Munich Accident Forecasting

Fig 1: Category selection dropdown and future prediction tab for 2021(Alkoholunfalle).

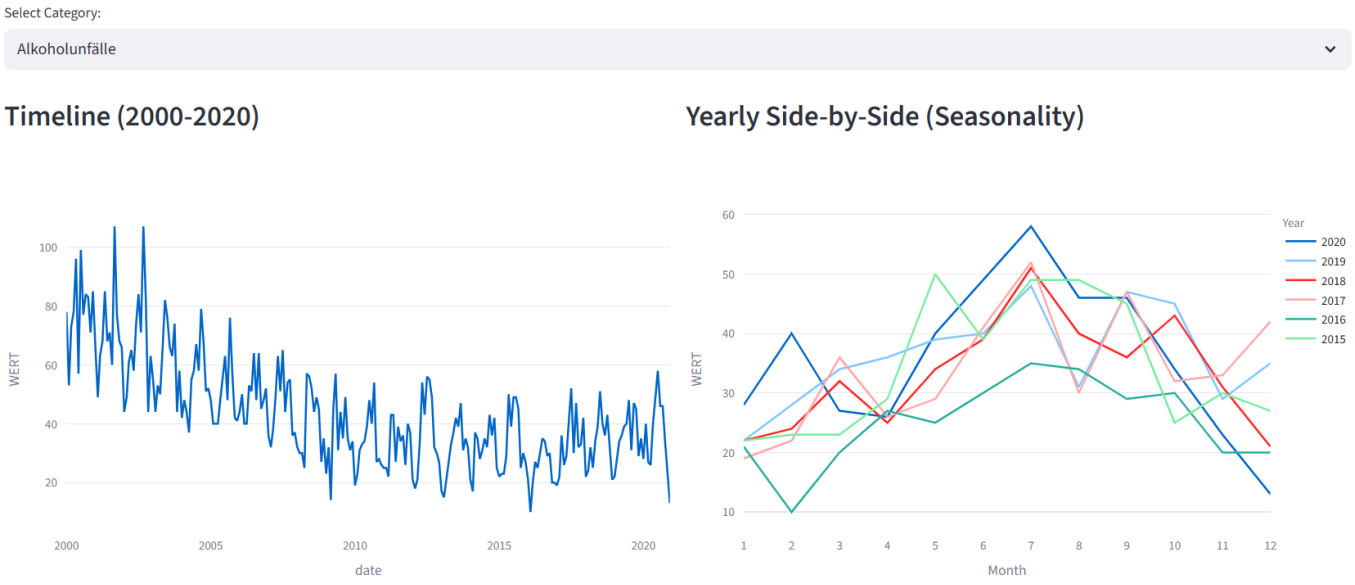


Fig 2: Visualization throughout past 20 years and comparison of past 5 years (Category:Alkoholunfalle)

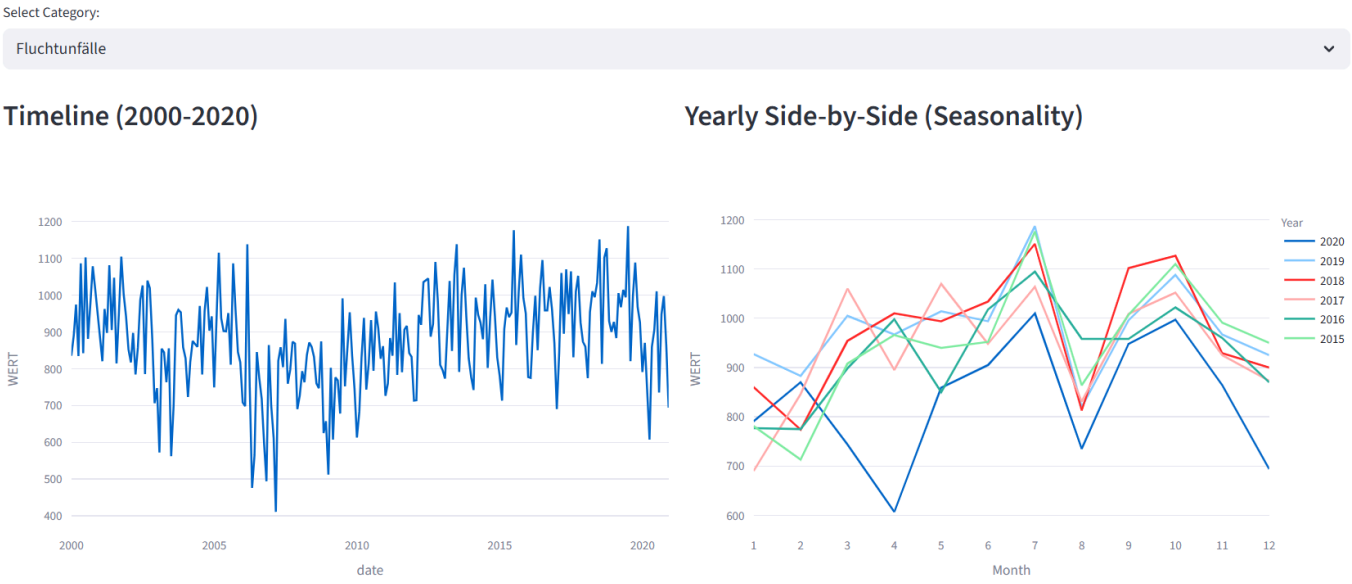


Fig 3: Visualization throughout past 20 years and comparison of past 5 years (Category:Flunchtunfalle)

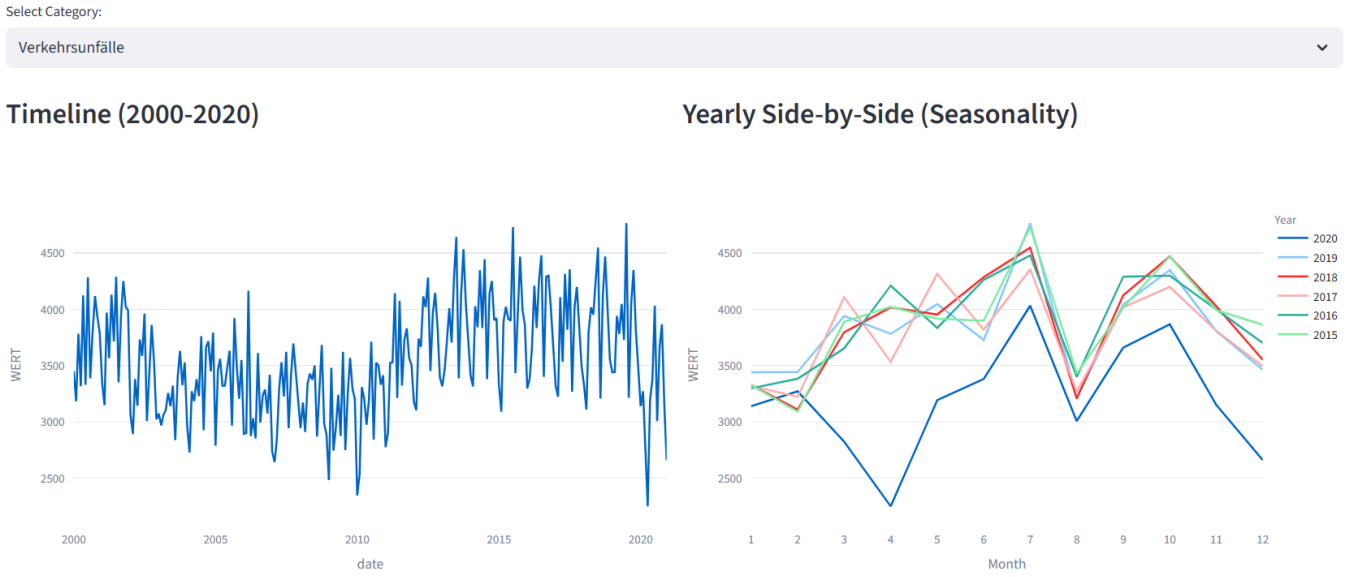
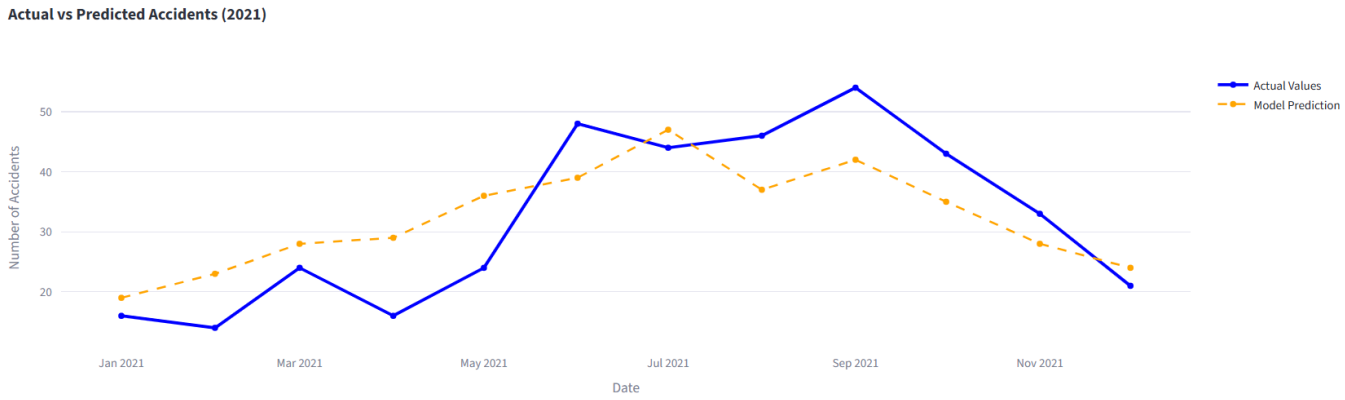


Fig 4: Visualization throughout past 20 years and comparison of past 5 years (Category:Verkehrsunfalle)

Performance Analysis: Full Year 2021

Comparing the SARIMA model's forecast against the ground truth for 'Alkoholunfälle'.



Average MAE for 2021

7.50 accidents

Fig 5:Comparison visualization between predicted and actual accident for year 2021(Category:Alkoholunfalle)

2021 Single Month Prediction

Select Month for 2021

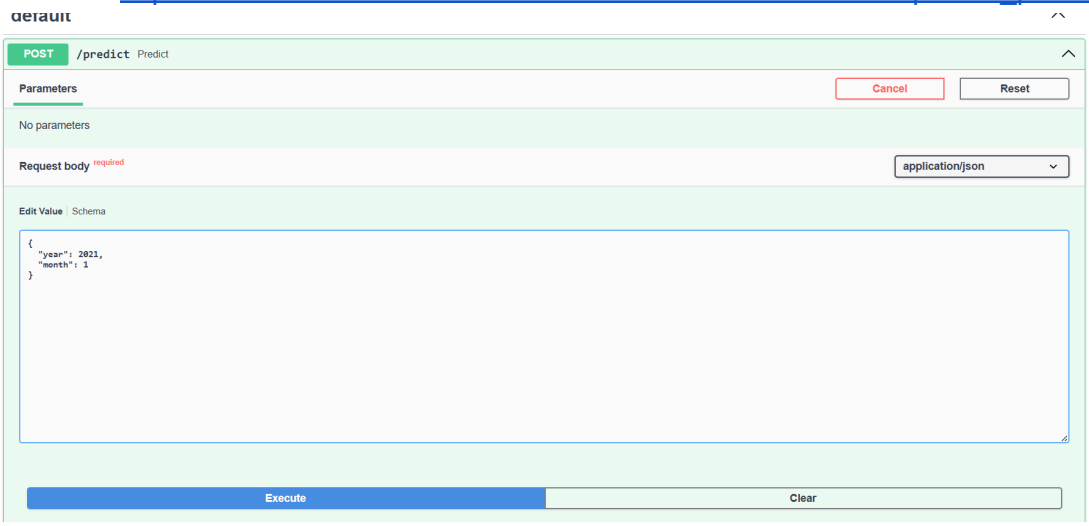
1

Predict & Calculate Error

Predicted	Actual (2021)	Absolute Error
19	16	3
		↓ -3

Fig 6: Exact Error calculation for year 2021(Category:Alkoholunfalle).

API Link- https://munich-accident-forecast.onrender.com/docs#/default/predict_predict_post



Conclusion:

The predictive core of this project was developed by filtering the historical Munich accident dataset to focus exclusively on "Alcohol accidents" with "all" value types, ensuring a consistent target variable. Following the challenge constraints, the dataset was truncated at the end of 2020 to ensure the model remains strictly predictive for the 2021 validation period. The training script performs feature engineering by extracting numerical representations of Year and Month, allowing a Linear Regression model to identify long-term trends and seasonal fluctuations. This model calculates optimal coefficients to map these temporal features to accident counts, and the resulting "brain" is serialized into a compressedmodel_dict.pkl file using joblib; this serialization allows the FastAPI service to load the model instantly and provide real-time predictions via the /predict endpoint.