Customizable Analysis and Visualization Tool for COVID Cases

Milestone 6

Team Members

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Faculty Advisor/Client

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Progress Matrix

Task	Stian	Sam	Nicole	CJ
1) Selecting a variable (column in a dataset) used in the different plots below	-	-	-	100%
2) Plot template for trends over time (line)	50%	-	-	50%
3) Plot template for proportion among categories (pie)	-	-	-	100%
4) Plot template for relationship between possible factors and situations (scatter)	45%	10%	-	45%
5) Plot template for distribution over FL counties (map)	-	-	-	-
Showcase Deliverables and User Manual	10%	30%	30%	30%

Showcase Poster

NORTHROP GRUMMAN
ENGINEERING & SCIENCE
STUDENT DESIGN SHOWCASE
FLORIDA TECH

Custom COVID-19 Dashboard

Calvin Burns, Nicole Wright, Sam Hartle, Stian Olsen
Faculty Advisor: Dr. Philip K. Chan, Dept. of Computer Science, Florida Institute of Technology

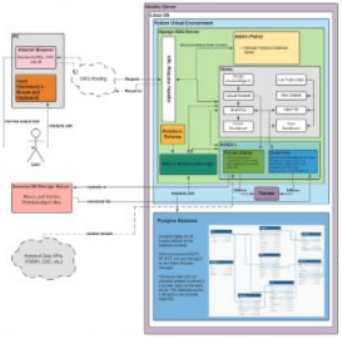
MOTIVATION

- During the COVID-19 pandemic, our advisor noticed the lack of interactive and customizable COVID-19 statistics websites/dashboards
- The majority of dashboards have predefined datasets, graphs, and maps
- No dashboards allowed the user to perform their own statistical analysis or create their own plots
- No dashboards allowed users to upload additional data to use in conjunction with the sites existing data
- Few dashboards have layered plots, none allow the user to create their own layered plots

GOAL

- Develop an interactive and customizable COVID-19 statistics dashboard that allows users to perform custom analysis, create custom plots, upload their own datasets/share them, layer multiple plots, and save a configuration of plots to a dashboard

DESIGN

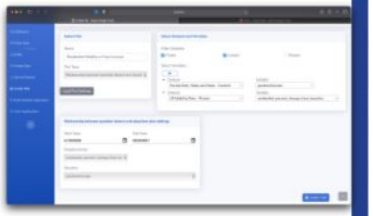


FEATURES

- Upload/View Dataset
  - Users can upload a CSV dataset of COVID-related data
  - Dataset is compressed into a pickle object and can be viewed as a table on a separate page
- Dataset/Variable Selection
  - Users can filter their dataset selection to include the 3 types of datasets
    - Private
    - Curated (Reviewed by admin)
    - Shared (Not reviewed by admin)
  - Users can search for a variable in their selected dataset(s)
- Build Plot
  - Users can choose a visualization method and build different types of visualizations from variables in their chosen dataset
    - Trends over time
      - Users can select frequency of time range
        - Daily, weekly, or monthly
    - Proportion among categories
      - Visualization of a selected variable among a set of categories
    - Relationships between factors and situations
      - "Cause and effect" visualization
    - Distribution over FL counties
      - Heat map of Florida counties showing the prevalence of a variable in that county
  - Each visualization method has a customizable time range based off of the chosen dataset
- View Plot
  - Users can view a list of their created plots and select individual ones for more detailed viewing

EVALUATION

- Majority of time was spent on design decisions
  - Crucial to success of project due to large amounts of COVID-19 related data
- Utilized the Python pickle module to serialize and deserialize datasets for more efficient storage



Interface for plot creation (Trends over time)

Resulting plot

FUTURE WORK

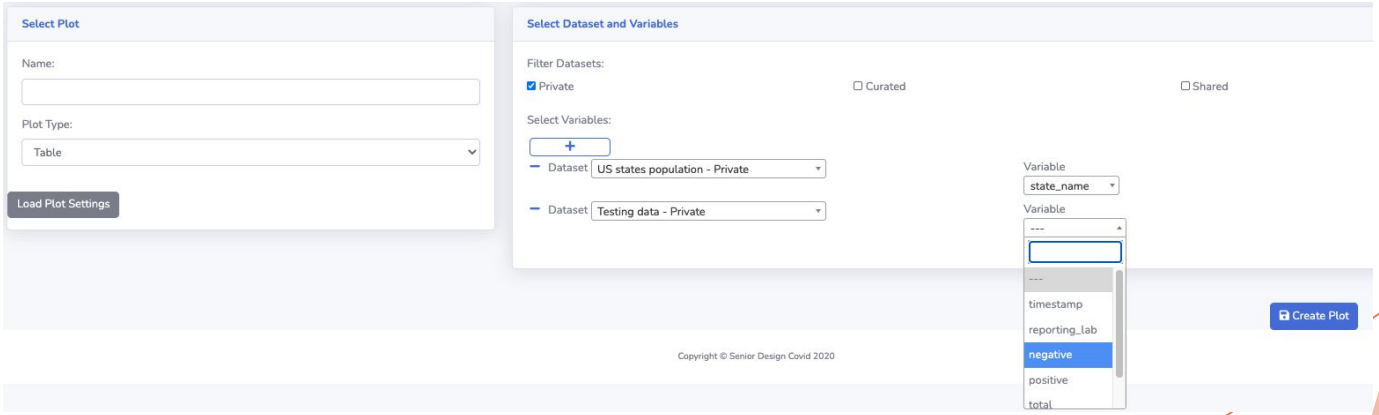
- Allow users more customizations with operations they can carry out on variables in a dataset
  - Ex. Calculating positivity rate per 1,000 people in a specific Florida county
- Expand the scope of the dashboard to the entire United States instead of just the state of Florida

ACKNOWLEDGEMENTS

- Dr. Chan for his guidance throughout the project
- Open source tools pandas, Django, and Highcharts.JS for aiding in development

Task 1 - Selecting a variable used in the different plots

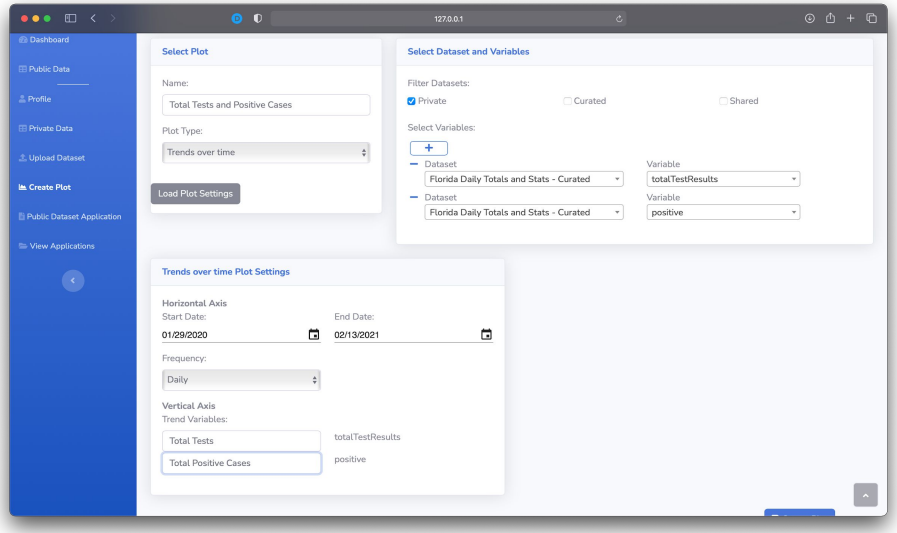
- Scope of our project was reduced
- Focus on producing 4 main plot types and reduce the customizability of our product.
- Adjust the UI to have the user select dataset/variable pairs



Task 2 - Trends over time

- Built a new UI/card specific to line charts.

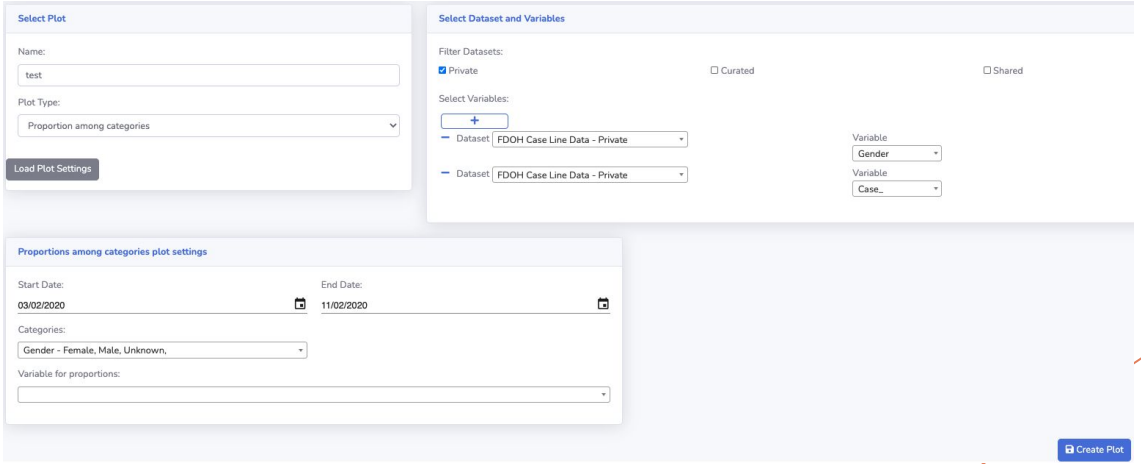
- Select:
  - Start and end date
  - Sampling frequency
  - Display name



Task 3 - Plot template for proportions among categories

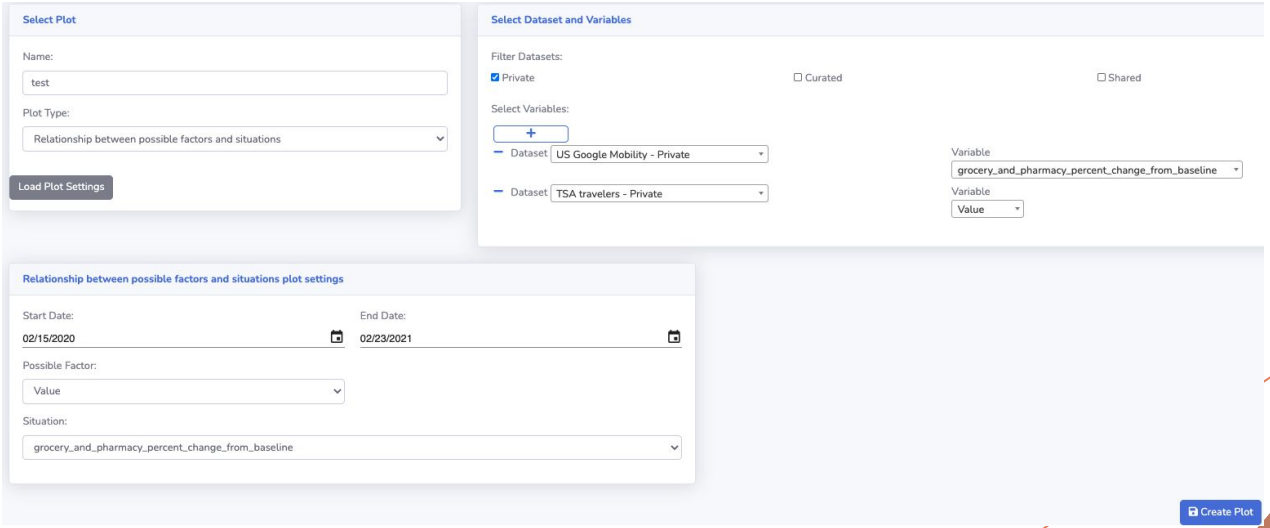
- Built a new UI/card specific to pie charts.

- Select:
  - Start and end date
  - Sampling frequency
  - Variable to use as categories
  - Variable to use to aggregate

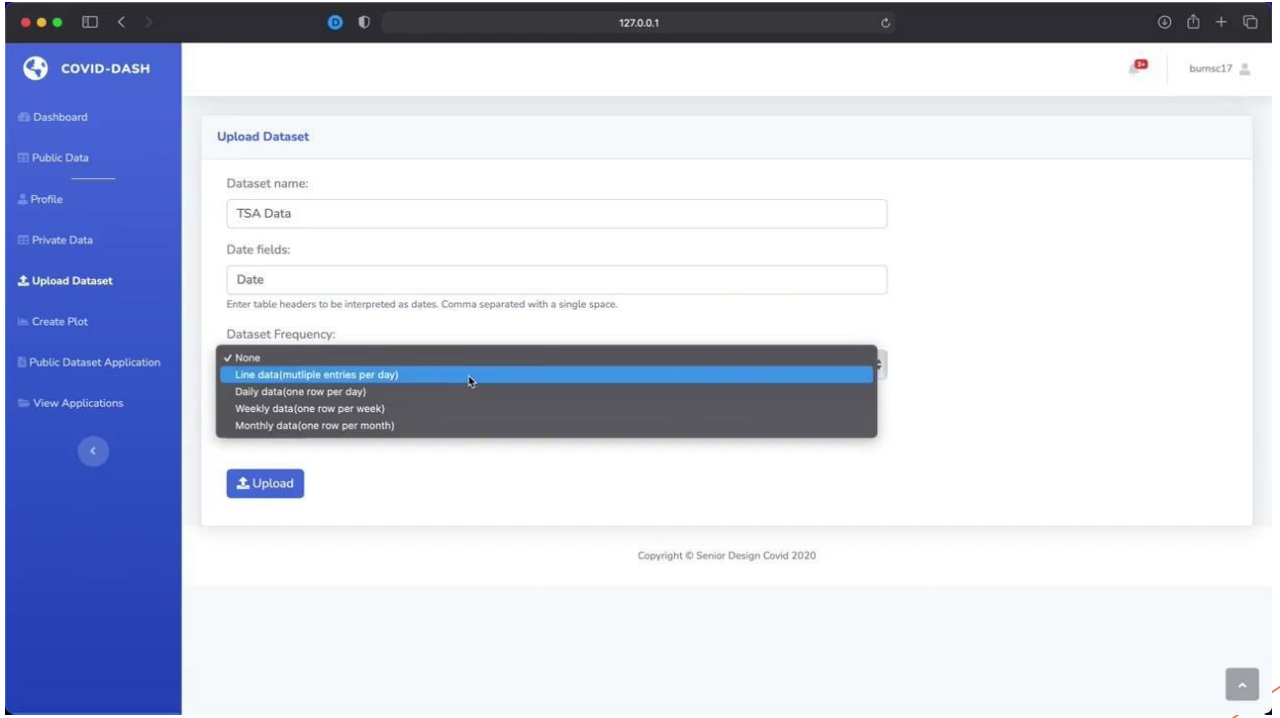


Task 4 - Factors vs Situations

- Built a new UI/card specific to scatter charts.
- Select:
  - Start and end date
  - Sampling frequency
  - Possible factor and situation from the selected variables



Project Demo



Lessons Learned

- *Project Scope*
  1. More complicated and involved than anticipated.
  2. Should have descoped earlier

- *Target Audience*
  1. Closer identification of what kind of user would be interested
  2. Would have allowed us to tailor development

Questions?