# DSCI 551 Project Guideline

## Spring 2022

The theme of the projects this semester is “data science for social good”. That is, your project should address pressing/important issues the society is currently facing. For example, issues in the areas such as education, health, public safety, energy, infrastructure, environment, economy, and social services.

**Requirements**:

- Your app should have real value to the people in the society.
- Use a cloud database to store the data.
- Develop a reasonable Web-based UI (your app can be accessed through web browser) or mobile app (Android or iOS).
- Form a team of 2 to 3 people.
- (3-person team only) Your UI should be accessible from the Internet. That is, anyone with Internet connectivity can access your app’s web site or mobile app from their laptops or mobile phones.
- (3-person team only) Your app should integrate and use data from different sources or domains. For example, the congestion pricing project (see example below) include trip data, census data, and incident data.

Topics and data set to avoid (many have been (over)used in the past semester): stock analysis, covid 19 cases, IMDB, yelp, game, sports, tweets, etc.

**Project phases:**

- Proposal (due 2/7, Monday), with items including
    - Project title, topic, motivation, plan, milestone, team members and their responsibility.
- Midterm progress report (due 3/28, Monday)
    - Progress in meeting the goals set out in the proposal.
    - Challenges faced
    - Expectation on the on-time completion of the project.
- Final report and project video (due 4/25, Monday)
    - Final report should be comprehensive, with all project items: title, topic, motivation, architecture and components of your app, its data flow, screenshots on the main functions of the app, reflection on learning experiences, challenges faced, team members and responsibility.
    - Demo video typically runs for 20-30 minutes. You can record it using Zoom and upload video to Google drive/YouTube.
- In-class demo will be conducted in the week of 4/25
    - All members of the project should present part of the project, with camera on.

**Project evaluation:**

- Proposal (10%)
- Midterm progress report (10%)
- Final report (10%)
- Implementation (50%)
    - User interface, utilization of cloud database, other functions of the app
- Demo (5%) and video (5%)
- Peer evaluation (10%, conducted in the last week of the semester), based on:
    - the societal impact/value of your app
    - its user experiences
    - how well it meets the requirements.
- Bonus points (up to 20%)
    - Truly impressive projects may receive bonus points
    - Impressive projects are ones that has:
        - good peer evaluation
        - significant societal impacts
        - "wow" factors
        - well received by the teaching staff

**Example projects:**

- Build a social app for collaborative learning among data science students
    - The app may import student data from their LinkedIn profiles, resumes, etc.
    - It may also obtain data directly from students, e.g., via survey/input function of the app. Refer to background survey for information the app may collect from the students.
    - It may include course registration data (e.g., student X has taken courses Y). These data may be obtained from students or imported from student registration record.
    - The app may support communication among current and past students.
    - It may also allow students to share their course learning, internship, and job experiences; and form study/project teams.
    - The app may allow students to submit questions (similar to that in Piazza, but not necessarily on specific courses) and may find answers to similar questions asked by someone in the past or recommend other students (based on his/her past activities on Piazza and academic background) who might know the answer. For examples, asking for suggestions on which courses to take.
    - It may also extract student data from Zoom chat log, Piazza, etc.
    - I can provide some example data from Piazza, Zoom, etc. to get you started.
- Safety awareness around USC campus:
    - Build an app that uses past alerts from DPS (department of public safety) of USC to alert people when they are in the proximity of areas where previous incidents occurred. It may also show the images of suspects previously identified.
    - You may find and extract a list of such alerts available on DPS web site (https://dps.usc.edu/category/alerts/ ) , or you can find them in your emails (app may have an import function that automatically extracts contents from the DPS emails).
    - DPS also has a list of daily crime & fire log: https://dps.usc.edu/alerts/log/
- Community report and watch

    - Build an app (similar to https://www.nextdoor.com) that allows people to report issues in the community (e.g., trees falling down, broken equipment in park). But perhaps different from other apps, your app can connect to the right services (e.g., city or park services) for fixing the issues.

Additional example projects and resources that help you brainstorm:

- UW Data Science for Social Good summer program (look for project summaries)
    - Understanding Congestion Pricing, Travel Behavior, and Price Sensitivity. Washington State Transportation Center, Data science fellow project, 2019.
    - Developing an Algorithmic Equity Toolkit with Government, Advocates, and Community Partners. UW Information School, Data science fellow project, 2019.
        - Katell, Michael, Meg Young, Dharma Dailey, Bernease Herman, Vivian Guetler, Aaron Tam, Corinne Bintz, Daniella Raz, and P. M. Krafft. "Toward situated interventions for algorithmic equity: lessons from the field." In Proceedings of the 2020 conference on fairness, accountability, and transparency, pp. 45-55. 2020.
    - Sivan Tuchman, Research Analyst, University of Washington, Bothell,. Access to Out-of-School Opportunities and Student Outcomes. Center on Reinventing Public Education, University of Washington. Data science fellow project, 2018.
    - Automatic Damage Annotation on Post-Hurricane Satellite Imagery. Industrial & Systems Engineering, University of Washington, Data science fellow project, 2018.
    - Strengthening capacities, knowledge and data sharing platforms for sustainable development. DSSG (Data science for social good) fellow project, 2017.
    - Mining Online Data for Early Identification of Unsafe Food Products. DSSG project, 2016.
    - Assessing Community Well-being through Open Data and Social Media. DSSG project, 2015.
- Data Science for Social Good Summer Program at Stanford
    - 2021 projects
        - Forecasting Aids for COVID-19 Research
        - Measuring spatial-temporal change of physical conditions in neighborhoods with street view imagery
        - Operationalizing Equity Tiebreaker in San Francisco Student School Assignment
    - 2020 projects
        - Improving predictions for targeted human trafficking investigations in Brazil
        - Building a network of land ownership in Kenya
- Data science for social good summer fellowship projects at CMU
- AI for social good at USC
    - Project ideas
- Coulton, Claudia J., Robert Goerge, Emily Putnam-Hornstein, and Benjamin de Haan. "Harnessing big data for social good: A grand challenge for social work." Cleveland: American Academy of Social Work and Social Welfare (2015): 1-20.
- IDS (integrated data system) for social innovation. University of Pennsylvania (watch the video and examples on this web site).

Resources on how to build a Web app:

- Streamlit
- Firebase Firestore Tutorial: https://www.youtube.com/watch?v=4d-gIPGzmK4
- Past students have also used Flask, Django, AngularJS