Machine Learning Foundations

CAPSTONE-PROJECT

TEACHING-ASSISTANT-PERFORMANCE-EVALUATION

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CONTENT

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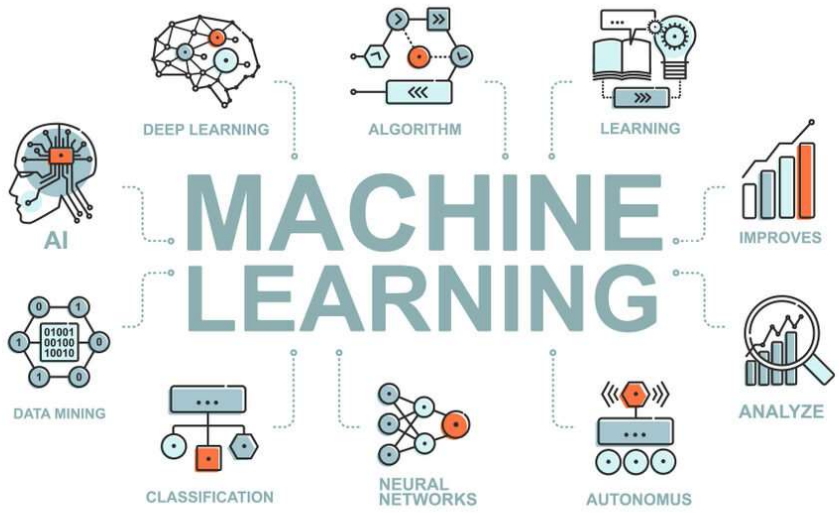
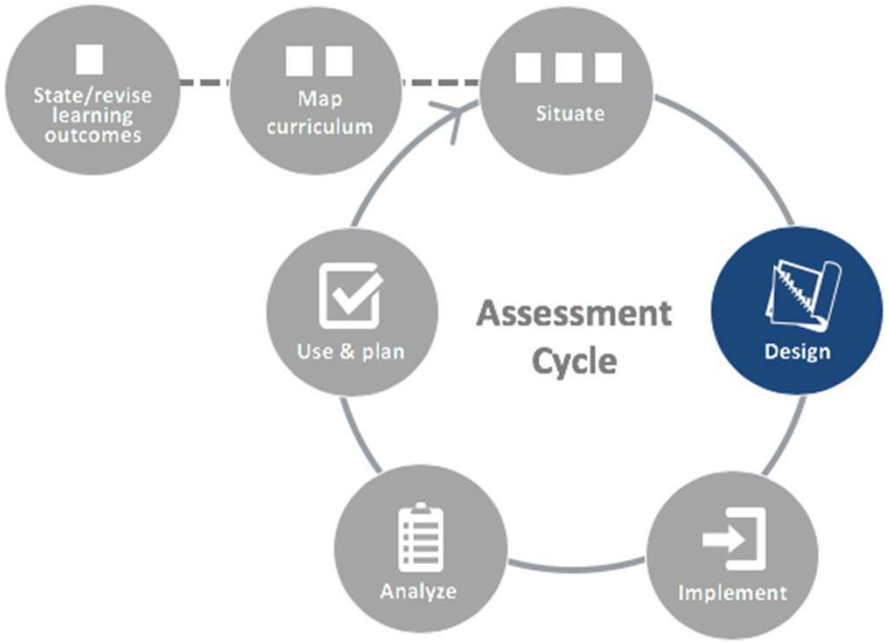


USE CASE

Teaching Assistant Evaluation



DATA

Teaching Assistant Evaluation Data Set

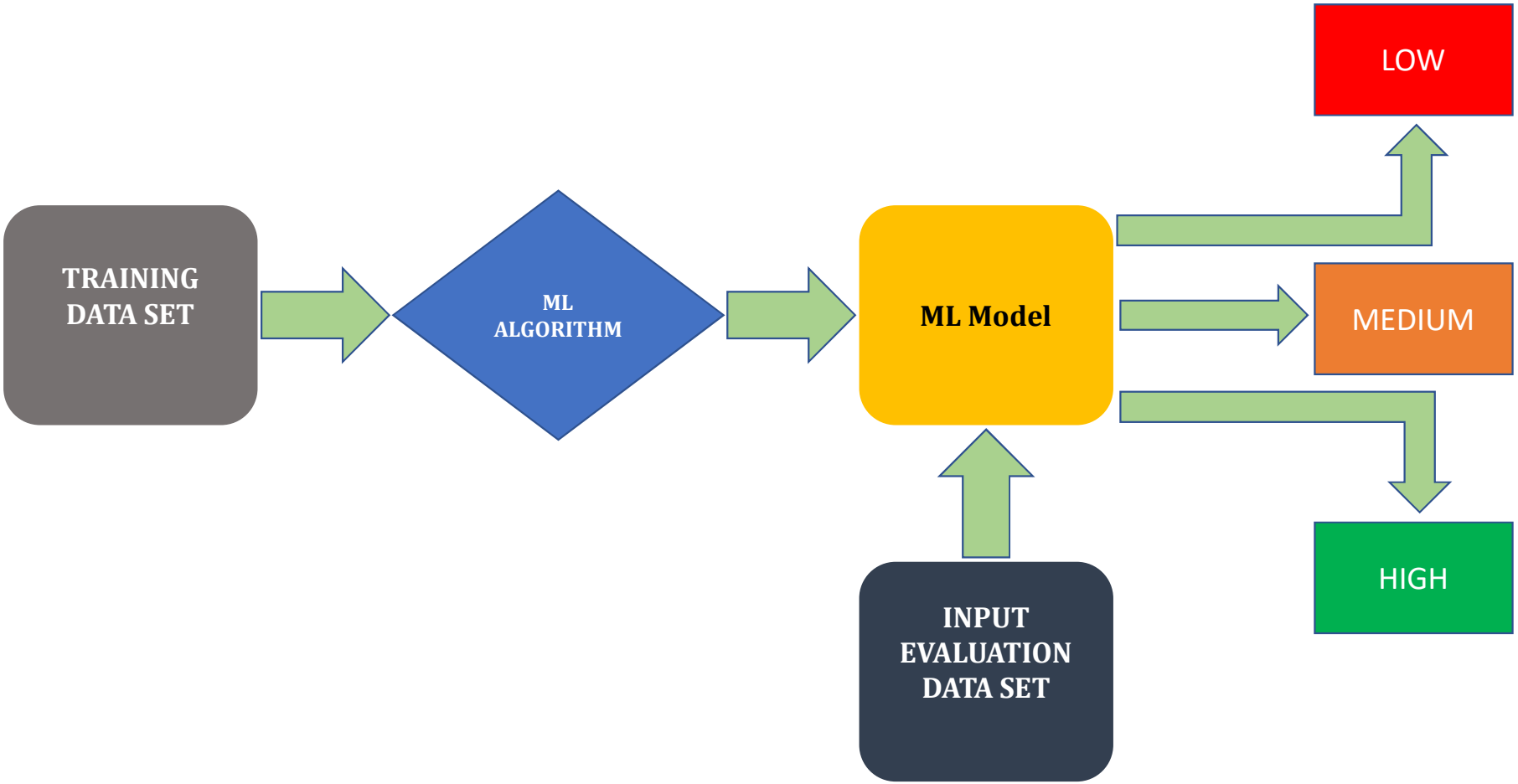
Data Source – UCI Machine Learning Repository

Data Format– CSV file format

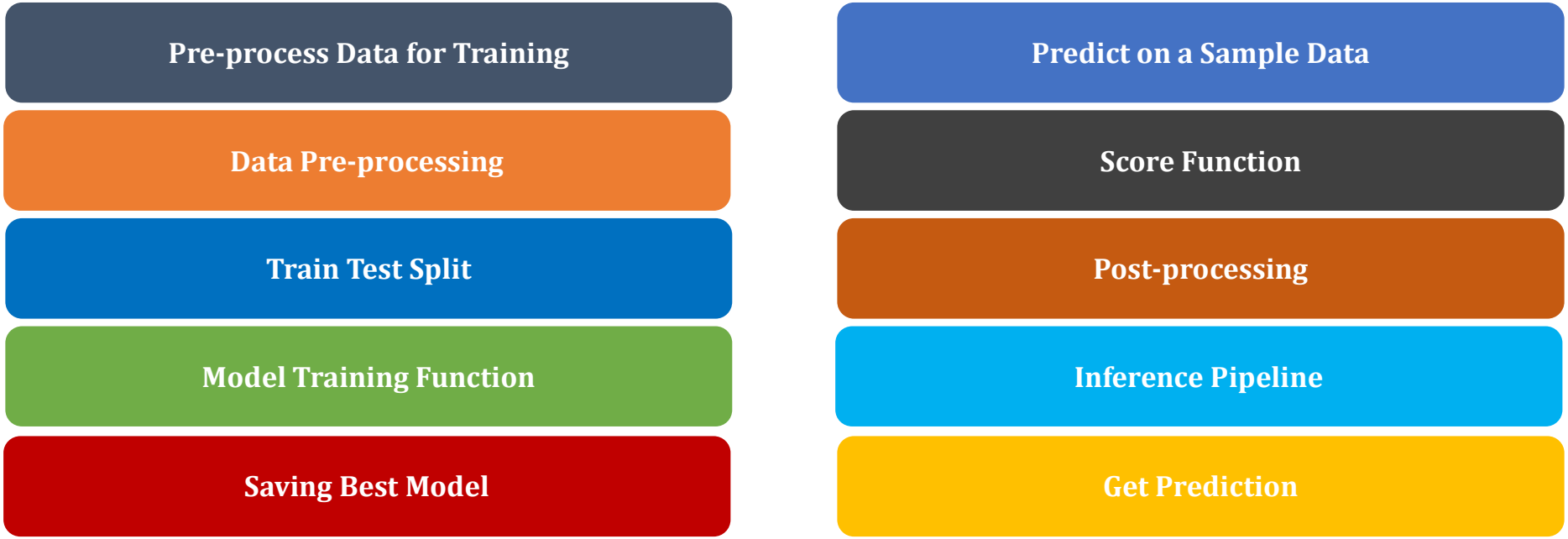
Number of Attributes – 5

Number of Instances – 151

SOLUTION


TRAINING DATA SET
ML ALGORITHM
ML Model
LOW
MEDIUM
HIGH
INPUT EVALUATION DATA SET

MODEL BUILDING



SELECTING BEST MODEL

Models parameters

```
[ ] models = []
    models.append(model_train(LogisticRegression(n_jobs=3, verbose=1), 'lgr1', X_train, y_train, X_test, y_test))
    models.append(model_train(RandomForestClassifier(n_estimators=100, max_depth=None, n_jobs=3, verbose=1), 'rf1', X_train, y_train, X_test, y_test))
    models.append(model_train(RandomForestClassifier(n_estimators=500, max_depth=None, n_jobs=3, verbose=1), 'rf2', X_train, y_train, X_test, y_test))
    models.append(model_train(RandomForestClassifier(n_estimators=500, max_depth=10, n_jobs=3, verbose=1), 'rf3', X_train, y_train, X_test, y_test))
    models.append(model_train(RandomForestClassifier(n_estimators=500, max_depth=20, n_jobs=3, verbose=1), 'rf4', X_train, y_train, X_test, y_test))
    models = pd.DataFrame(models)
    models
```

Models

	model_name	model	accuracy	precision	f1_score
0	lgr1	LogisticRegression(n_jobs=3, verbose=1)	0.543478	0.625000	0.529956
1	rf1	(DecisionTreeClassifier(max_features='auto', r...	0.717391	0.746283	0.713043
2	rf2	(DecisionTreeClassifier(max_features='auto', r...	0.717391	0.746283	0.713043
3	rf3	(DecisionTreeClassifier(max_depth=10, max_feat...	0.717391	0.746283	0.713043
4	rf4	(DecisionTreeClassifier(max_depth=20, max_feat...	0.717391	0.746283	0.713043

Best model

```
print(gs_model.best_params_)
```

```
{'max_depth': None, 'n_estimators': 500}
```

RESULTS

Sample Data

	English Speaking	Course instructor	Course	Semester	Class size
91	2	9	5	2	24
69	2	11	1	2	51
10	2	10	22	2	9
137	2	22	1	2	42
35	2	16	8	2	36
5	2	23	3	1	20
92	2	18	25	2	25
135	2	12	8	2	24
58	2	7	25	2	42
100	1	6	17	2	35

Predictions

```
array([[0.062     , 0.146     , 0.792     ],
       [0.862     , 0.02      , 0.118     ],
       [0.014     , 0.138     , 0.848     ],
       [0.64433333, 0.32      , 0.03566667],
       [0.882     , 0.112     , 0.006     ],
       [0.004     , 0.23594848, 0.76005152],
       [0.094     , 0.156     , 0.75      ],
       [0.186     , 0.72      , 0.094     ],
       [0.032     , 0.902     , 0.066     ],
       [0.044     , 0.788     , 0.168     ]])
```

	English Speaking	Course instructor	Course	Semester	Class size	id
0	2	18	21	2	29	13

```
0.084
```

MODEL SERVER API AND TEST

Model Server API

```
(base) PS C:\Users\lahir\Desktop\MLFoundations> C:\Users\lahir\anaconda3\python C:\Users\lahir\Desktop\MLFoundations\model_server.py
C:\Users\lahir\anaconda3\lib\site-packages\sklearn\base.py:310: UserWarning: Trying to unpickle estimator DecisionTreeClassifier from version 1.0.2 w
hen using version 0.24.2. This might lead to breaking code or invalid results. Use at your own risk.
  warnings.warn(
C:\Users\lahir\anaconda3\lib\site-packages\sklearn\base.py:310: UserWarning: Trying to unpickle estimator RandomForestClassifier from version 1.0.2 w
hen using version 0.24.2. This might lead to breaking code or invalid results. Use at your own risk.
  warnings.warn(
 * Serving Flask app "model_server" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Restarting with watchdog (windowsapi)
C:\Users\lahir\anaconda3\lib\site-packages\sklearn\base.py:310: UserWarning: Trying to unpickle estimator DecisionTreeClassifier from version 1.0.2 w
hen using version 0.24.2. This might lead to breaking code or invalid results. Use at your own risk.
  warnings.warn(
C:\Users\lahir\anaconda3\lib\site-packages\sklearn\base.py:310: UserWarning: Trying to unpickle estimator RandomForestClassifier from version 1.0.2 w
hen using version 0.24.2. This might lead to breaking code or invalid results. Use at your own risk.
  warnings.warn(
 * Debugger is active!
 * Debugger PIN: 699-707-837
 * Running on http://127.0.0.1:5001/ (Press CTRL+C to quit)
```

Test 1 and Result

```
In [11]: import requests

         url = 'http://127.0.0.1:5001/classifier'

         payload = {'English Speaking': 1,
                 'Course instructor':10,
                 'Course': 21,
                 'Semester':  2,
                    'Class size': 29,}

         headers = {}

         files=[

         ]

         response = requests.request("POST", url, headers=headers, data=payload, files=files)

         print(response.text)

         {
           "prediction": 0.442
         }
```

Test 2 and Result

```
In [16]: import requests

         url = 'http://127.0.0.1:5001/classifier'

         payload = {'English Speaking': 0,
                 'Course instructor':3,
                 'Course': 3,
                 'Semester':  2,
                    'Class size': 29,}

         headers = {}

         files=[

         ]

         response = requests.request("POST", url, headers=headers, data=payload, files=files)

         print(response.text)

         {
           "prediction": 0.078
         }
```