**A5 Extension Plan**

For this extension project, I plan to combine the Covid-19 data of Hartford, CT with the data of locally reported crime to explore the impact of Covid-19 on local security and whether there is a correlation between the two factors.

**Motivation/problem statement:**

Since last year, governments around the world have implemented lockdowns due to the Covid-19 pandemic, and the impact of this policy on people's lives has gradually become apparent over time. According to a sociological global analysis published in *Nature Human Behavior* ([Global crime trends during COVID-19](https://www.nature.com/articles/s41562-021-01151-3)), stay-at-home orders implemented globally due to the Covid-19 pandemic were associated with a 37% decrease in average crime rates in 27 cities in 23 countries. Therefore, I was interested in exploring whether this finding would also apply to mask mandate. The safety and crime rate of an area are critical to the quality of life of local people. As a human-centered data analysis project, this study attempts to uncover the dynamic mechanisms of urban crime in the context of Covid-19, in order to provide appropriate and robust safeguards for the safety of people's daily lives.

**Research questions and/or hypotheses:**

In A4, I already explored the relationship between the implementation of the mask mandate and the rate of confirmed infection cases of Covid-19 in Hartford, CT. So, for the extension project, I would like to continue to explore whether the mask mandate affects local crime rates in the Covid-19 context, and if so, whether it changes by regions or by types of crime? The initial hypotheses are as follows：

Hypothesis 1: During the implementation of the mask mandate, Hartford's crime rate was lower than that of the same period in previous years.

Hypothesis 2(null hypothesis): There was no difference in the impact of the implementation of mask mandate on crime rates in different regions of Hartford.

Hypothesis 3(null hypothesis): There was no difference in the impact of the mask mandate on the different categories of crime rates in Hartford.

**Data used:**

In addition to the datasets used in A4, for this extension project, I plan to use [*Police Incidents 01012005 to Current*](https://data.hartford.gov/Public-Safety/Police-Incidents-01012005-to-Current/889t-nwfu) from the government of Hartford, and its license is *Creative Commons license (CC0 1.0 Universal).* The reason I chose this dataset is because it serves as the official record of reported crimes that have occurred in the City of Hartford since 2005 to the present. The data is detailed down to each day of recording, which allowed me to integrate it with the Covid-19 dataset. Also, this dataset contains a division by region and category of crime, which facilitates my comparative research.

It is important to note that this dataset does not include sexual assault according to statute. In addition, the Hartford Police Department has also issued a disclaimer for this data and requires users not to use the words "Hartford Police Department", "Hartford Police", "HPD", etc. without authorization. Since this dataset only records the date, time, location, and category of the incidents of crime, it does not involve privacy issues.

**Unknowns and dependencies:**

The problem of unemployment caused by the pandemic may also lead to an increase in the local crime rate. Therefore, unemployment rate as a confounding variable is likely to affect the results of my study. In addition, the escalation of violence across the United States caused by the murder of George Floyd may also increase the crime rate of Hartford in a certain period during the pandemic. It is worth noting that there was a long period of overlap between the Hartford lockdown period and the implementation of the mask mandate, so it can be difficult to define exactly which factor influenced the change in crime rates. However, from another perspective, the relationship between the phase plan of reopening and the crime rate is another potential research direction.

**Methodology:**

Firstly, I will compare the crime data of Hartford during the implementation of mask mandate in 2020 with the data of the same period in 2019, and then present the results through a simple time series visualization in Python or Tableau, as this method can provide a very intuitive overview of the differences in crime. Secondly, I plan to use the method of hypothesis testing in R to figure out whether there is significant difference between the number of crimes in these two years, which will make the study results more rigorous and convincing. Thirdly, I will apply ANOVA test in R and analyze the test statistic score and p-value to figure out the impact of mask mandate on different regions and crime categories.

**Timeline to completion**:

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| Collect and prepare data | Nov 12 – Nov 15 |
| Build models or conduct statistic tests | Nov 16 – Nov 21 |
| Test or analyze the models | Nov 22 – Nov 27 |
| Visualize the results and review | Nov 28 – Dec 02 |
| Prepare presentation (Assignment A6) | Dec 03 – Dec 07 |
| Finish final report (Assignment A7) | Dec 08 –Dec 14 |

Data Source

Covid-19 Cases by Town, Connecticut https://data.ct.gov/Health-and-Human-Services/COVID-19-Tests-Cases-and-Deaths-By-Town-/28fr-iqnx