



The Economic Impact Caused by COVID-19 on People's Life

Analysis & Visualization

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Motivation/Introduction:

The goal of this project is to demonstrate how hard the pandemic hurts people's well-being, in terms of the loss of lives and job opportunities. Most current research works are focused on separate factors, such as the transmission condition of COVID 19 or the change of house market in different areas. This project explores approaches to evaluate the overall impact by considering the impact of the pandemic as well the economic environment together.

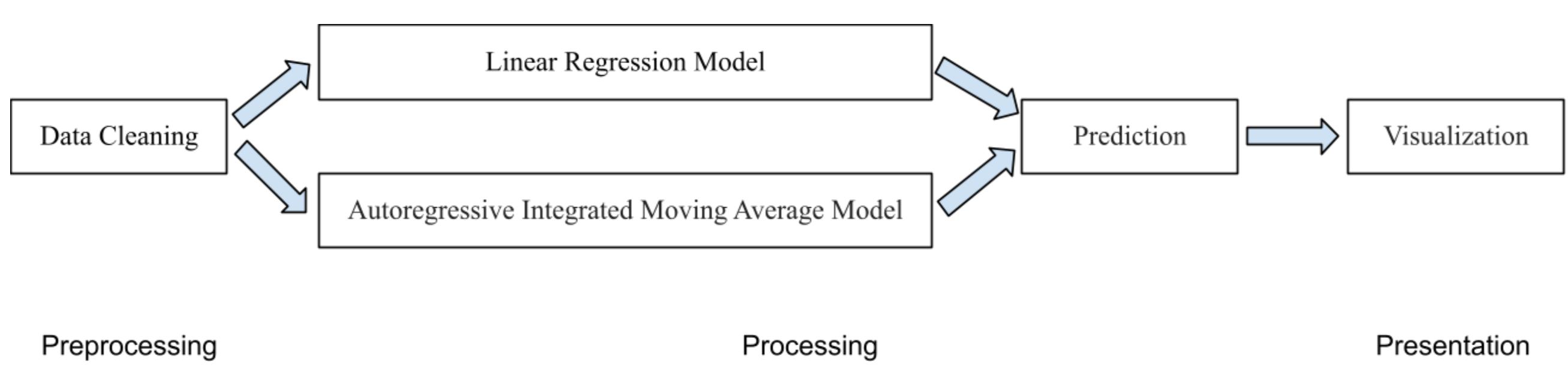
Data:

We downloaded the following data from corresponding sources:

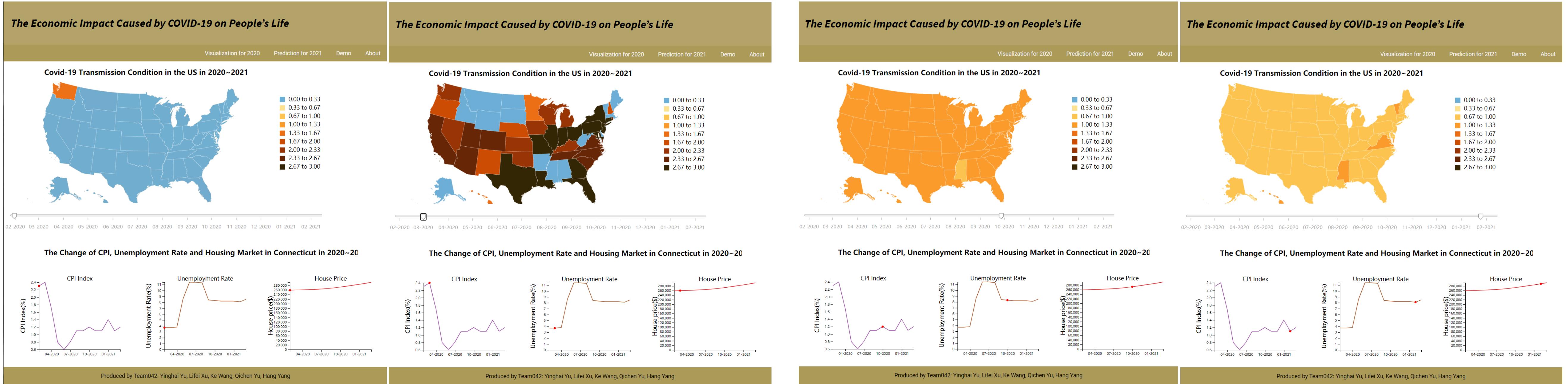
- The COVID-19 spread condition provided by [CDC](#) (~2.4GB)
- The average house price around US at county level by [Zillow](#) (~2MB)
- The CPI data by [U.S. BUREAU OF LABOR STATISTICS](#) (~61KB)
- The unemployment data by [U.S.BUREAU OF LABOR STATISTICS](#) (~4KB)

Approaches:

- Combined Linear Regression models with ARIMA models into our prediction of COVID-19 impact on our lives
- Applied statistical testing (P-value, t-statistics, R-squared, MAE, MPE, MRSE) and compared the model predictions with actual data to evaluate our models
- The predictions for housing price is mostly closed to actual numbers, where the average prediction error is only 4.82%
- However, for CPI the average prediction error is as high as 37.1%, and for the unemployment rate the average prediction error is as high as 46.0%
- Our methodology is very simple to understand when comparing to other more complicated models, without losing much of accuracy
- Utilized both Line charts with Choropleth maps to visualize the state/monthly level economic impact driven by COVID-19



Visualization for R0, CPI, Housing Price and Unemployment rate in the United States across 2020



Visualization for Prediction of CPI, Housing Price and Unemployment rate of Connecticut in February 2021



Results and Discussions

Our prediction models predicted the housing prices across different states with the highest average accuracy, and this could be driven by the straight MoM increase of housing price. The small prediction errors for housing prices are primarily from underestimation. For CPIs, our models predicted the CPIs with highest average accuracy for the states from the Northeast and West regions, but with higher errors when predicting the CPIs for the states from the Midwest and South regions. Overall, our models tended to underestimate CPIs. For the unemployment rate, our models tend to overestimate by 2% on average across all states. We believe that the data volatility caused our model predictions to be less accurate for CPIs and unemployment rates.