

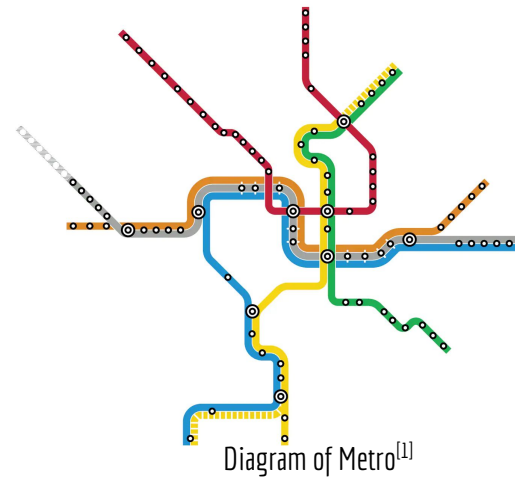
COVID-19 & Urban Mobility



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Description

- Tool to display urban mobility information in a digestible and user-friendly manner
 - Urban mobility information is in the form of Washington Metro ridership
 - Metro data was chosen due to being an ideal case of public transportation
- Machine learning model that predicts change in public transit ridership due to a pandemic
 - Takes input of demographic information and previous ridership data
- View color coded demographic information broken down by census tract



Background

- Covid-19 Pandemic significantly impacted urban mobility in the DMV area
- Lockdown to reduce transmission
- Businesses hit hard because fewer people leaving their homes
- Urban mobility information can be hard to digest in the form of research papers
- Create a tool for researchers, policymakers, and general public to better visualize the impact



DC Metro^[7]

Target Users



Policymakers^[2]



Researchers^[3]



General user^[4]

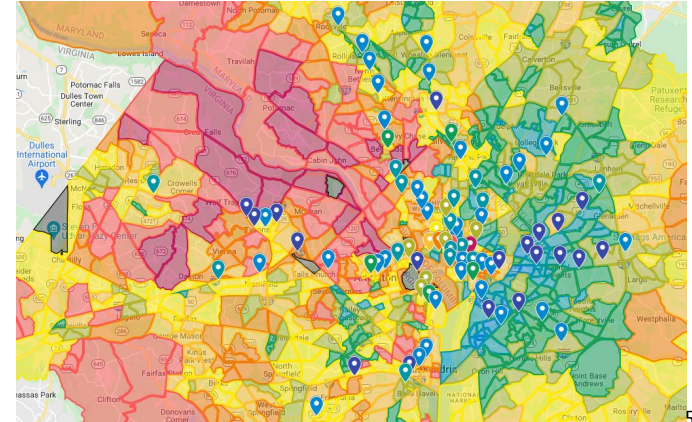


Maintenance Team^[5]

Main Functions/Features

- Two primary functions:
 - Visualize demographic and ridership data
 - Predict changes on novel census tracts and ridership situations
- Google Maps integration for easily finding specific locations
- Sources publicly available for other researchers to use

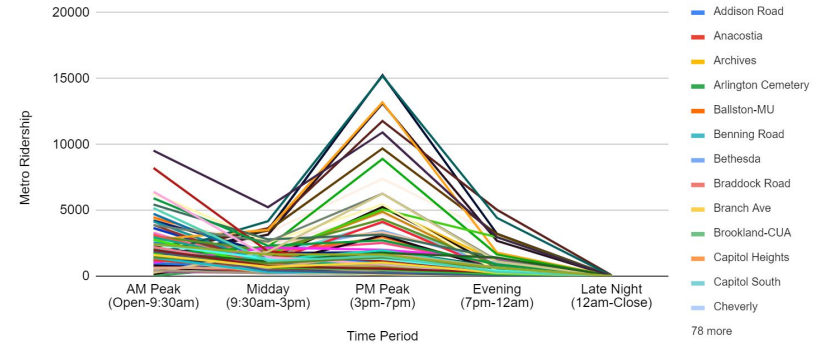
X_test.csv Tract 1		X
AM Peak (Open-9:30am)_y:	145 (-92%)	
Evening (7pm-12am)_y:	95 (-94%)	
Late Night (12am-Close)_y:	2 (-83%)	
Midday (9:30am-3pm)_y:	206 (-91%)	
PM Peak (3pm-7pm)_y:	346 (-96%)	
Grand Total_y:	795 (-95%)	
X_test.csv Tract 2		X
AM Peak (Open-9:30am)_y:	133 (-88%)	
Evening (7pm-12am)_y:	64 (-90%)	
Late Night (12am-Close)_y:	2 (-85%)	
Midday (9:30am-3pm)_y:	154 (-81%)	
PM Peak (3pm-7pm)_y:	168 (-90%)	
Grand Total_y:	523 (-88%)	
X_test.csv Tract 3		X
AM Peak (Open-9:30am)_y:	207 (-80%)	
Evening (7pm-12am)_y:	37 (-76%)	
Late Night (12am-Close)_y:	1 (-50%)	
Midday (9:30am-3pm)_y:	182 (-71%)	
PM Peak (3pm-7pm)_y:	126 (-79%)	



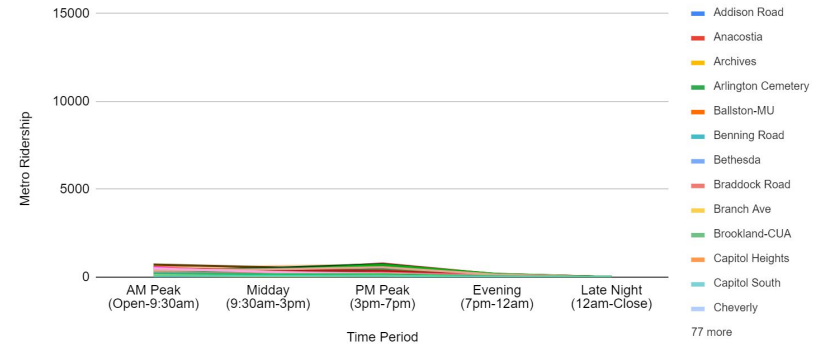
Methods

- Front-End:
 - Vue to create the framework
 - Google Maps API for color-coded KMLs
- Back-End (ML):
 - Data Collection/Scraping
 - Data Preprocessing
 - ML Model Architecture Experimentation
- Back-End (Docker/Kubernetes):
 - Uploaded to VT CS Cloud web hosting services

Metro Ridership Numbers Throughout the Day (May 2019)



Metro Ridership Numbers Throughout the Day (May 2020)



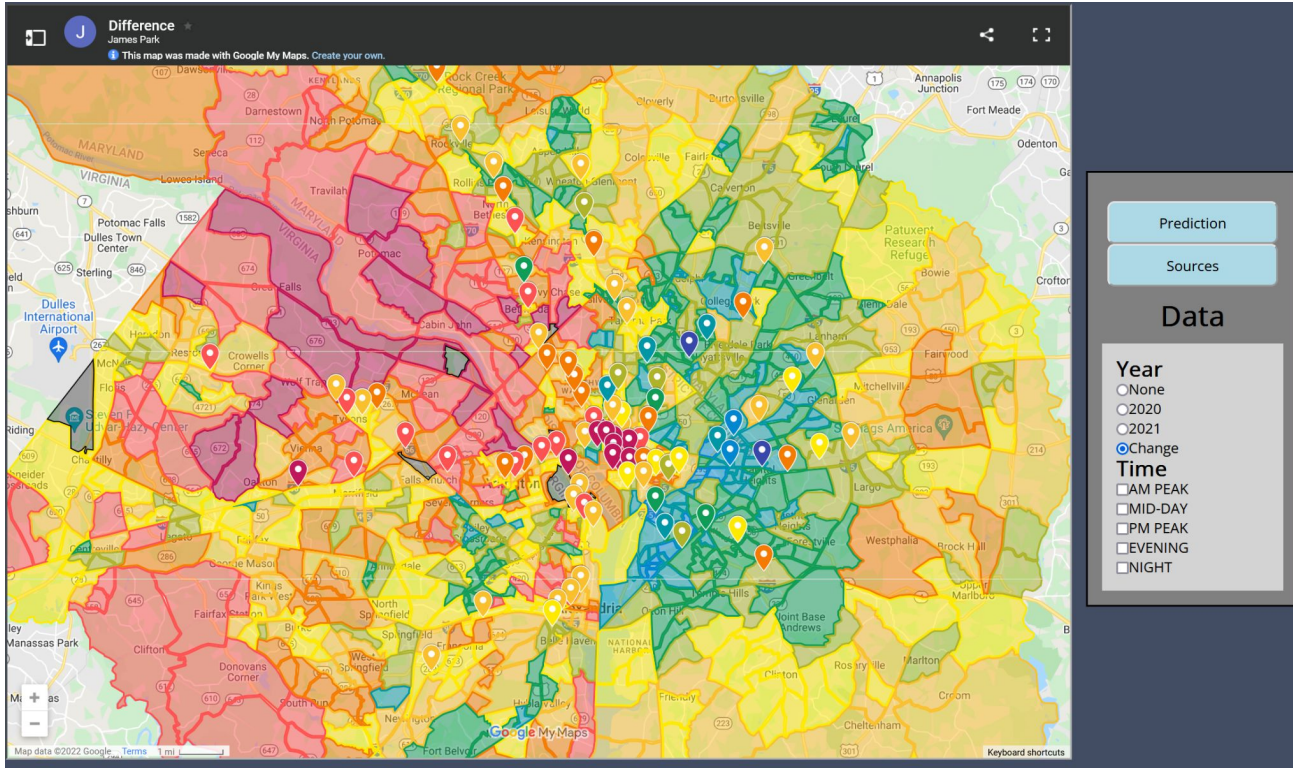
Difficulties Encountered

- Poor communication at beginning of Sprint 1
- Acquisition of metro rider data
- Docker issues
- Limitations of Google Maps/difficulty of custom visualization
- Learning Curve for new technologies



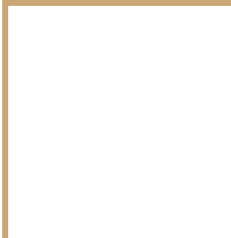
Artist's Interpretation of Brian struggling to figure out Docker^[6]

Demo



References

1. <https://www.washingtonpost.com/blogs/wonkblog/files/2015/01/dc.png>
2. https://i.guim.co.uk/img/static/sys-images/Education/Clearing_Pix/furniture/2014/11/10/1415641501542/Came-rons-cabinet-010.jpg?width=465&quality=45&auto=format&fit=max&dpr=2&s=b92d6baf3813da7fc2d17df15c1927f5
3. <https://statements.eahp.eu/sites/default/files/EP.JPG>
4. <https://service-tree.com/wp-content/uploads/2018/07/Managing-an-IT-Team-in-a-Business-Not-Tech-Focused-ServiceTree-1024x683-1.jpg>
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7. <https://resources.twc.edu/articles/five-step-guide-dcs-metro-system>



Thank you!
Questions?

