SUMMARY FOR THE MODEL PREPARED

We are classifying which activity is being performed

Deep Learning on Raw Inertial data

- Approach: An LSTM model was trained directly on standardized raw inertial sensor signals, with one-hot encoded activity labels.
- Outcome: The LSTM captured the temporal dynamics of the sensor data and achieved a test accuracy of about 91%.

Machine Learning with Engineered Features:

- TSFEL-Generated Features:
    - Raw sensor data was processed using the TSFEL library, extracting 1,404 features per sample.
    - Traditional models (Random Forest, SVM, Logistic Regression) trained on these features achieved accuracies ranging from approximately 93% to 96%.
- Provided Features:
    - The provided features from the dataset were used to train the same ML models, yielding similar high performance metrics.

Key Observations:

- The ML models using engineered features (both TSFEL and provided) slightly outperformed the LSTM model, highlighting the advantage of domain-specific feature extraction.
- SVM and Logistic Regression showed consistent and marginally better performance compared to a Random Forest.
- The performance metrics of these models could be increased by implementation of k fold cross validation
- While the deep learning approach is robust and effective at capturing temporal patterns, engineered features enable traditional models to achieve a competitive edge in accuracy for this task.

By Vishesh Gupta

(Intern ID : 21925472)