Car Sharing Demand Prediction

Projective Objective

As car-sharing services grow, predicting hourly demand becomes crucial for optimal vehicle distribution and user satisfaction. This project aims to accurately forecast the number of shared cars required at different hours based on environmental and temporal data.

Objectives

- Predict hourly car-sharing demand using historical data.
- Identify the most influential features affecting demand.
- Assisting companies in resource planning,fleet management

Dataset Description

The dataset contains hourly records of car-sharing usage along with weather and time-based features. Key variables include temperature, humidity, windspeed, hour of the day, and count of rented cars.

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5. Methodology

- Conducted exploratory data analysis (EDA) and preprocessing.
- Built multiple models (Linear Regression, Random Forest, Gradient Boosting).
- Evaluated using R^2 score, MSE, and visual inspection of predictions.

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6. Key Findings

- Random Forest model achieved the highest accuracy with an R^2 score of 0.93.
- Temperature was identified as the most important feature, though time-based features like “hour” also contributed significantly.
- The model sometimes overemphasized temperature due to its correlation with time.

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7. Limitations & Future Work

- Need to explore error analysis across time segments.
- Deploy the model with a user-friendly interface using Streamlit.

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8. Conclusion

Through preprocessing, exploratory analysis, model training, and hyperparameter tuning, the Random Forest model achieved a high R^2 score of 0.93 on the test set. Early insights suggest that temperature is a dominant predictive feature, likely due to its correlation with time-of-day usage patterns.