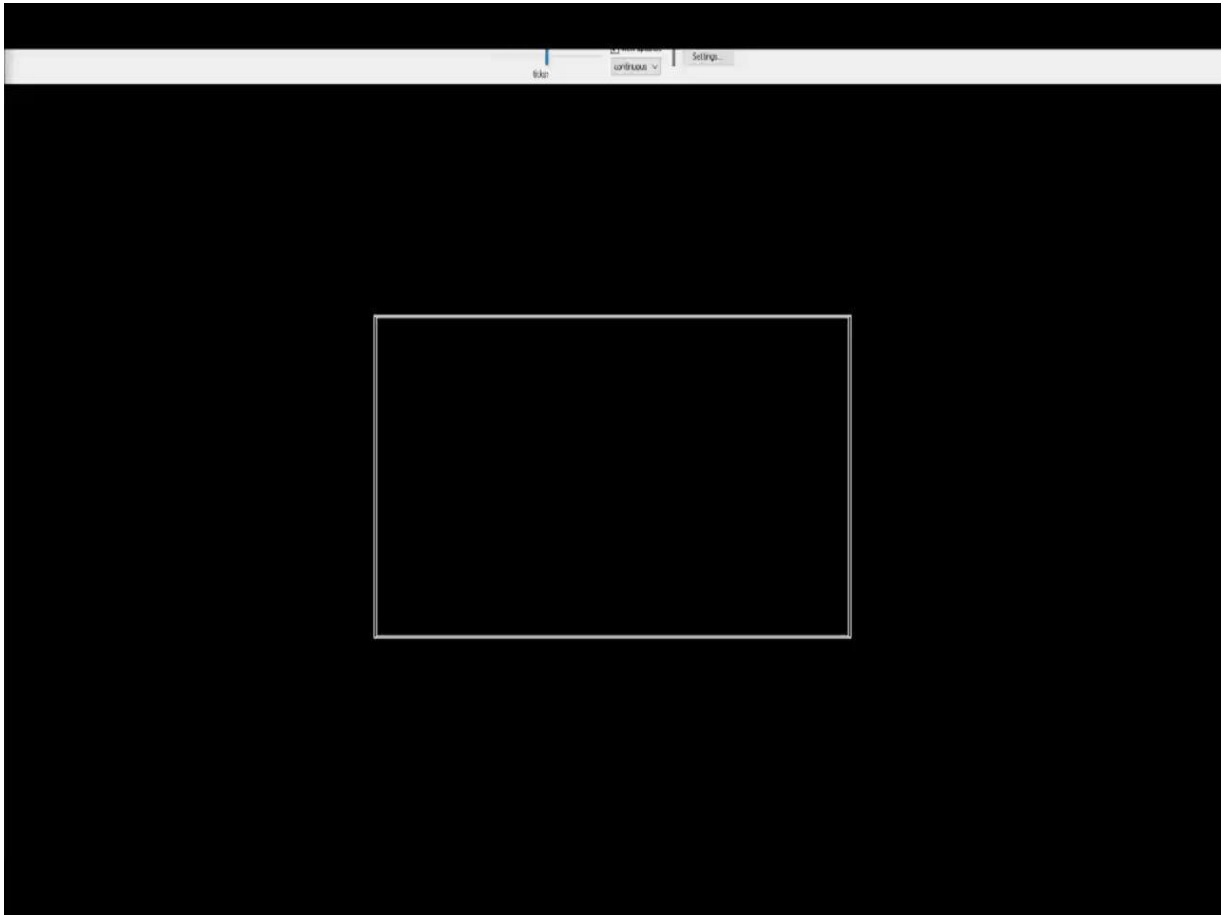
Intended path the passenger wants to take.

Trajectory

Subsequent positions the passenger has in each frame.



Demo



Results

Metric	ticks	tick_distance	total_distance	Crowdedness			
				0.8	1	1.2	1.4
mean	464.710000	0.297951	138.460790	0.001160	0.203689	0.397329	0.457151
std	204.348647	0.024352	61.119533	0.039845	0.541747	0.739537	0.799496
Min	127.000000	0.000000	38.504057	0.000000	0.000000	0.000000	0.000000
25%	256.750000	0.300000	76.022187	0.000000	0.000000	0.000000	0.000000
50%	479.000000	0.300000	141.865455	0.000000	0.000000	0.000000	0.000000
75%	608.750000	0.300000	182.623531	0.000000	0.000000	1.000000	1.000000
Max	898.000000	0.564923	268.083006	3.000000	5.000000	6.000000	6.000000

Conclusion

- We are satisfied with our final results. We were able to achieve most of our goals but for the ideation of solutions that could be applied to the scenario;

- Though we've acquired new skills, we have to point out how flawed Netlogo is:
  - Very hard to work with different files;
  - Less flexibility than standard programming languages;
  - Idiosyncrasies (time).

- Nonetheless, we were able to overcome the adversity and deliver what we believe to be a successful project.