

Special Topics in Design, DSL 810

I would be offering an elective course DSL 810 in autumn semester 2020 on Data Driven Design. Since this course is not there in the course catalog yet, so I am sharing the contents of this course. It would be called Special Topics in Design-I (DSL 810).

Please note that unlike the previous semesters, the emphasis in DSL 810 would not be on electronics and micro-controller programming since this is an online semester.

This course would help the students to explore the possibilities of data driven design in a hands-on manner. They would be able to conduct a data science analysis, right from choosing a data science oriented design problem to finding the right data sources to creating the data in the right format to predict using an appropriate machine learning model to deploying this model in an app. Some interesting examples may be:

- 1) Estimating the spread of COVID-19 based on meteorological factors using regression
- 2) Predicting a medical condition based on risk factors using classification
- 3) Estimating the fitness of a person through human activity recognition data collected from the smart phone sensors via classification
- 4) Using Wi-Fi data to predict occupant behavior using big data analytics
- 5) Sentiment analysis for amazon reviews data, facebook comments data, WhatsApp data and so on.

The students would also study the statistical approaches for user research, concept selection and user testing through examples using the data driven design process. Some of the questions of interest may be:

- 1) How to use the various online data sources for user research?
- 2) How to choose the appropriate sample size representative of the user group population for my design problem?
- 3) How to compare concepts and prototypes through user testing statistically?

We would be using GUI based statistics and machine learning toolbox from MATLAB, R and Python for data science examples and projects.

Some of the topics to be discussed in this class are available at http://web.iitd.ac.in/~jay/dsl810/dsl810_data_science.html.

Prerequisite: It would help to have a basic programming background.