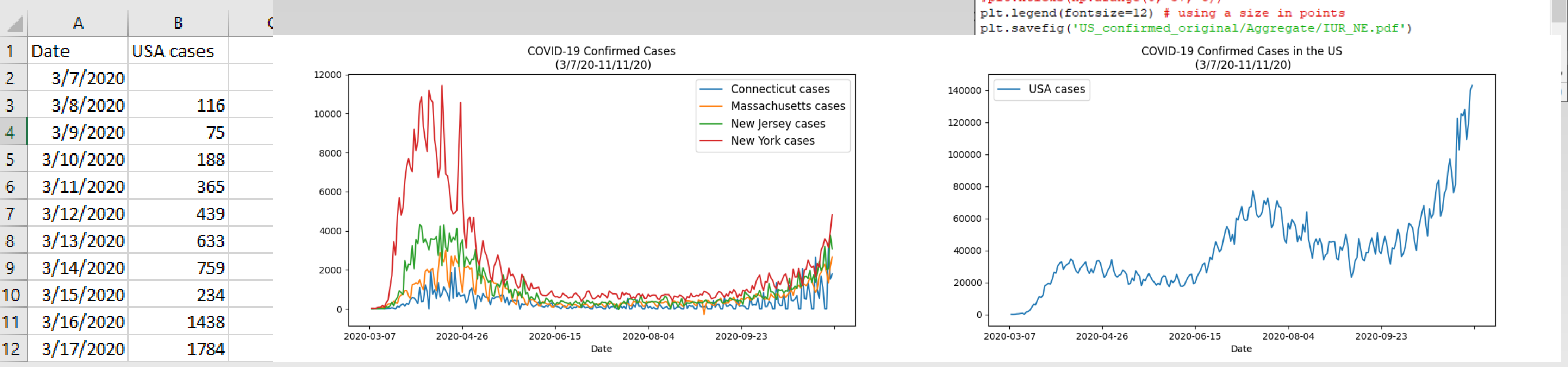


COVID-19 Data Analysis is a fitting project that can be used at different levels of CS courses.

- **Data availability:** COVID-19 data can be obtained from many well-known public sources such as CDC[1], JHU[2], WHO[3], etc.
- **Ease of comparison:** Many analysis results and data visualization outcomes have been published based on these common COVID-19 data, so students can compare their own results with the published results.
- **Practicality:** Since COVID-19 data is real-world data; it provides students with the opportunity to use the technology and skills learned in the classroom to deal with such dynamic and constantly updated datasets and gain benefits.
- **Student engagement:** Students appeared to get engaged easily in the projects. May be because as they are the witness and history is unfolding before them. They felt that they are dealing with their own data.
- **Multi-perception:** The data is multi-dimensional. In addition to having information about cities, counties, states, countries, etc., it contains information about age, gender and race. Multiple facets of COVID-19 data allow data analysis to be performed from different angles.

CSC 180: Fundamentals of Computing

We provided daily new case data of CT, MA, NJ, NY and US in the csv table format. Students were required to use Python to show the trend of new cases in each state and the country and compare differences. To prepare them for the project, students were provided with simple data sets and program examples. Guidelines were given on how to read formatted data and display it in a specific graphical representation.



CSC 305: Data Mining and Applications

Possible project topics include

- How does the COVID-19 vaccine affect the number of positive cases?
- Assess the potential relationship between the number of administered COVID-19 vaccines and COVID-19 mortality”.
- The Impact of COVID-19 on Northeast: from the perspective of CFR and unemployment
- Using LS-Boost learner to predict the prevalence of COVID-19 in Northeast

Students need to collect and prepare data based on a specified problem outlines and process the data accordingly. They need to use data mining and machine learning techniques to discover certain patterns and interesting trends and draw informative conclusions.



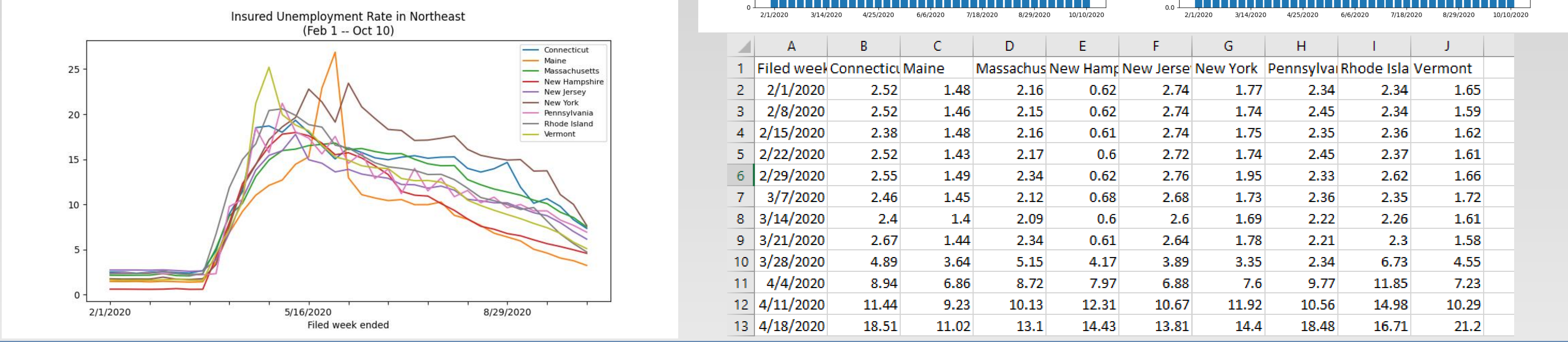


COVID-19 Data Analysis Applied to Computer Science Courses

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CSC 202: Introduction to Programming and Machine Intelligence

We provided students with unemployment data[4] (e.g., the insured unemployment rate) of Northeast states (CT, MA, ME, NH, NJ, NY, PA, RI and VT) and asked them to discover changes in unemployment during the pandemic, Feb to Oct 2020. They used tables and graphics to present results and saved them in files and appropriate directories.



CSC203: Advanced Programming for Data Science

A possible data analysis project could be to create a simple COVID-19 dashboard. The procedure is [5]

- 1) Collect data from trustworthy sources;
- 2) Clean, select and prepare data according to the dashboard requirements;
- 3) Perform data processing, such as using Plotly to visualize 10 worst-hit countries (or states); and/or using Folium to plot all confirmed cases (or deaths) on the World (or US) map;
- 4) Use Voilà to convert the Notebook to a standalone dashboard.



This work aims to share the experience of applying COVID-19 data analysis to different levels of CS courses that teach data science. Interested parties can gain some useful insights from the report.

References

[1] CDC COVID data tracker. https://covid.cdc.gov/covid-data-tracker/#cases_casesinlast7days.
[2] COVID-19 data repository by the CSSE at Johns Hopkins University. <https://github.com/CSSEGISandData/COVID-19.2020>.
[3] World Health Organization. <https://covid19.who.int/table>
[4] US department of labor, employment & training administration. <https://oui.doleta.gov/unemploy/claims.asp>.
[5] Harshit Tyagi Building COVID-19 interactive dashboard from Jupyter Notebooks [Building COVID-19 interactive dashboard from Jupyter Notebooks | by Harshit Tyagi | Towards Data Science](#)