DEVELOPER STRESS PREDICTION

MACHINE LEARNING REGRESSION PROJECT

PROBLEM STATEMENT

Software developers face increasing workload and deadlines

- Stress affects:
  - Productivity
  - Code quality
  - Mental health
  - Companies often react after burnout happens

Goal:

- Predict stress early to support better decisions.

Dataset Overview

- Dataset size: 500 records
- Features: 10
- Target: Stress_Level (0–100)

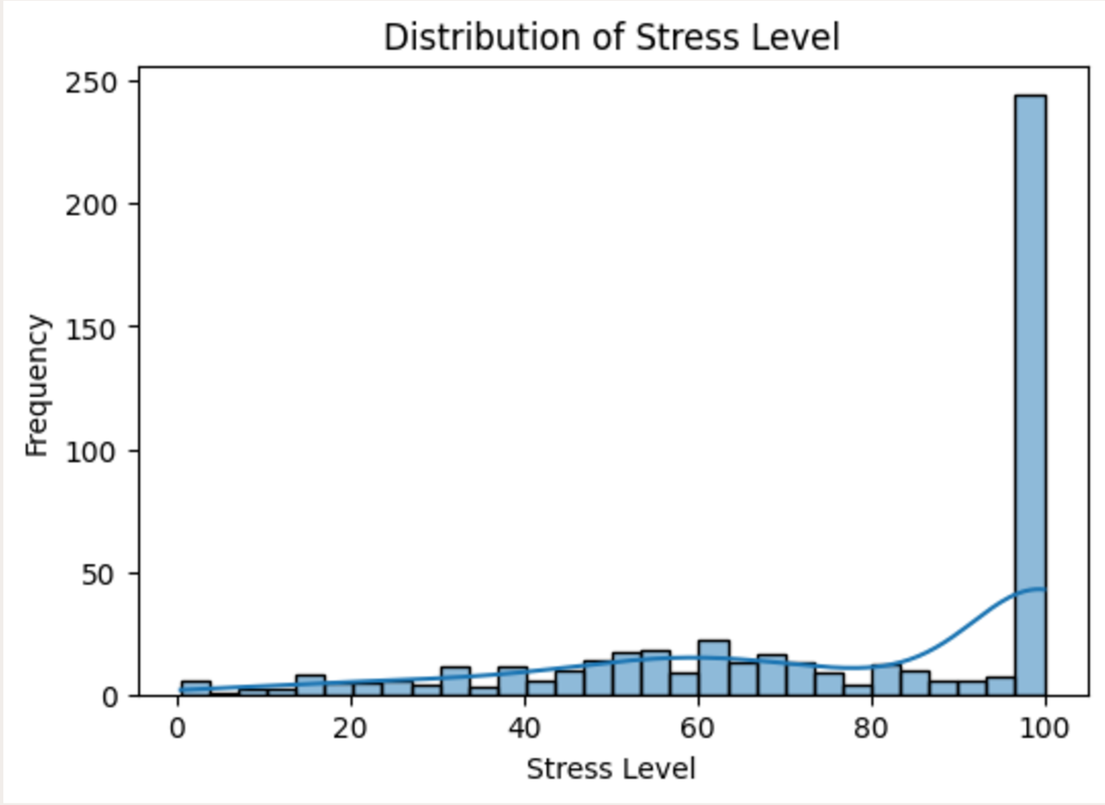
Features include:

- Workload (Hours Worked, Bugs)
- Personal habits (Sleep, Coffee)
- Work environment (Meetings, Interruptions)
- Experience & Code Complexity

TARGET VARIABLE

Stress_Level

- Continuous numeric value
- Range: 0 – 100
- Represents overall mental stress level



DATA PREPROCESSING

Handled categorical features:

- Experience Years → Junior / Mid / Senior
- Code Complexity → Low / Medium / High
- Remote Work → Yes / No
- Applied Label Encoding
- Used StandardScaler for normalization

🎯**Ensured all features are machine-readable.**

MODELS USED

Linear Regression : Baseline

Random Forest : Non-linear relationships

Gradient Boosting :High accuracy & generalization

MODEL EVALUATION METRICS

We evaluated models using:

- MAE (Mean Absolute Error)
- RMSE (Root Mean Squared Error)
- R^2 Score

These metrics help measure:

- Prediction accuracy
- Error magnitude
- Model reliability

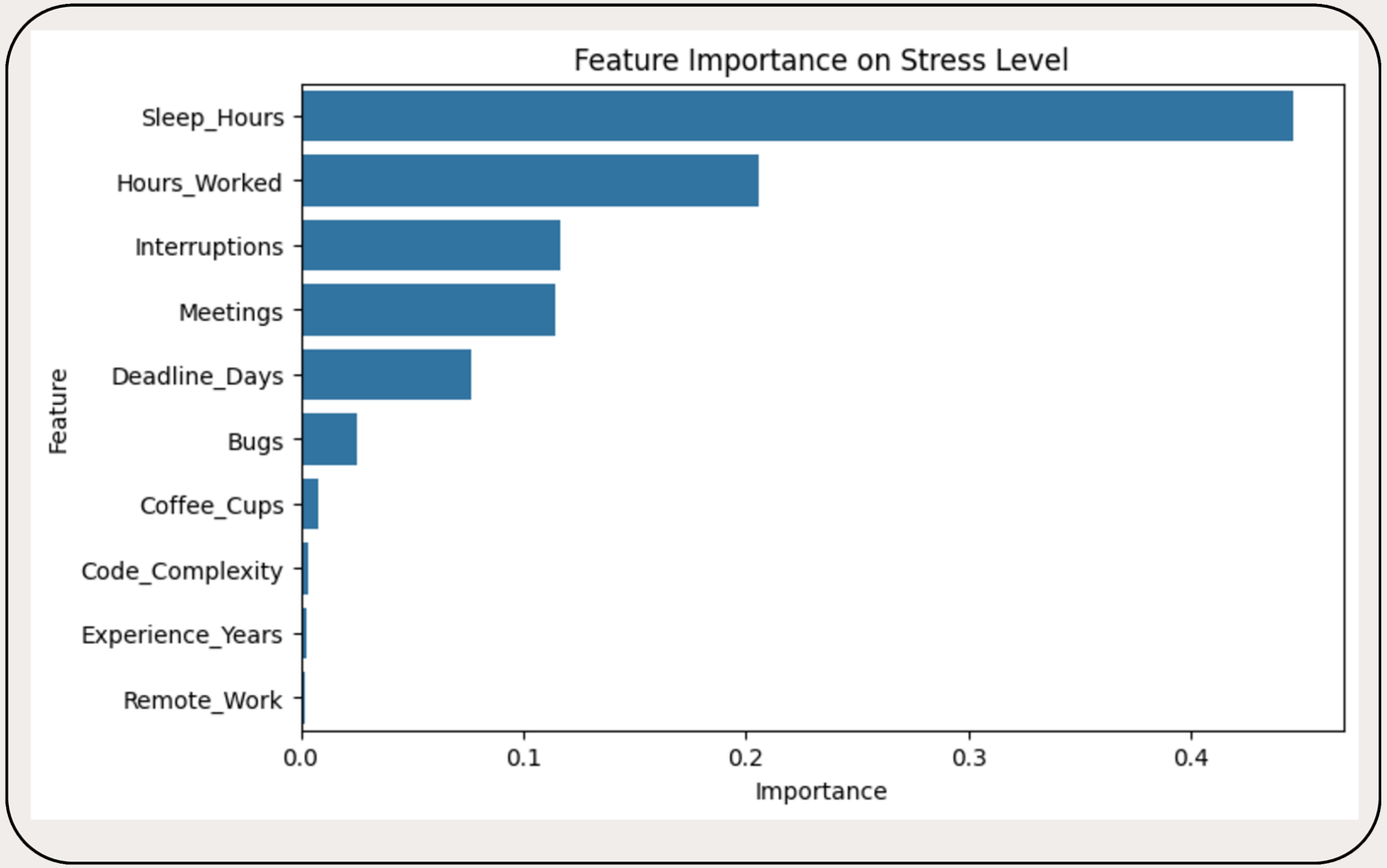
FEATURE IMPORTANCE

R^2	RMSE	MAE	Model
0.56	16.41	13.21	Linear Regression
0.88	8.41	5.27	Random Forest
✅ **0.90**	**7.71**	**5.52**	**Gradient Boosting**

Best Model: Gradient Boosting Regressor

FEATURE IMPORTANCE

- Identified most influential features:
  - Hours Worked
  - Sleep Hours
  - Bugs
  - Deadline Days
- Confirms logical relationship with stress



DEPLOYMENT

- Built an interactive web interface using Gradio
- User inputs developer conditions
- Model predicts stress level in real time

- **Conclusion:**
  - Successfully predicted developer stress levels
  - Gradient Boosting achieved best performance
  - Project demonstrates real-world ML application
- **Future Work:**
  - Real-world dataset
  - Time-series stress tracking
  - Integration with HR systems

thanks

By :

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