Data Mining the City

Violet Whitney Wednesday 7p-9p 114 Avery
Course website
Course slack
Unity Tutorials & Documentation

From Yelp reviews directing people to preferred restaurants to Airbnb reprogramming homes into vacation rentals, the invisible code that powers a city's use may have more drastic influence than any physical invention in the last century. This course will focus on creating agent based models that enable designers to speculate creatively about behavior in the urban environment, pushing beyond modeling only 3D physical features. Students will develop a critical understanding of the social, economic, and political dynamics caused by these technologies as well as technical training in simulation, data sorting and visualization techniques. We will hypothesize about the relationships of digital models and space, as well as develop simulations so designers can gain a foothold in the changing landscape of a platform city.

MATERIAL
The main technical language of this course will be C# in Unity, working with Behavior Bricks and the Mapbox Unity SDK. No prior coding knowledge is necessary, though the content of the course will require perseverance. This course is exceptionally difficult and time intensive. Students are expected to regularly submit coursework, attend classes and submit a final comprehensive project. Classtime will include lectures and fun pair programming exercises (demos).

Outcomes:

- Methods, tools and data, system-logic
- Experimentation with code-driven workflows
- Critical understanding of simulation/data concepts (e.g. generalization, bias)
- How the underlying framework of a system determines its behavior over space and time

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Students will create a "vignette simulation" capturing "modern" behaviors.
They'll add a behavior for each course module (Populations, Space and Time) using a method or framework from that section. By the time students join in groups before the "Time" module, they will have a simulation with many behaviors. For the final, students will work in small groups to create a new "vignette simulation" combining behaviors from their previous "vignette simulations". The aim will be to understand emergent behavior across individual behaviors which have not yet interacted, as well as to understand how to get code segments to "talk" to one another. Collectively students will format a final simulation project with a structured thesis.

Example Module Projects:

- Populations - population size for competing species using a cybernetic framework
- Space - locations and size for an Amazon distribution center using logistics and routing
- Time (group) - vacancy/occupancy based on room reservations using scheduling.

Medium Submissions:
Students will submit a Medium post to the course website for each module by midnight on the due date.

SCHEDULE

wk	*Date*	*Topic*
Populations		*Post Due: Sep 24* *[Roll A Ball + Behavior Bricks]*
1	4-Sep	**Lecture**: Complexity, Agent Based Models **Lab**: Pseudo Code, Simple Agent Based Model **Module:** Unity Intro / Roll A Ball
2	11-Sep	**Lecture:** Populations, Emergent Behavior, Randomness **Lab**: Simulation Dissection, Population Poetry Pair Programming **Module**: Behavior Bricks **Assignment Read:** ● "The Environment is Not a System," Tega Brain [link] ● "What, Why, How: Spatial Simulation Models," Dan O Sullivan [link]
3	18-Sep	**Discussion**: How do we ethically use models? **Lecture:** Data Subjectivity, Bias, Fidelity, Limitations of Models
4	25-Sep	**Presentation:** Students Present Population
Space		*Post Due: Oct 15* *[Mapbox SDK, Proj Brief, ex cred: Navigation]*
5	2-Oct	**Lecture:** Environment, Logistics, Routing, Graph Theory, Activity Based Travel Models **Lab**: Project Brainstorm / Spreadsheet Shared **Module**: Mapbox SDK and/or routing
6	9-Oct	**Workshop** In Class Paper Workshop Reading Example Papers + MetaPaper
7	16-Oct	**Presentation:** Students Present Space

Students should be in groups now!

Time		*Post Due: Nov 13* *[optional: Clock , UIs]*
8	23-Oct	**Lecture:** Scheduling, Taylorism, Affordance, Game Theory, Behavioral Economics, Decision Trees **Lab**: Schedules

9	30-Oct	**Desk Crits** *Arch. Midterm Reviews Oct 22 - Nov 2* **Assignment Read:** "Medium Design", Keller Easterling "Architecture Design Data: Practice Competency in the Era of Computation," Phil Bernstein Extra: Humans of Simulated New York, Francis Tseng [link] Behavioral Economics: "Governing the Commons" & 8 Design Principles, Elinor Ostrom
10	6-Nov	**Discussion:** Simulation as practice Meet in 115 Avery (moved rooms for special lecture)
11	13-Nov	**Present:** Students Present Time Meet in 115 Avery (moved rooms for special lecture)
Final		*Due: Nov 5*
12	*20-Nov*	*NO CLASS - (Thanksgiving)*
13	27-Nov	**Desk Crits**
14	**TBD**	**FINAL REVIEW** *Final Review Week* *Dec 3 - Dec 12*

GRADING

- Attendance / Class Participation..... 20%
- Populations 15%
- Space 15%
- Time 15%
- Final..... ..... 35%

Hello Friendly Visitor,

Some of my thoughts that I hope will help you in this class:

Experimentation — This class emphasizes experimentation over something well done but expected. Try to make things that surprise yourself. Life is short!

Openness — We'll learn about an eclectic range of subjects, and strive to develop relations and new models that have not yet been made. Be open to new and untested theories and models.

Programming is hard — Learning to program will take years and years of practice like any other language. Not only is it a language, it's also a very different way of thinking. Sometimes the best way to learn is to build things you enjoy. Play!

Collaboration Attitude — One of the best ways to learn new methods (especially in programming) is to learn from peers. Respect every voice, even quiet ones, and make class a great place to be. Support and push one another.

Welcome to this class. I'm glad you're here and I can't wait to see how you grow and what you do this semester and beyond.

-Violet