# Predicting Workout Performance with Regression and Time Series Models

Interactive Forecasting for Bench Press, Squat, and Deadlift

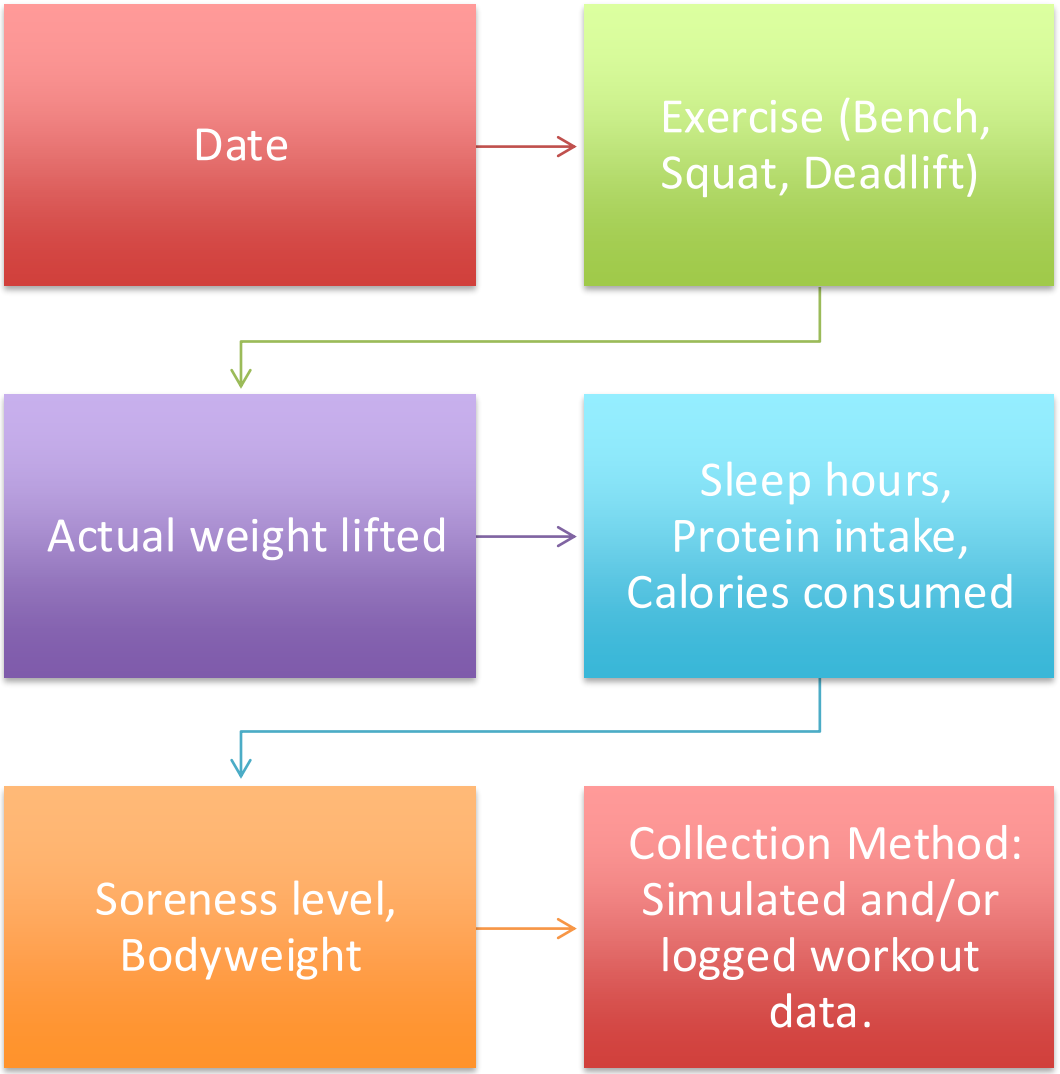
By Satvik Hulikere

# Project Overview

Goal: Predict the weight lifted for major lifts using historical and custom input data.

Motivation: Track strength gains, optimize training plans, and plan performance goals.

# Data Collected



# Tools Used

- Pandas
- numpy
- matplotlib
- seaborn
- scikit-learn
- streamlit
- tensorflow

# Models Used

REGRESSION MODEL: TRAINED WITH HISTORICAL WORKOUT + RECOVERY DATA.

TIME SERIES MODEL: PREDICTED PERFORMANCE USING LIFT HISTORY.

COMPARED PERFORMANCE USING RMSE TO EVALUATE ACCURACY.

# RMSE Comparison

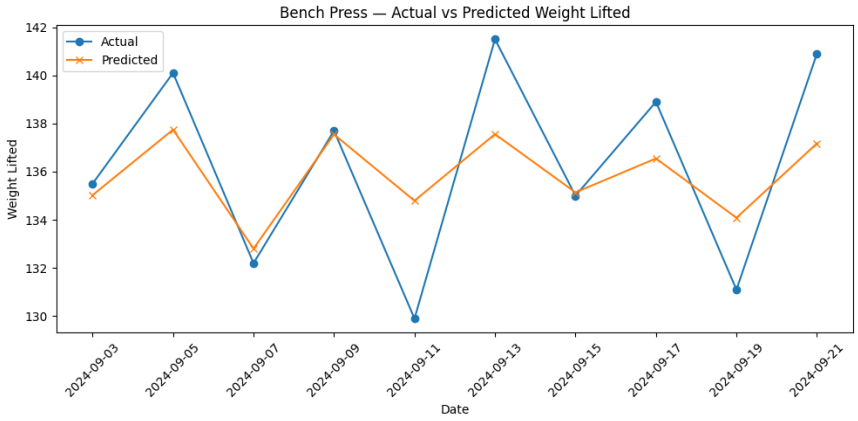
Finding: Regression outperformed time series across all lifts.

| Exercise | Regression | Time Series |
|---|---|---|
| Bench Press | 2.72 | 3.09 |
| Squat | 4.23 | 2.86 |
| Deadlift | 4.11 | 2.38 |

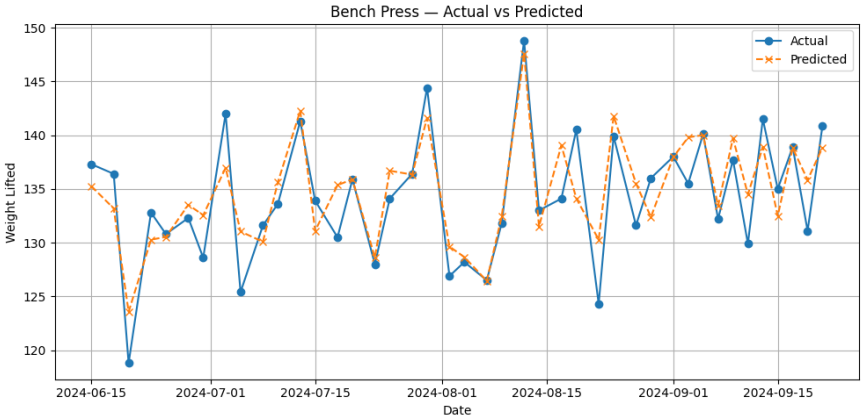
# Bench Press Predictions

- Line chart: Actual vs Predicted over time.
- Showcases performance trend and prediction accuracy.

Regression RMSE: 2.72



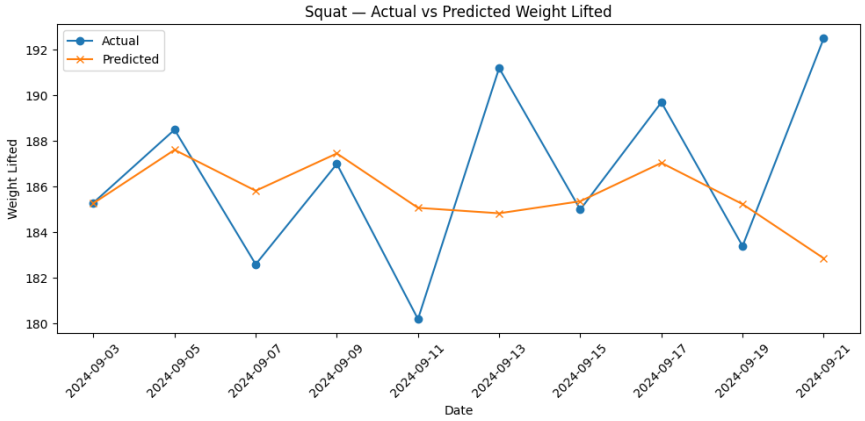

LSTM RMSE: 3.09



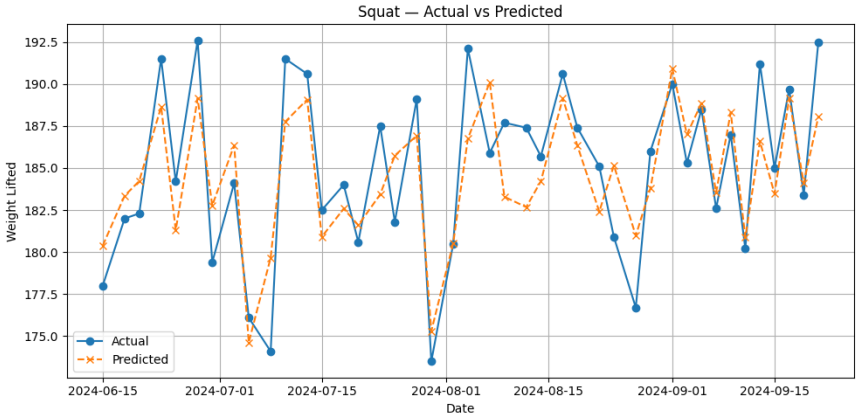
# Squat Predictions

- Line chart: Actual vs Predicted over time.
- Highlights model's ability to forecast squat progression.

Regression RMSE: 4.23



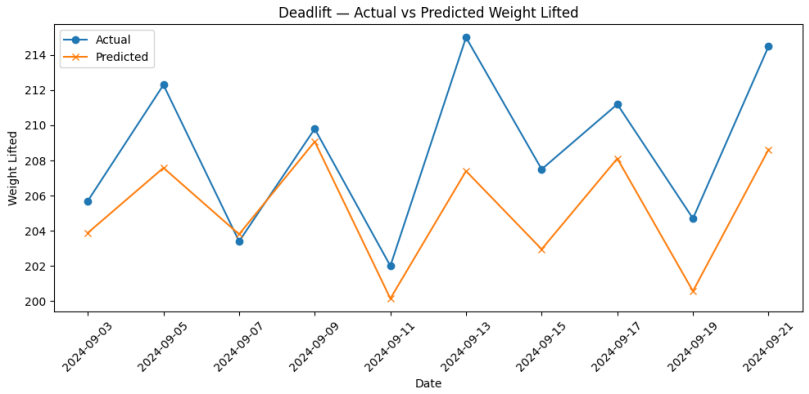

LSTM RMSE: 2.86



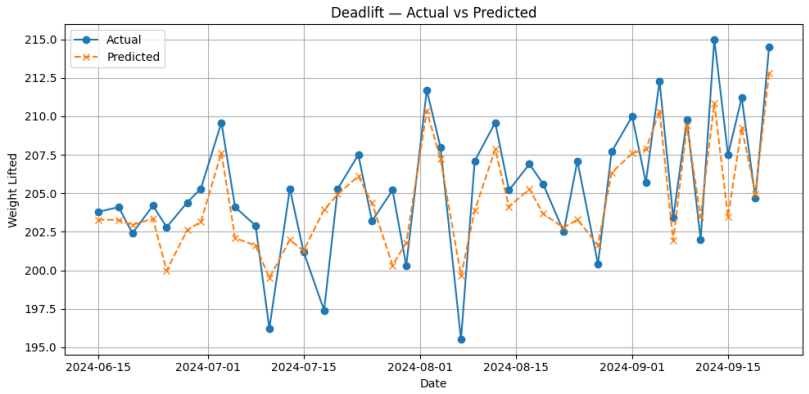
# Deadlift Predictions

- Line chart: Actual vs Predicted over time.
- Demonstrates accurate forecasting for deadlift performance.

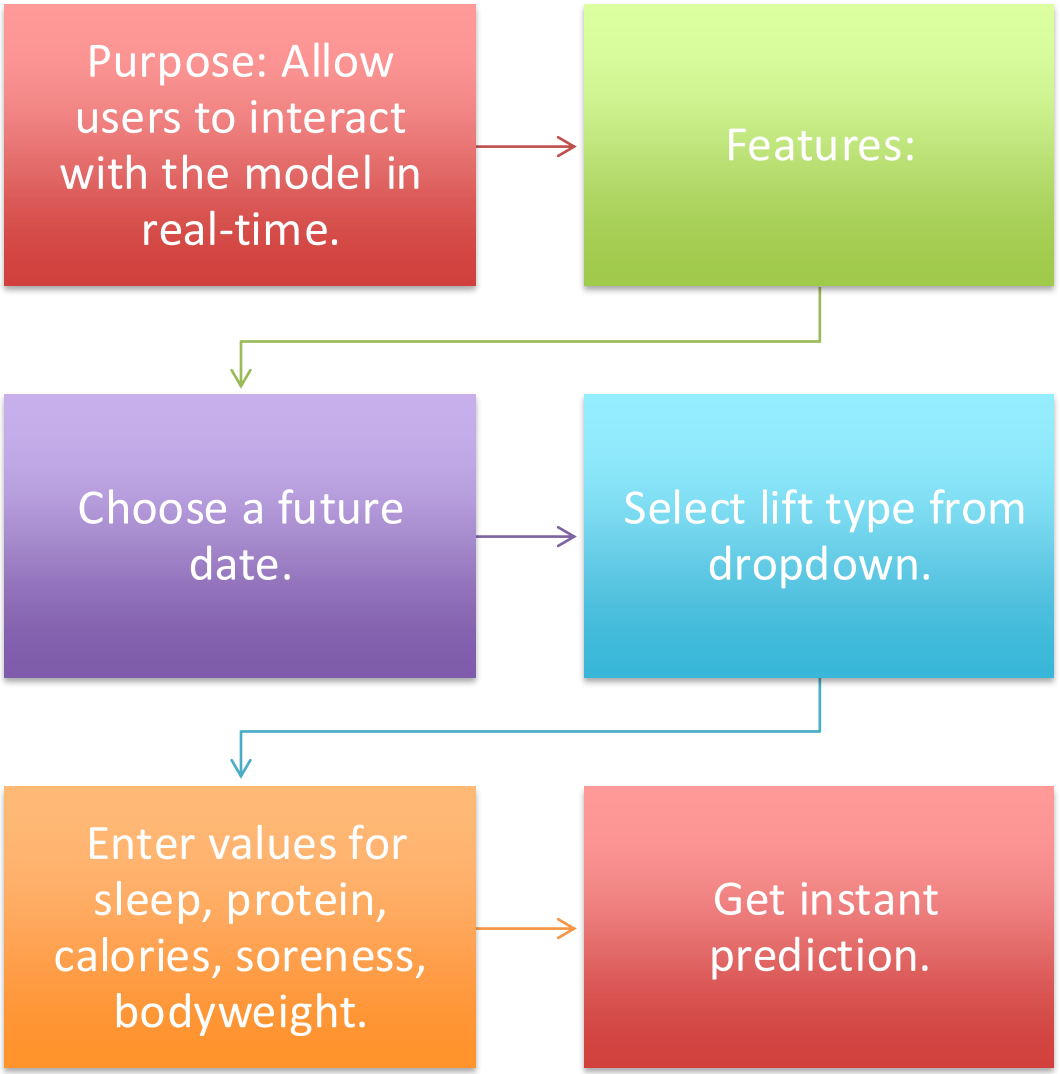
Regression RSME: 4.11




LSTM RSME: 2.38



# Streamlit App Overview



# Streamlit App Demo

# Conclusion

- Built & compared two predictive models.
- Visualized actual vs predicted performance.
- Created an interactive Streamlit app for forecasting.
- Made the tool adaptable to any future workout plan.

# Next Steps

COLLECT MORE REAL-WORLD DATA TO IMPROVE ACCURACY.

EXPAND TO INCLUDE MORE EXERCISES.

DEPLOY STREAMLIT APP ONLINE FOR PUBLIC USE.