

Modelling and Prediction of Athletic Readiness based On Sleep and Recovery Patterns

Krina Khakhariya, Urjit Mehta, Brijesh Munjiyasara, Khushi Agrawal, Jafri Syed Mujtaba

Ahmedabad University

Team: Panchtron

Week number: 7

A. Progress Summary

1) Work Completed

- Finalized CTGANSynthesizer for augmentation task and generated synthetic data.
- Saved all trained models (Linear Regression, Random Forest, XGBoost, LightGBM) to avoid retraining of models everytime for similar kind of data.
- Compared distribution plots of MICE-imputed data (raw data) with generated synthetic data to finalize the mentioned augmentation strategy.
- Passed synthetic data through all saved models to evaluate their predictions.
- Evaluated and recorded performance metrics (R^2 , MAE, RMSE) across original and synthetic datasets.
- Recorded all model results and saved them in a CSV file.

2) Milestones Achieved

- Successfully generated and used synthetic data for model training.
- Improved model accuracy using the augmented dataset.
- Compiled and compared all model results in a summary table.

B. Challenges & Resolutions

1) Problems Faced

- Choosing augmentation methods that preserved weekly and time-based structure.
- Avoiding overfitting and loss of generality in synthetic data.
- Evaluating model stability between real and augmented inputs.

2) Resolutions & Actions Taken

- Applied feature-based augmentation to generate realistic synthetic data.
- Retrained and tested models on both real and synthetic datasets.

C. Upcoming Tasks

1) Tasks Planned

- Document the end-to-end modeling and data pipeline.
- Prepare for final report and project presentation.