Department of City and Regional Planning, Masters of Urban Spatial Analytics
University of Pennsylvania Weitzman School of Design

MUSA 801: MUSA Smart Cities/Practicum

Instructors: Michael Fichman & Matthew Harris - Spring 2022

Tuesdays, 10:15-1:15, Meyerson B13

The purpose of this course is to have students work with city and non-profit clients on analytical projects that convert client data into actionable intelligence. Students will work with the client to understand the business process, wrangle data, develop spatial and aspatial analytics and serve these outputs to non-technical decision makers through the medium of data visualization. Below are the six projects for 2022:

City: Colorado Springs, CO
Project: A Mobility Decision Support System at Fort Carson Army Base
Client: US Ignite / US Army Corps of Engineers
Team: Zhenzhao Xu, Benjamin She, Shimin Tu, Bingchu Chen
Scope of Work

City: Philadelphia, PA
Project: Allocating Programming Resources Using A Mobility-Based Information System
Client: Philadelphia Parks and Recreation
Team: Xiong Zheng, Hui Tian, Jeff Stern, Lan Xiao
Scope of Work

City: Guilford County, NC
Project: A Human Resources Turnover Risk Intelligence System
Client: Guilford County Human Resources
Team: Jiali Yao, Johnathan Clementi, Olivia Scalora
Data Security: MOU signature and CITI certification are mandatory
Scope of Work

City: Guilford County, NC
Project: A Structure Fire Risk Model
Client: Guilford County Emergency Services
Team: Hannah Bonestroo, Marlana Zink, Briana Cervantes
Data Security: MOU signature and CITI certification are mandatory
Scope of Work

City: El Paso, TX
Project: Pavement Repair Prioritization System
Client: City of El Paso Capital Improvement Department
Team: Sisun Cheng, Jenna Epstein, Kristin Chang
Scope of Work

City: Philadelphia, PA
Project: A Development Risk Assessment Tool for Adverse Possession - Eligible Side Lots
Client: Philadelphia Legal Assistance
Team: Max Masuda-Farkas, Xuezhu Gillain Zhao, Adrian Leon
Scope of Work

Students will be mentored by MUSA Faculty and advised by someone from the partnering agency. Ultimately, these projects will provide students with a real-world, client-driven educational opportunity, while demonstrating useful proof of concepts for cities and nonprofits interested in embedding data science into their existing business processes.

Instructors
Michael Fichman - mfichman@upenn.edu
Office Hours (Tues 3-5, Thurs 1-3): https://calendly.com/mfichman/office-hours
Matt Harris - mdharris@upenn.edu
Office Hours (Mon & Thurs, 8:30-10AM)

Piazza - Here is the class board - we will use this as the central communication and trouble-shooting forum.

Remote Learning

At present (1/3/2022) the first week of class is to be held remotely, with the rest of the semester in person. There is no hybrid option planned for this class. The first week will be held via Zoom. The link below will be good for that first class and for any subsequent classes that must be held remotely:

https://upenn.zoom.us/j/92286000429?pwd=bzdvNDZDZ1BtWGpqUk55c1ZaWkkydz09

Assignments & Requirements:

1. An 'Agile' development project management plan detailing due dates and deliverables.
2. Collaboration on Github and a working github markdown that you will present to professors each week. This markdown should be updated each week by 5pm on the Monday before class, giving enough time for your professors the opportunity to acquaint themselves with new additions.
3. A midterm presentation and markdown on data wrangling, exploratory analysis, and model development.
4. A final presentation and markdown on polished modeling results and a final web-based application.

For each markdown to be replicable, all work will have to be done in R. The final deliverable is a replicable markdown and a working Shiny or Javascript-based application. Each of these items must be uploaded to the class GitHub Page. You can "double dip" and use your project app as the final project in your Javascript course.

Students working on certain projects will be required to sign relevant data use agreements and undergo CITI certification for handling sensitive data. These groups might also be subject to stricter protocols for handling and storing data sets.

The grading breakdown is as follows: 20% for demonstrating that you can keep momentum going on your project from week to week. This includes maintaining your markdown, taking direction from professors, and weekly presentations. 20% for each of

the two formal presentations and markdowns and 40% for the final deliverables. The University's Code of Academic Integrity will be strictly enforced.

Class agenda

Classes will begin with either a short introduction, a tutorial or a guest speaker. Then, students will work independently on their project, meeting with professors for 20-30 minutes to present progress. As you are required to keep and update a working draft of your markdown online, your professors will review it in advance if possible. You will then make your presentation and professors will provide feedback.

Your professor's goal is to keep you on time and on task. Students must commit to progressing in the project each week and coordinating among each other to project manage/share responsibilities equitably.

Schedule

Date(s)	Phase	Class content	Be prepared to talk about	Deliverable
1/18	**Intro**	Course introduction; Agile project management; Team meet; Client meetings **THIS CLASS IS REMOTE**		
1/25	**Data wrangling / Exploratory**	Go over project management plan; Data wrangling	What is the use case/business process? What is your project management plan?	Project management plan
2/1		Data wrangling / Exploratory analysis	What is the purpose of your exploratory analysis? What are the relevant features you intend to build from your dataset?	
2/8		Data wrangling / Exploratory analysis	Update on exploratory analysis	
2/15		Data wrangling / Exploratory analysis	Update on exploratory analysis	
2/22	**Modeling**	Tidymodels workshop (Matt); Modeling work		1st Presentation & Markdown due
3/1		Modeling work	Modeling strategy; What is your plan for generalizability	
3/8		Spring break - NO CLASS		
3/15	**App Development**	Wireframing workshop/ Modeling work		
3/22		App Development/Modeling work	Modeling update; Application development	2nd Presentation & Markdown due
3/29		App Development/Modeling work	Modeling update; Application development	
4/5		App Development	Modeling update; Application development	
4/12		App Development	Modeling update; Application development	
4/19		App Development	Modeling update; Application development	
4/26		Final presentations (internal)		Final Presentation run-through
TBA		Studio Presentation		Final markdown