

INTRODUCTION

Background:

There are a lot of options these days for customers without pristine credit. American First Finance (AFF) has been committed to helping millions of people get what they need exactly how, where, and when they need it the most by providing financial services to customers right at their fingertips.

What we do?

As part of Purdue – American First Finance Corporate Partners team, our primary focus was studying the market to identify the potential future markets to expand AFF footprints as well as to boost their revenue and profit. We also focused on visualization using Geographic Information System tools to present research result to technical and nontechnical audiences in a simple way.

How we do?

There are data from 50 states and territories of the United States. We broke down the data into the state level and Metropolitan Statistical Areas level. At each level, we performed different layer of analysis using Python packages such as: Pandas, Numpy, statsmodels, etc. to provide the insight about the markets. We also performed web-scraping procedure to collect data and utilized plotly package to present the data on a U.S. map

DATA VISUALIZATION

Topic:

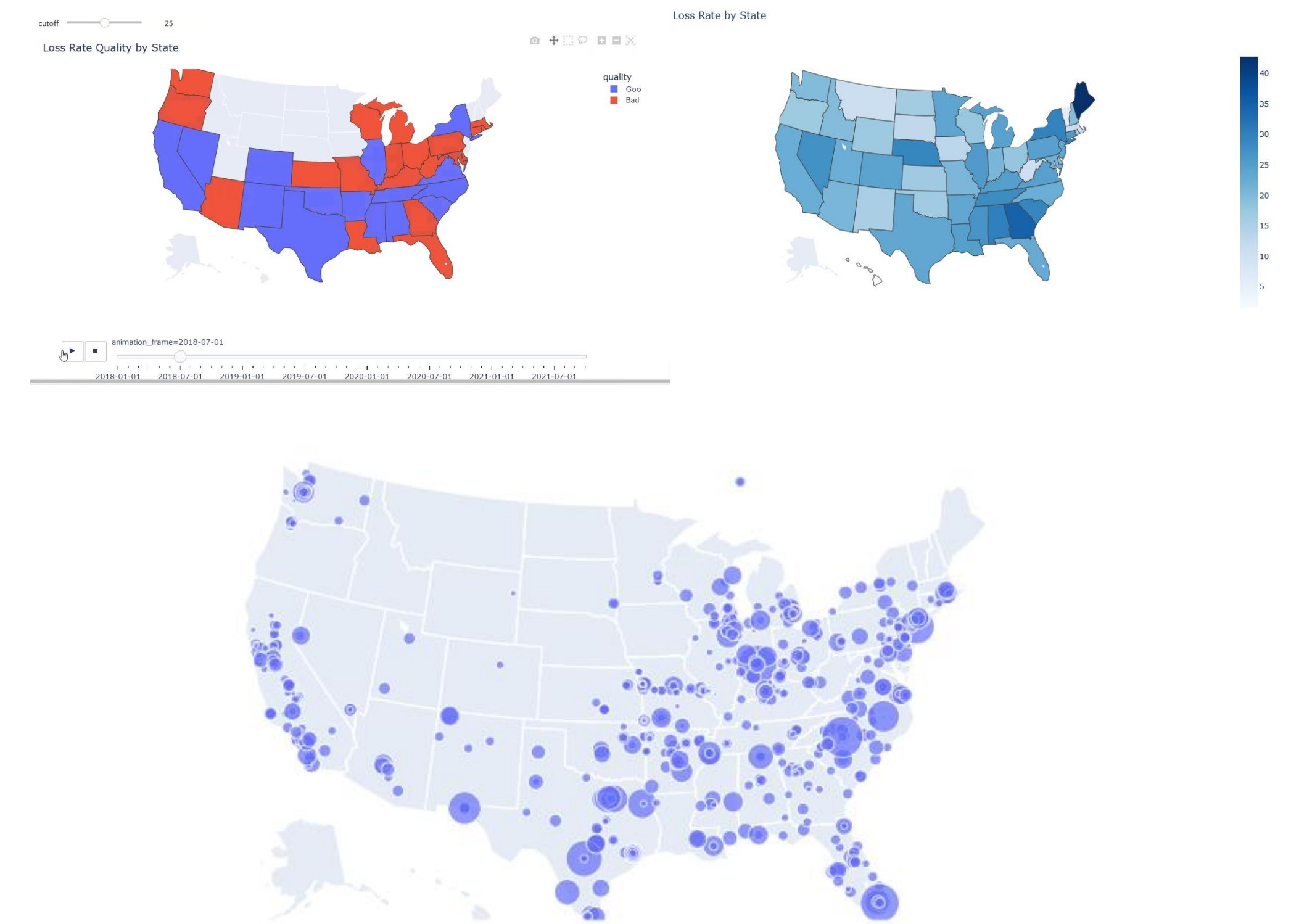
- Creating map visuals for key statistics such as applications, loss rate and FPD rate on state and MSA level

Method:

- Used plotly express for maps
- Subsetted data based on time or store ID
- Used latitude and longitude data for graphing
- A "weighted" average For each location, we summed up the defaulted amount and divided by total origination. This accounts for differences in loan volume
- Used cutoff to compare with mean FPD/Loss rate of each state per month

Results

- Interactive map with average FPD rate based on MSA
- Animation of applications, average FPD/loss rate by month according to state



ESTIMATING MSA HEALTH OVER TIME

Topic:

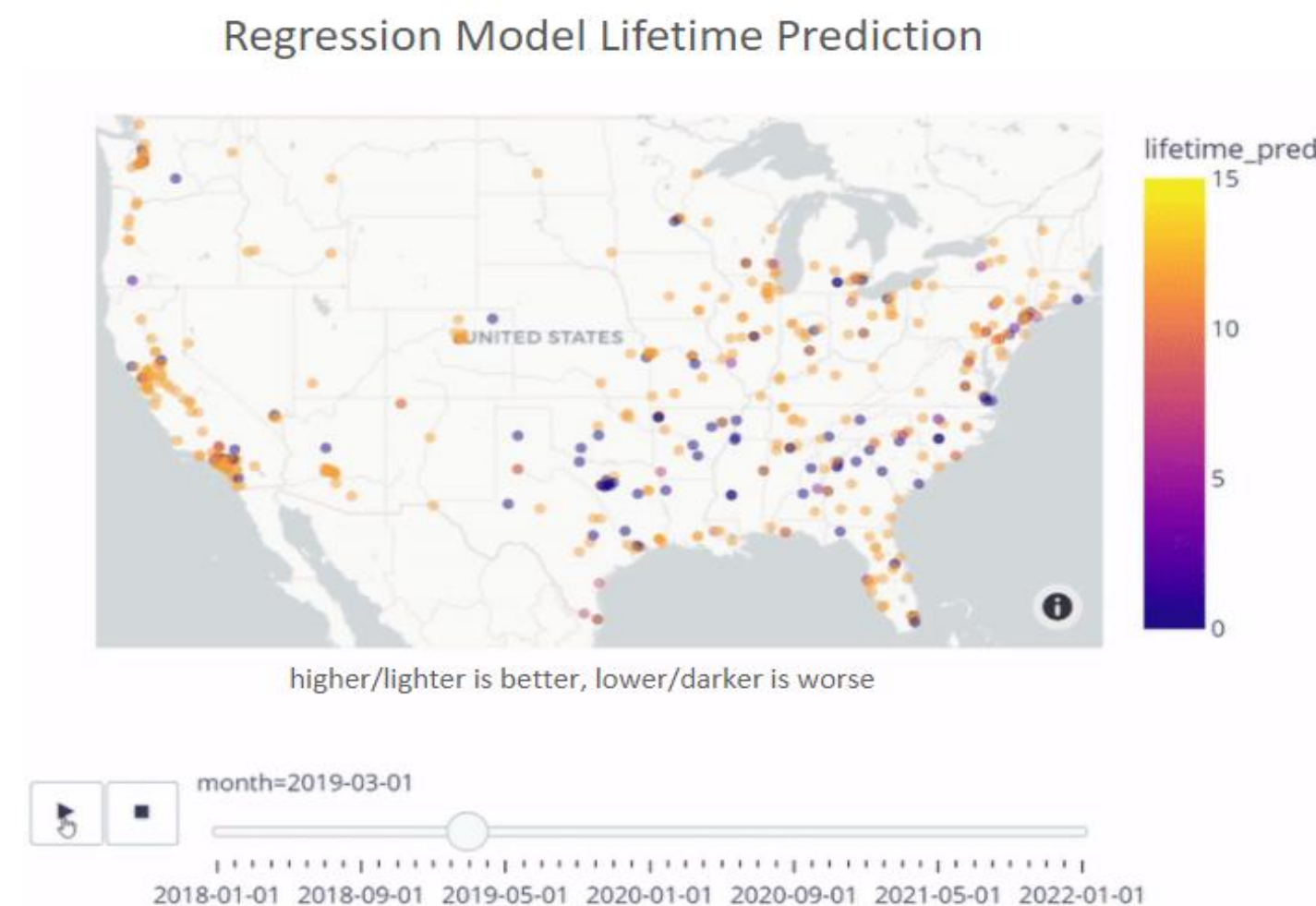
- Where do we have the best and worst performance?

Method:

- Used sklearn linear regression and plotly scatter mapbox for visualization
- Trained on weighted average FPD, loss, FICO, and originations per dealer funded of all dealers Y months prior to their termination
- Based on the idea that the financials of dealers closer to termination is worse than those farther away
- This model was applied to MSA data per month to estimate how well an MSA's financials are for that month.

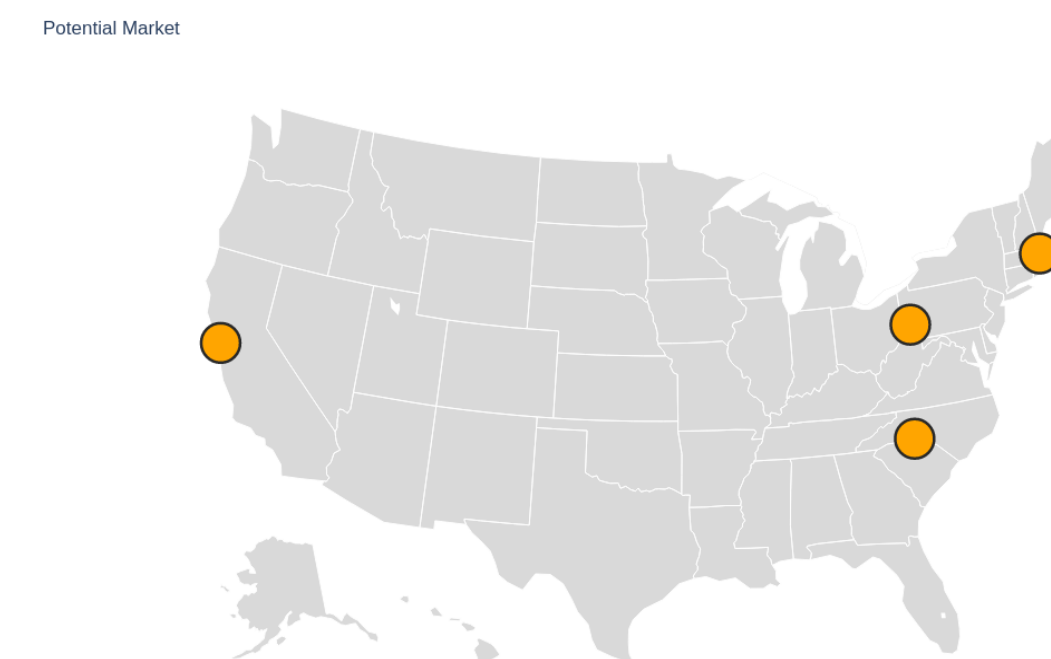
Results:

- Determine to what extent any set of financials would be considered good or bad by AFF
- Determine which MSAs demonstrate consistently poor or stable financials
- Identify which markets would be safe/financially desirable to expand in



SUMMARY

- With 7% tolerant for the FPD rate and 18% tolerant for the Loss rate, we can identify the future potential markets: Boston-Cambridge-Quincy, San Francisco-Oakland-Fremont, Pittsburgh, Charlotte-Gastonia-Concord.
- States with greatest performance:
 - Looking at the loss rate by state, we can see that Maine and Georgia has the greatest performances.
 - Based on the loss rate quality, there are more states with bad loss rate quality than states with a good loss rate quality.
- Cities with greatest penetration:



FUTURE WORKS

- Provide a joint analysis of the models and extract which MSAs are consistently performing poorly and strongly.
- Improve upon both models by accounting for categorical variables such as industry or season
- Use FPD rate and loss rate to loss at MSAs where AFF can perform better
- Look at MSAs with good applicants where AFF can look to expand
- Given a tolerant FPD rate of 7% and tolerant Loss rate of 18%, the analysis can provide the potential markets where AFF marketing team can focus on to increase its footprint as well as to boost the revenue
- Work on dealer segmentation using unsupervised learning

ACKNOWLEDGEMENT

- Data Mine Program – Purdue University
- Data Mine Corporate Mentor – American First Finance: Wallace Campbell and Chris Brown
- Data Mine Undergraduate TA: Sean Lee

REFERENCES

- Pandas - <https://pandas.pydata.org/>
- Statsmodels - <https://www.statsmodels.org/>
- Plotly - <https://plotly.com/>
- Beautiful Soup - <https://beautiful-soup-4.readthedocs.io/en/latest/>