Flooding: Impact on Real Estate Values

NJ Raritan River

Real Estate near the Raritan River

Rain Overflow

Central Jersey - Somerville and New Brunswick

Raritan

IDA
Sandy

Real Estate

List Price

Were you looking at purchasing or investing in property in Central Jersey along the Raritan River?

Perhaps you are looking to identify bargain opportunities to purchase real estate and are considering insurance premiums and payouts.

You've come to the right place.

Next slides will provide insight into flooding potential and show if there is a relationship to residential real estate values.

Our Findings

MACHINE LEARNING MODELS

ModelsML_Pricedrop.ipynb (This has detail test and train model for ML to predict

NJ_flood risk and house Pricedrop variaton Prediction).

SUPERVISED LEARNING

1. Prileminary code preprocessing (at this moment only newbrunswick and Bridgewater).

2. using ML codes ran

(Logistic Regression,Decision Tree,

RandomForest)

RESULTS

1.logistic Regression gave 0.5988372093023255 accuracy

2.Decision Tree gave 0.7848837209302325

3.Random forest gave Accuracy Score : 1.0 -(which is to the perfection but in reality no data can be so perfect ,so ignoring this Model.)

VISUALIZATION OF MODEL

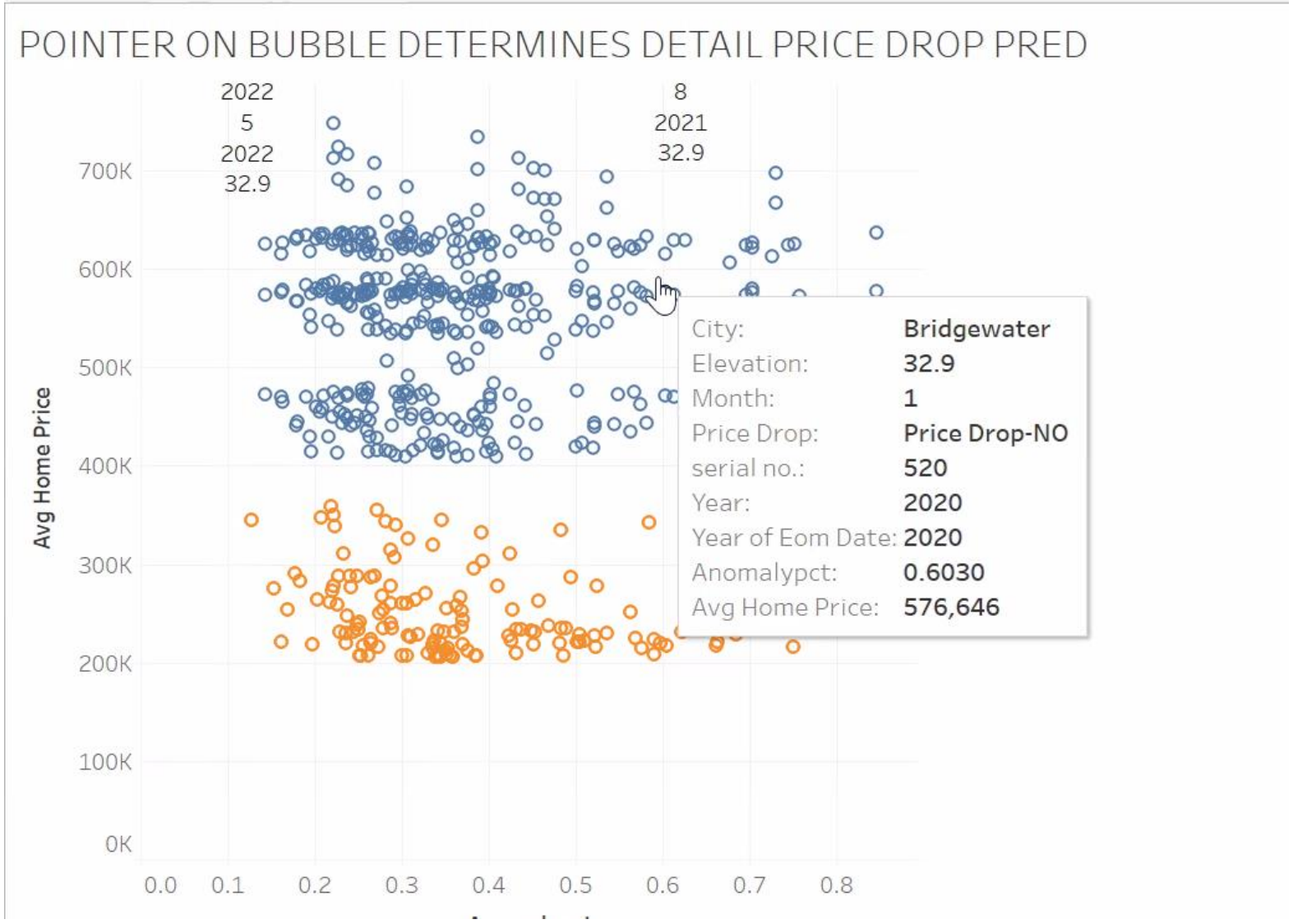
output is in folder TABLAUE VISUALISATION OF DATA-ARCHANA

Heatmaps Rain levels by Month

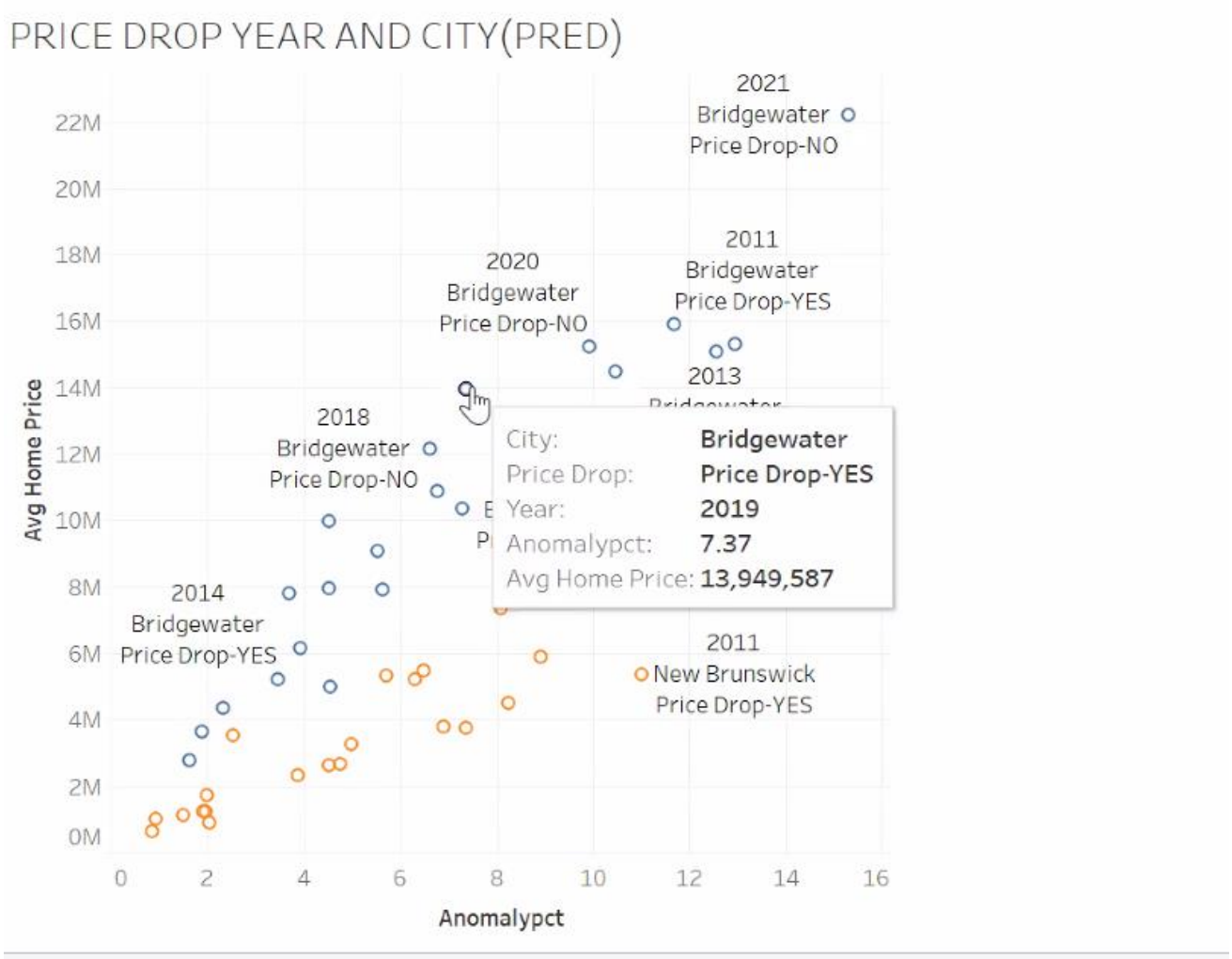
Line Charts Rain vs. Pct change in Real Estate

Bar Charts?

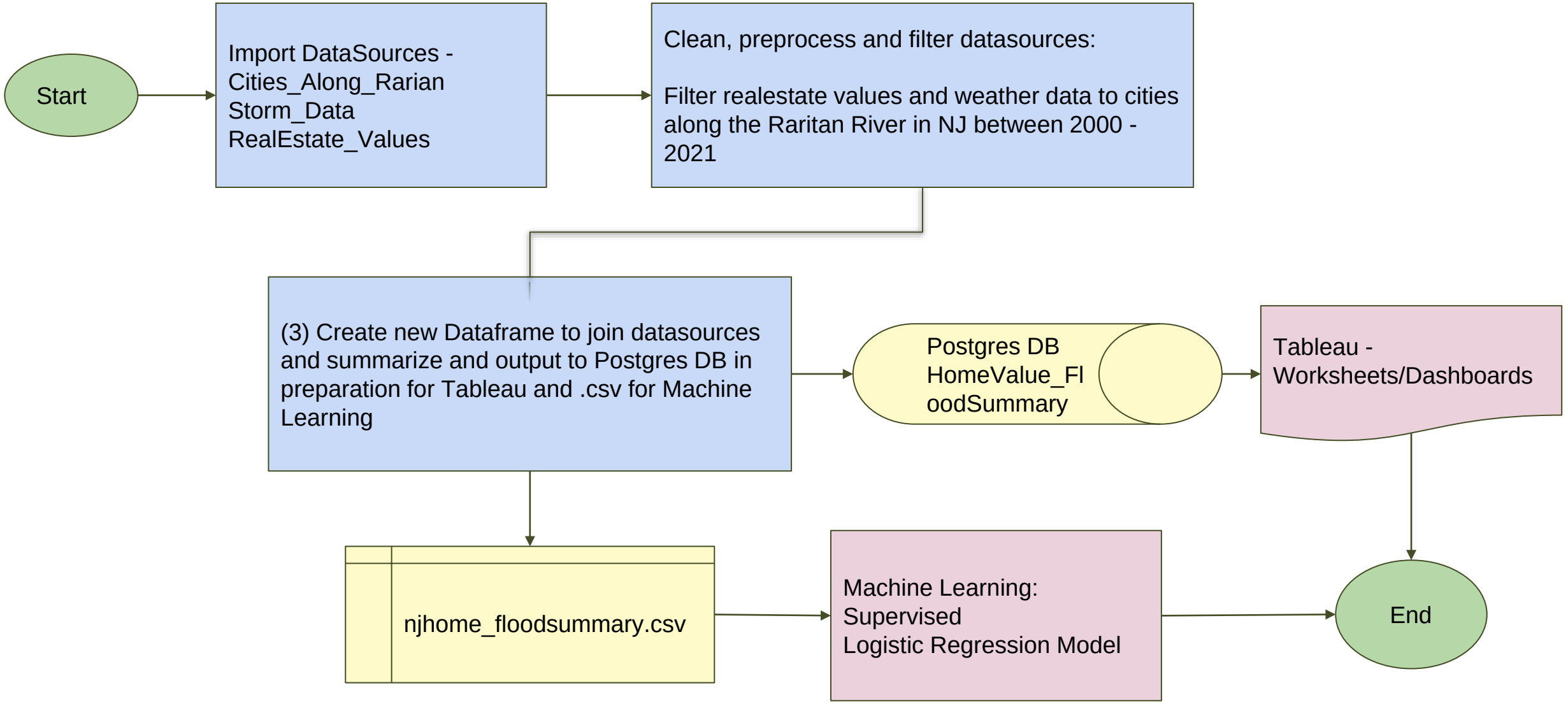
Machine Learning - Precipitation Anomaly vs. Home Price



Machine Learning - Price Drop By City



Source Data Flow to Analysis Presentation
Github Repo: https://github.com/c-ramos/NJ_Flood_Risk_Capstone



Appendix

Key Datasources and URLs

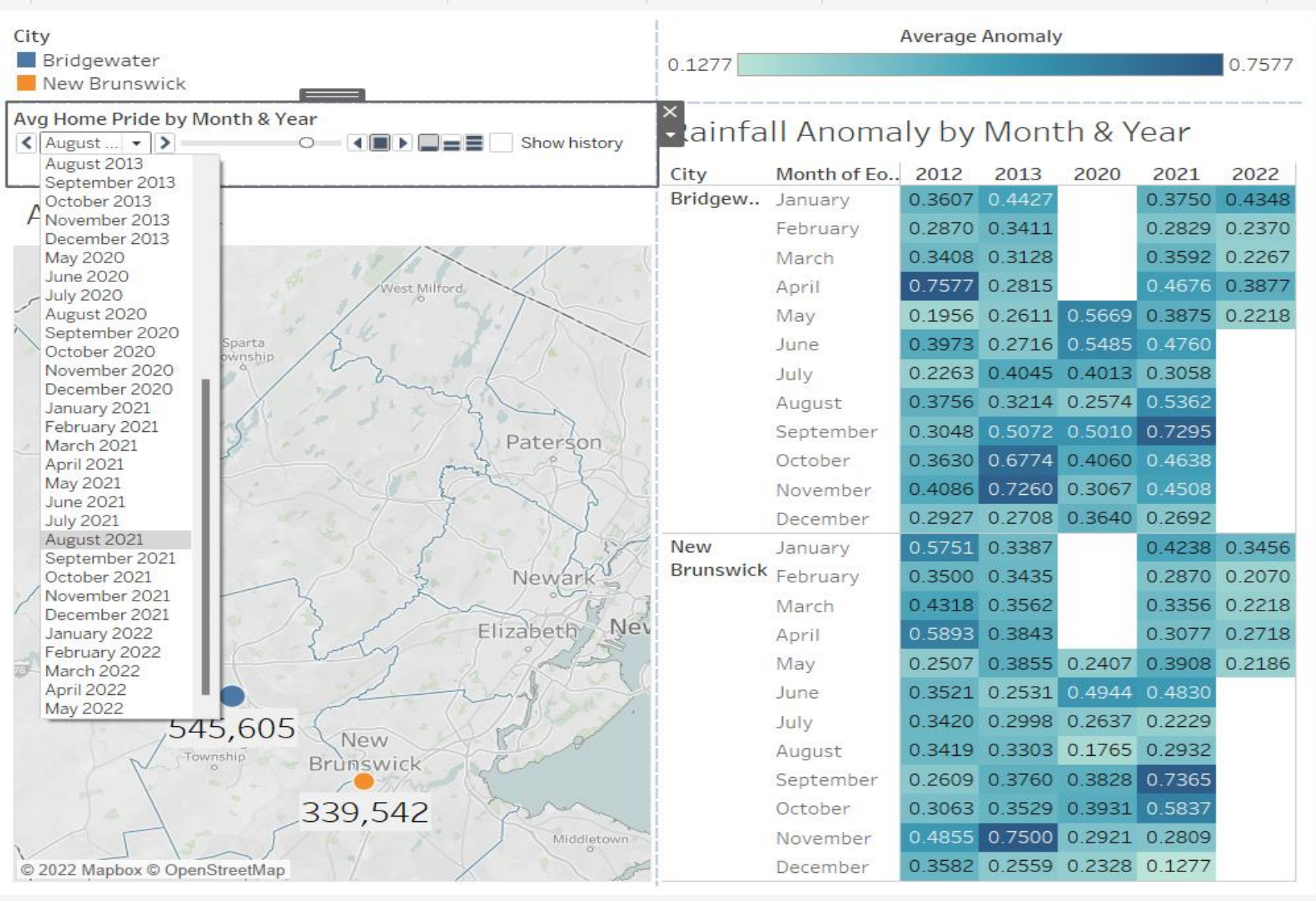
Dataset	DataSource	Details
Cities_Along_Raritan,csv	FEMA Flood Map Service Center | Search By Address	Picked select cities along Raritan River, NJ. Also select 1 or 2 cities not prone to flooding in the nearby area.
daily_rainfall.csv (combined from all .csv's listed in /Resources/Cities CSVs	https://www.ncdc.noaa.gov/cdo-web/datasets	Precipitation: daily rainfall in inches by city (historical from 2000 to 2021).
ZipcodePricealltypeshouse.csv	Housing Data - Zillow Research	Average list price all homes (USD) by city (historical from 2000 to 2021

Infrastructure	Link
Jupyter Notebook / SQL scripts	**Github Repo: https://github.com/c-ramos/NJ_Flood_Risk_Capstone**
AWS RDS - Postgres	**Endpoint:**
Tableau	**<URL> to Dashboard**
Machine Learning Models	**Supervised => Logistic Regression, Decision Tree, Random Forest Regression. Determine best model.**

Jupyter Notebooks, SQL scripts and Output Files (Preparation for ML and Tableau data)

Jupyter Notebooks and SQL Scripts	Description	Input Files	Output to CSV	Postgres DB Table Name
ConvertRain.ipynb	Cleans daily_rainfall, calculates mean, max, total rainfall for the month and identifies if there was an anomaly event (storm) that took place within the month.	daily_rainfall.csv	per_city_rainfall_final.csv	per_city_rainfall
CleanCities_and_HomePrice.ipynb	Cleans cities, transposes dataframe to calculate historical realestate list prices by city, month and year.	ZipcodePriceallltypeshouse.csv	njhomeprice_final.csv	njhomeprice
schema.sql	Creates tables in Postgres DB	n/a	n/a	per_city_rainfall cities njhomeprice njhome_floodsummary
njhome_floodsummary.sql	Joins the rainfall table to the real estate home listing table to export to .csv for machine learning and Tableau worksheets/dashboard	n/a	n/a	njhome_floodsummary
NJ_FloodSummary.ipnyb	Generates final .csv for use by Tableau and Machine Learning.	AWS	njhome_floodsummary.csv	njhome_floodsummary
ML_Pricedrop.ipynb	Data split into test and train. Models analyzed and most accurate model determined.	njhome_floodsummary.csv	Tableau pictures provided	

Analysis - Tableau Description



City	Month of Eo..	2012	2013	2020	2021	2022
Bridgew..	January	0.3607	0.4427		0.3750	0.4348
	February	0.2870	0.3411		0.2829	0.2370
	March	0.3408	0.3128		0.3592	0.2267
	April	0.7577	0.2815		0.4676	0.3877
	May	0.1956	0.2611	0.5669	0.3875	0.2218
	June	0.3973	0.2716	0.5485	0.4760	
	July	0.2263	0.4045	0.4013	0.3058	
	August	0.3756	0.3214	0.2574	0.5362	
	September	0.3048	0.5072	0.5010	0.7295	
	October	0.3630	0.6774	0.4060	0.4638	
	November	0.4086	0.7260	0.3067	0.4508	
	December	0.2927	0.2708	0.3640	0.2692	
New Brunswick	January	0.5751	0.3387		0.4238	0.3456
	February	0.3500	0.3435		0.2870	0.2070
	March	0.4318	0.3562		0.3356	0.2218
	April	0.5893	0.3843		0.3077	0.2718
	May	0.2507	0.3855	0.2407	0.3908	0.2186
	June	0.3521	0.2531	0.4944	0.4830	
	July	0.3420	0.2998	0.2637	0.2229	
	August	0.3419	0.3303	0.1765	0.2932	
	September	0.2609	0.3760	0.3828	0.7365	
	October	0.3063	0.3529	0.3931	0.5837	
	November	0.4855	0.7500	0.2921	0.2809	
	December	0.3582	0.2559	0.2328	0.1277	

Tableau Dashboard

1. Interactive Map: View average home price in New Brunswick or Bridgewater by month and year via drop down menu

Animated map also displays map if you press “play” button

2. Rainfall Anomaly chart: Displays monthly rainfall anomaly by month and year (2012, 2013, May 2020 – May 2022

Gradient chart
Darker blue = anomaly

THANK YOU