ASDS - Data Visualization

Course Number and Title: Data Visualization
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Term/Year: Spring, 2019
Class Schedule and Location: Wednesdays, 18:30 – 20:00, 203 room
Prerequisites: *None*
Co-Requisites: *None*

Course Description: This course provides an introduction to the main concepts of Data Visualization (BI). It aims to supply the necessary skill set for querying and reporting data, creating both static and interactive visualizations, working with databases and using dashboards for visualization. Leading tools will be introduced during the course. Multidimensional analysis of the data will be conducted through the use of various techniques (such as OLAP or unsupervised learning techniques like t-SNE).

Required Materials: Notes, articles, posts and other materials supplemented by the instructor
Additional Material: to be provided by the instructor

Schedule & Topics: If the schedule changes for any reason, this will be posted on Moodle.

Week	Topic	Description	Assignments
1	Introduction to Data Visualization	Core concepts, tools, techniques and approaches	N/A
2	Python: an overview	Data types and structures, Control flow	HW1
3	Data manipulation with Python and pandas	Data manipulation using pandas	
4	Plotting using matplotlib and seaborn	Creating graphics using matplotlib and seaborn	Due :HW1 HW2
5	Introduction to Plotly (alternative: bokeh)	Interactive visualization in Python	
6	Reporting using Pweave	Creating interactive reports with Python and Markdown	

7	Developing dashboards with Dash	Developing interactive user interface with Dash	Due :HW2 HW3
8	Introduction to Dash and folium	Developing dashboards with dash and maps with folium	
9	Introduction to HTML and CSS	Basics of web development	Due :HW3 HW4
10	Customization of dashboards with HTML	Incorporating customs components into shiny/dash application	
11	Data scraping using *beautifulsoup and regex.*	Scraping data from web pages and extracting knowledge from stings	Due :HW4 HW5
12	Dealing with APIs in Python	Requesting structured data from Google, Twitter and other sources	
13	Python and SQL: SQLALchemy	Dealing with database in Python	Due :HW5 HW6
14	Plotting multidimensional data	Using unsupervised learning algorithms to concisely plot multidimensional datasets	Due :HW6
15	Final Project	Submission Pitching session	

Learning Outcomes:
Course Structure:
Instructor-led class will meet once per week. Home tasks may include readings, individual homework, and group projects. All home tasks must be completed before the discussion starts. There will besix homework assignments and a final project.

Method of Evaluation:
Student learning will be evaluated on the basis of the following weighted components:

- *Homework – (60%) [each 10%]*
- *Final Project – (40%)*

All of components above are graded based on the presentation (pitch deck, delivery, Q&A etc.) and the underlying document (with all the necessary calculations, estimations and forecast) submitted to the instructor (the presentation and the document will have equal weight). The document format will be provided by the instructor and will mainly highlight homework and classroom assignments.

Class attendance and participation:
Students are expected to attend class and demonstrate their understanding of topics by participating in class discussions. The data of the attendance monitoring will be created based on several checkpoints, randomly chosen by the course instructor. Students who arrive late or leave the class early may be counted as being absent for that class session. Regular missing can result in a grade reduction of the overall grade at the end of the semester. Students are highly expected to demonstrate their understanding of topics by participating in class discussions.

Final Session
Students work individually or in teams of two people in order to complete an in-depth analysis of a particular problem and present their findings to the class using appropriate media and technology. The assessment rubric will be provided by the instructor. Students must submit a proposal by week 8 identifying members of their team, their project focus, and a brief plan for their investigation. Teams are expected to meet periodically with the instructor in order to solicit guidance and feedback as they develop their analysis and conclusions. Students will be assessed on the quality of their analysis and presentation.

Library and Media/Technology Use
Students are encouraged to use supplemental online and reference materials available at the library to enhance their overall learning in the course. Students are encouraged to use audio-visual aids and presentation software as appropriate.

Late Policy
Assignments must be completed on-time. Late submissions may be refused.

Make-up Procedures
Generally, no make-ups are allowed. Students must submit convincing evidence of a medical or other emergency that makes completing an assignment at the scheduled time impossible.

Contingency:
Any situation which is not explicitly covered by the syllabus will be resolved based on the following principles:
- Fairness
- Rational judgment
- Instructor's grounded position

The syllabus is subject to change and it is the responsibility of the student to stay abreast of these changes.

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