Agent-Based Modelling and Simulation with NetLogo

Day 2: Session 6

Social Spaces

Session 6 Outline

- The importance of social spaces.
- Discrete, continuous, networks and other abstractions.
- Complex social network models.
- Networks in NetLogo: using Links.

Social Spaces

- Physical or virtual space where social actors interact.
- The structure of social relations is fundamental for the construction of **plausible social simulation scenarios**.
- **These structures shape the way actors interact** and develop their social identity.
- Provides a **filter** to what kind of interactions social actors can engage in.
- Social spaces have a deep influence in emergent processes.

Social Space Models

- Much like other aspects of Agent-based models, social spaces can be designed with different levels of abstraction.
- They can have dynamics of their own.
- They can ilustrate, abstract or mimic real-world scenarios.
- In some models they are completely ignored. In such models the influence between the agent environment and the agent behaviour is disregarded.

Social Space Models: in NetLogo

- Continuous coordinate spaces
  - 2-dimensional grids. (NetLogo 2D patch grid)
  - 3-dimensional grids. (NetLogo 3D patch grid)

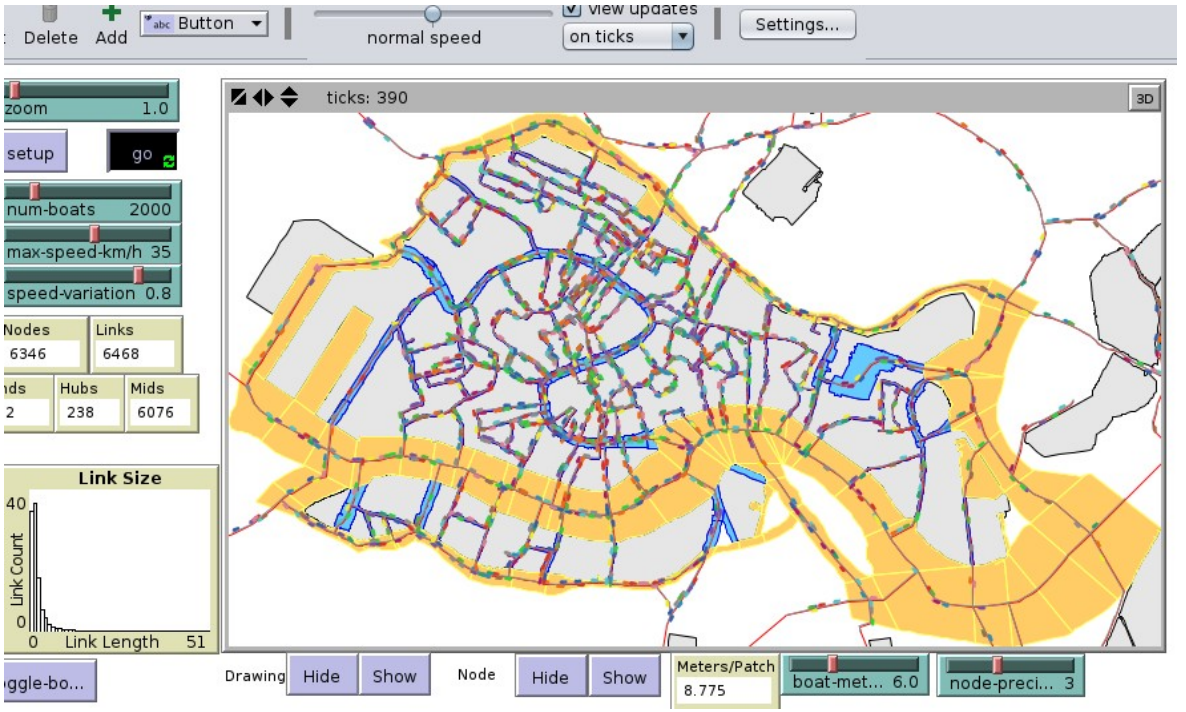
- Discrete structures
  - 2-dimension grids (considering a patch as a discrete unit).
  - 3-dimensional grids

Social Space Models

- Hexagonal Grids (NetLogo Models Library)
  - Hex Cells Example
  - Hex Turtles Example
  - Lattice Walking Turtles Example
- Regular Lattices (NetLogo Models Library)
  - Link lattice example
- Complex Social Network Models

Social Space Models

- Data driven models.
- Models based in GIS (Geographic Information Systems)



Complex Social Network Models

- Random Graphs (Erdos and Renyi, 1959)
- Small-world model (Watts & Strogatz 1998)
- Scale-free model (Barabási and Albert, 1999)

Networks as simulation models

- **Small-world networks:** appear as a way to model the six degree of separation phenomena by creating a highly clustered network first and replacing existing links with random connections (shortcuts).

- **Scale-free networks:** comes from the idea that systems that exibit scale-free properties emerge as a result of a preferential attachment mechanism.

- **Other dynamic network structures:** see for instance the Team Assembly example from the NetLogo model library.

Creating Links in NetLogo

- In turtle context you can use the commands:
  - create-link-to some-turtle
  - create-links-to
  - create-link-from
  - create-links-from
  - create-link-with
  - create-links-with

Next Session...

- ABM and social sciences.
- Different purposes of ABM models.
- Simulation Model levels of Abstraction.
- Auto-organisation, consensus and social norms.
- Exploring a model of consensus formation in social networks.