**Report Video Link:** https://youtu.be/5p0V7FZRe34

**Main Question:**

Given data of post-pandemic crime in Los Angeles (including portions of 2024), what factors are most useful in predicting the type or severity of crime? Given an incident, can we figure out what sort of crime might have occurred based primarily on environmental factors, and could we use this to assist in finding if crime occurs altogether?

**Importance:**

This deep learning model holds significant importance, both practically and socially. This model allows policymakers to draft adaptive policies focused on addressing the root causes of crime in specific areas and scenarios based on what crimes are gaining prominence. Although all crime requires addressing, crimes such as murder, sexual victimization, and armed robbery are higher-priority and carry greater risk.

An important limitation of our dataset is that by the nature of being a ‘crime’ dataset, it does not contain non-crime incidents. That is, the data within the dataset cannot by itself be used to identify risk factors for crimes or factors that distinguish between non-crime and crime situations, because the null case is not captured within. In particular, though descriptive statistics may find factors associated with crimes, it cannot capture the predominance of such factors overall. Although we may be able to make rough estimations at what features appear disproportionately within crime cases, we cannot extrapolate to more complex relations easily.

However, that said, even within crimes there is a significant gap in the urgency or severity of an incident. Thus, we turn our focus to this equally important issue that can serve somewhat as a proxy for the above question. Crimes such as disorderly behavior, vandalism, or vagrancy are perhaps important for the order of society, but clearly less pressing than murder or arson. We compare factors that distinguish between these two classes of crimes, and between crimes as a whole, to find which features are most predictive of each crime.

**Approach:**

To address this issue, we decided to leverage recent advancements in deep learning for crime prediction. Specifically, we developed a feed-forward network with carefully selected features to predict crime. Our selection of features were based upon whether this information was a factor of the environment or situation, or a feature of the crime. For example, the severity of the possible crime is related to the crime’s occurrence itself, but the date of a possible crime is a feature of the situation in which the crime may occur.

**Quick Summary of Results:**

Our model was able to accurately predict the exact crime being committed 68% of the time. In addition, we found that Mocodes (where mo indicates modus operandi - features describing the suspect), premise codes, and the weapons used were the most important features in predicting crime.

**Discussion about future work, implications, and applications:**

Our model provides information on situational features correlated with different crimes. This knowledge is applicable in several ways.

Firstly, authorities can adaptively and in real time allocate resources to potential situations based on predicted severity. Our model can automatically identify which situations may be more likely to intensify using existing environmental factors, and this could provide guidance for human operators dealing with a significant number of ongoing situations.

In addition, authorities can take targeted steps to address factors predictive of crime severity. Knowing what factors are predictive of more severe crimes may assist in identifying root causes or potential avenues for prevention, or with identifying risky situations and taking proactive steps to reduce risk.

Finally, authorities can adaptively adjust resources based on crimes that are gaining in numbers or growing to be a greater issue within society. Knowing what situational factors, such as area or suspect features, are related to certain crimes can assist in targeting approaches to specific crimes.

To expand on this model further, cross referencing with other dataset would be crucial in expanding the feature set to improve performance. With information such as traffic, weather, mean income of a district, or unemployment rates, this model could be easily improved to achieve higher levels of accuracy. Also, having more information on the similarity relations between different crimes or mocodes could assist in predicting with more accuracy and with identifying features correlating to groups of crimes, such as property crimes or sexual violations. In addition, the use of a Recurrent Neural Network, such as Long Short-Term Memory Networks, could help predict the evolution of crime over a period of time. This could be a more nuanced approach to prediction.

With a much more accurate model, advanced crime preventative measures can be enforced such as apps that notify the user of possibly high-crime locations. This app could send push notifications based on the location, date, and surroundings of the user. Using modern IoT devices, such as a simple security camera, real-time predictions could be leveraged for immediate notification of the user or increase in police surveillance. Using modern advancements in deep learning, civilians, police, and policy makers could be informed of possible crime much faster which keeps everyone safe and reduces overall crime.