sklearn_Models [link]

Overview

This folder includes machine learning models on Los Angeles data using sklearn library.

Data Files

- **speedbumps_1.csv**:
  - **X**: forward acceleration (front and back, measured in G-force)
  - **Y**: horizontal acceleration (left and right, measured in G-force)
  - **Z**: vertical acceleration (up and down, measured in G-force)
  - **z_jolt**: vertical jolt (up and down, measured in G-force per second) Vertical jolt is calculated as the incremental difference of Z between timestamp t and t-1.
- **speedbumps_2.csv**:
  - **X**: forward acceleration (front and back, measured in G-force)
  - **Y**: horizontal acceleration (left and right, measured in G-force)
  - **Z**: vertical acceleration (up and down, measured in G-force)
  - **z_jolt**: vertical jolt (up and down, measured in G-force per second) Vertical jolt is calculated as the incremental difference of Z between timestamp t and t-1.
- **speedbumps_3.csv**:
  - **X**: forward acceleration (front and back, measured in G-force)
  - **Y**: horizontal acceleration (left and right, measured in G-force)
  - **Z**: vertical acceleration (up and down, measured in G-force)
  - **z_jolt**: vertical jolt (up and down, measured in G-force per second) Vertical jolt is calculated as the incremental difference of Z between timestamp t and t-1.
- **speedbumps_4.csv**:
  - **X**: forward acceleration (front and back, measured in G-force)
  - **Y**: horizontal acceleration (left and right, measured in G-force)
  - **Z**: vertical acceleration (up and down, measured in G-force)
  - **z_jolt**: vertical jolt (up and down, measured in G-force per second) Vertical jolt is calculated as the incremental difference of Z between timestamp t and t-1.
- **speedbumps_5.csv**:
  - **X**: forward acceleration (front and back, measured in G-force)
  - **Y**: horizontal acceleration (left and right, measured in G-force)
  - **Z**: vertical acceleration (up and down, measured in G-force)

- **z_jolt**: vertical jolt (up and down, measured in G-force per second) Vertical jolt is calculated as the incremental difference of Z between timestamp t and t-1.

Python Scripts (100-iteration shuffled cross-validation)

- **sklearn_DTClassifier.py**
  - Decision Tree Classifier model
  - sklearn.tree.DecisionTreeClassifier Model 1
    Features: speed, X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.839755634888
    StdDev F1 score: 0.130332647122
    Median F1 score: 0.857142857143
    IQR F1 score: 0.123076923077
    Skewness F1 score: -0.9312941130701623
  - sklearn.tree.DecisionTreeClassifier Model 5
    Features: speed, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.862055537056
    StdDev F1 score: 0.104037700387
    Median F1 score: 0.875
    IQR F1 score: 0.123076923077
    Skewness F1 score: -0.5198674730087519
- **sklearn_MLPClassifier.py**
  - Multi-Layer Perceptron (neural network) Classifier model
  - sklearn.neural_network.MLPClassifier Model 1
    Features: speed, X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.741151789215
    StdDev F1 score: 0.131056097601
    Median F1 score: 0.75
    IQR F1 score: 0.166666666667
    Skewness F1 score: -0.17764724445877225
  - sklearn.neural_network.MLPClassifier Model 4
    Features: X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.768293995745

StdDev F1 score: 0.145068273462
Median F1 score: 0.8
IQR F1 score: 0.151260504202
Skewness F1 score: -0.9084608798371765

- **sklearn_RFClassifier.py**
  - Random Forest Classifier model
  - sklearn.ensemble.RandomForestClassifier Model 1
    Features: speed, X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.752606154017
    StdDev F1 score: 0.167105063492
    Median F1 score: 0.75
    IQR F1 score: 0.222222222222
    Skewness F1 score: -0.4187277412794091
  - sklearn.ensemble.RandomForestClassifier Model 5
    Features: speed, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.776350305138
    StdDev F1 score: 0.162164715017
    Median F1 score: 0.8
    IQR F1 score: 0.222222222222
    Skewness F1 score: -0.9648420340951355
- **sklearn_GBClassifier.py**
  - Gradient Boosting Classifier model
  - sklearn.ensemble.GradientBoostingClassifier Model 1
    Features: speed, X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.85653241862
    StdDev F1 score: 0.11652634414
    Median F1 score: 0.888888888889
    IQR F1 score: 0.123076923077
    Skewness F1 score: -1.3724497131384026
  - sklearn.ensemble.GradientBoostingClassifier Model 5
    Features: speed, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.849028969453
    StdDev F1 score: 0.135855048019
    Median F1 score: 0.857142857143

IQR F1 score: 0.141176470588
Skewness F1 score: -1.0626229240276495

- **sklearn_Logistic.py**
  - sklearn.linear_model.LogisticRegression Model 1
    Features: speed, X-accel, Y-accel, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.380158730159
    StdDev F1 score: 0.0761656705651
    Median F1 score: 0.4
    IQR F1 score: 0.0888888888889
    Skewness F1 score: -0.13189690526454476
  - sklearn.linear_model.LogisticRegression Model 2
    Features: speed, Z-accel, Z-jolt
    Labels: speedbump (1 = yes, 0 = no)
    Average F1 score: 0.318518518519
    StdDev F1 score: 0.073329592123
    Median F1 score: 0.333333333333
    IQR F1 score: 0.0888888888889
    Skewness F1 score: -0.29479962014482924