

## COVID-19 Unemployment Payout

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**Objective:** Use county median household income (2018) data to observe its effects on the unemployment payout amount.

- Visualize median household income and the unemployment for 2019 vs 2020
- Show relationships between benefits paid and median income/amount of beneficiaries
- See what variables have the most impact on the benefits paid during 2020
- Implement a time series algorithm to predict the future of the number of beneficiaries for the next 5 years

### Data Visualizations & Analysis:

- Inserted the data into the Sqlite3, created the database and normalized the tables.
- Plotted various kinds of graphs, including choropleth maps for New York state, Confusion Matrices, Scatterplots, Line graphs using plotly and Matplotlib to perform exploratory data analysis and found out certain trends.
- Implemented a Random forest regression model, plotted a variable importance figure.
- Performed 2-component PCA on # of beneficiaries and median income, with their relationship to the response, benefits paid. Plotted the results in a scatter plot to show % of variance per component.
- Performed a time series analysis from the data of the past 20 years and predicted the future, which shows that the unemployment rate is going to stabilize and return to normal.

### Findings:

- Many states had mandated lockdowns starting March 2020, unemployment rate peaked in March and tended to slow down from the month of May. As of November, the unemployment rate is at 6.7%.
- The random forests regression model displayed that median income had minimum importance in predicting benefits paid at one time. This model placed greatest 'importance' on the New York City Region. This means that during 2020 in New York, the NYC region had the greatest impact on the benefits amount paid.
- The unemployment rate is going to stabilize over time with 95% confidence..

### Conclusions:

- As seen with the graphs, the unemployment payouts increased drastically in the months following the initial lockdowns in March, April and May
- Our prediction says with 95% confidence that in next 5-6 months the # beneficiaries that are claiming the unemployment insurance is going to become stable (return to pre-COVID numbers), and continue to stay stable in future.
- In the year 2020, New York City was the most important predictor for the amount of benefits paid at one time in New York.
- Median household income does not have much an impact on benefits paid, but we are limited to the variables within our selected dataset. Our dataset did not include more detailed information about individuals (race, age, gender etc.), that could potentially have an impact on benefits paid. These variables should be studied in the future for further analysis of unemployment payout.

