Module 5 Technique Practice – Austin Bike Crash Severity Prediction

Rohit Soni

The Northeastern University

ALY6040 20305 – Data Mining Applications

Winter 2024 CPS Quarter - Second Half

Prof. Justin Grosz

March 24, 2024

Summary of the Developed Solution

The solution I developed is a predictive model deployed as a Streamlit web application to predict the severity of bike crashes in Austin. The model takes various factors into account such as day of the week, weather conditions, presence of school zones, traffic control types, and others to predict the severity level of a bike crash. The severity levels are categorized as low, medium, and high.

How it Solves Issues in Austin's Biking Community

Austin's biking community faces several challenges related to safety and awareness. By predicting the severity of bike crashes, this solution provides valuable insights that can help improve safety measures and awareness among cyclists and other road users. By understanding the factors contributing to high-severity crashes, authorities can take targeted actions to mitigate risks and improve infrastructure where necessary. Additionally, cyclists can use this information to make more informed decisions about routes and timing, potentially reducing their exposure to high-risk situations.

Product Functionality

The product takes inputs from users regarding various factors related to the crash scenario, such as day of the week, weather conditions, and road conditions. Based on these inputs, the model predicts the severity level of a potential bike crash. The severity levels are categorized as low, medium, and high, providing users with an understanding of the potential risk associated with their biking route or time of travel.

Visualization to Show Risk Determination

The Streamlit web application includes visualizations to illustrate how the risk of a bike crash is determined. These visualizations may include bar charts showing the distribution of crash severity levels based on different factors such as weather conditions, time of day, or road conditions. Additionally, the application includes images that change based on the predicted severity level, providing users with a visual indication of the risk associated with their chosen parameters.

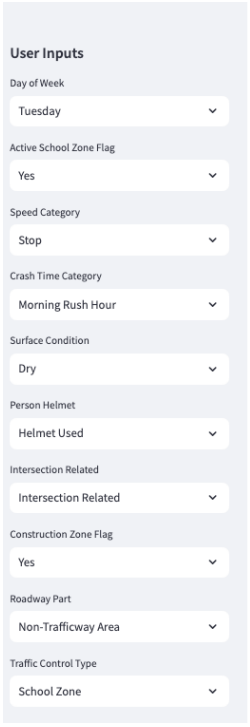
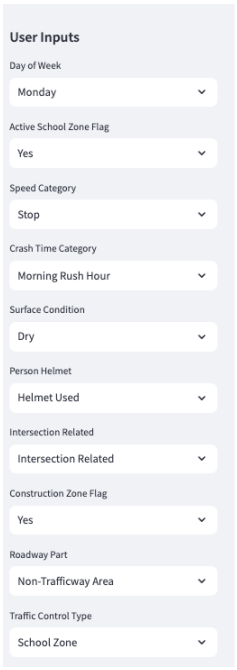


Fig 1. Low Severity



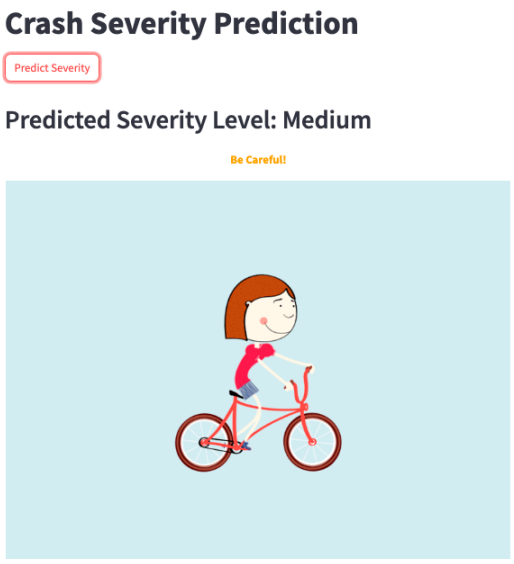


Fig 2. Medium Severity

Fig 3. High Severity

Screenshots of How to Use the Application

User Inputs: Users can select various factors such as day of the week, weather conditions, and road conditions using dropdown menus on the sidebar of the application.

Predict Severity: After selecting the desired parameters, users can click the "Predict Severity" button to generate a prediction of the crash severity level.

Predicted Severity Level: The application displays the predicted severity level (low, medium, or high) along with a corresponding color-coded indication and an animated image conveying the level of caution required.

Conclusion

The developed solution addresses the need for predictive analytics in Austin's biking community to enhance safety and awareness. By providing users with insights into the potential severity of bike crashes based on various factors, the application empowers cyclists and authorities to take proactive measures to mitigate risks and improve overall safety on the roads. With its user-friendly interface and intuitive design, the application serves as a valuable tool for promoting safe biking practices and reducing the incidence of severe bike crashes in Austin and potentially in other communities facing similar challenges.