

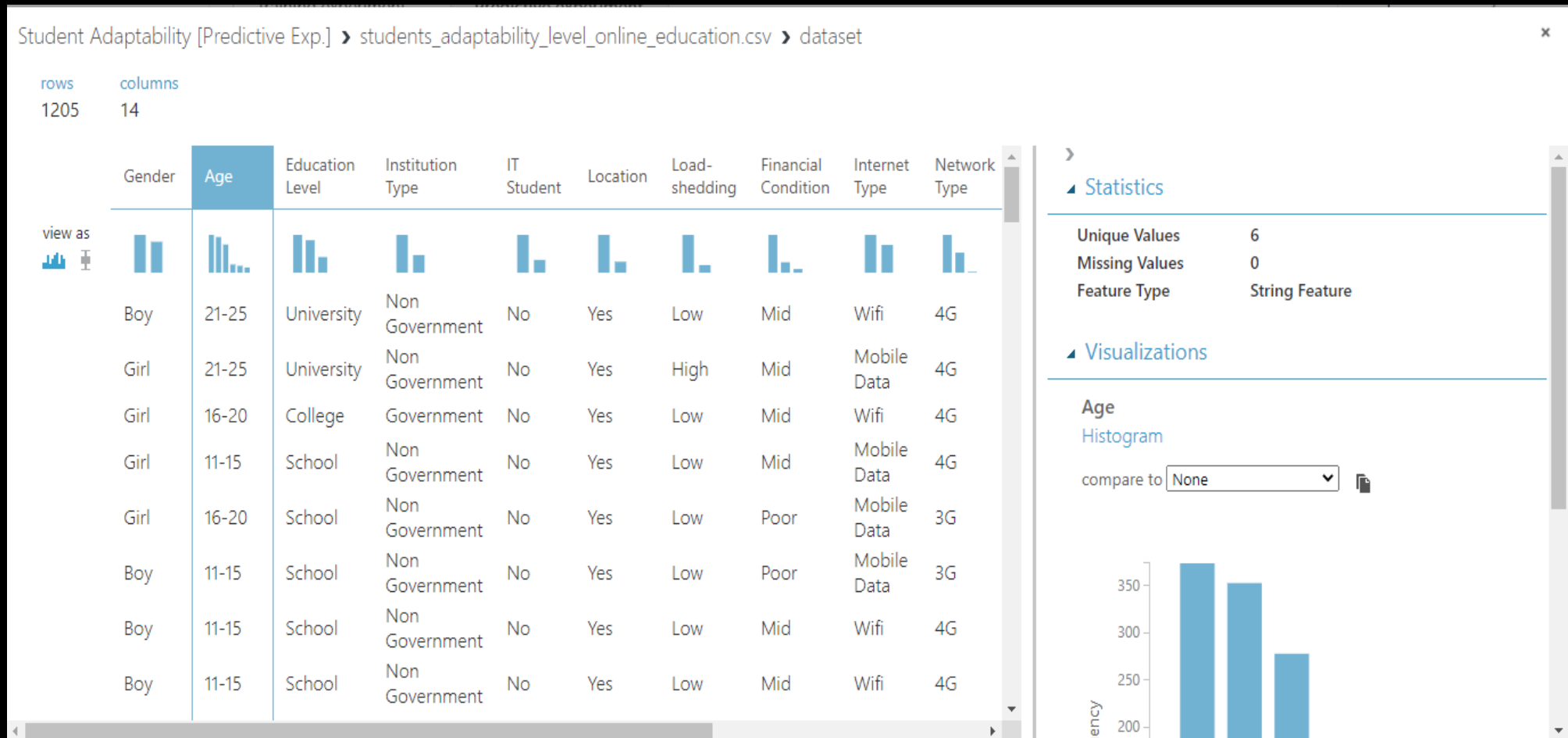
Case study: Student Adaptivity Level to Online Classes

Azure ML Prediction: Low/
Moderate/ High

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Visualizing the Dataset:

- Source: www.kaggle.com



Types of values contained by each column:

Gender	Age	Education Level	Institution Type	Location *	Load-shedding	Financial Condition	Internet Type	Network Type	Self LMS	Class Duration **	Device
Boy	6-10	School	Government	Yes	Low	Poor	Mobile Data	4G	No	0	Mobile
Girl	11-15	University	Non Government	No	High	Mid	Wifi	3G	Yes	1-3	Tab
	16-20	College				Rich		2G		3-6	Computer
	21-25										
	26-30										

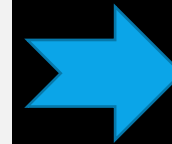
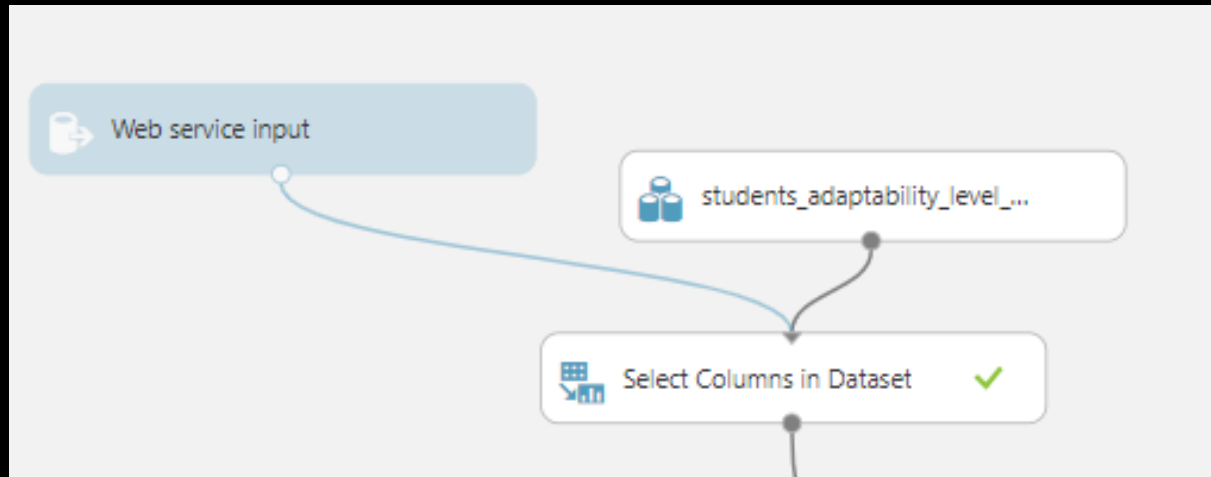
*If the student lives in the same location with the institution they attend

**Class duration in hours

Azure Pipeline Workflow



Data preprocessing: Eliminating the “IT Student” column



Obtained dataset of 13 columns
(out of 14):



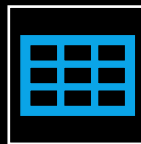
Student Adaptability [Predictive Exp.] > Select Columns in Dataset > Results dataset

rows
1205

columns
13

	Gender	Age	Education Level	Institution Type	Location	Load-shedding	Financial Condition	Internet Type	Network Type	Class Duration
view as										
	Boy	21-25	University	Non Government	Yes	Low	Mid	Wifi	4G	3-6
				Non				Mobile		

Splitting the data and picking the models:



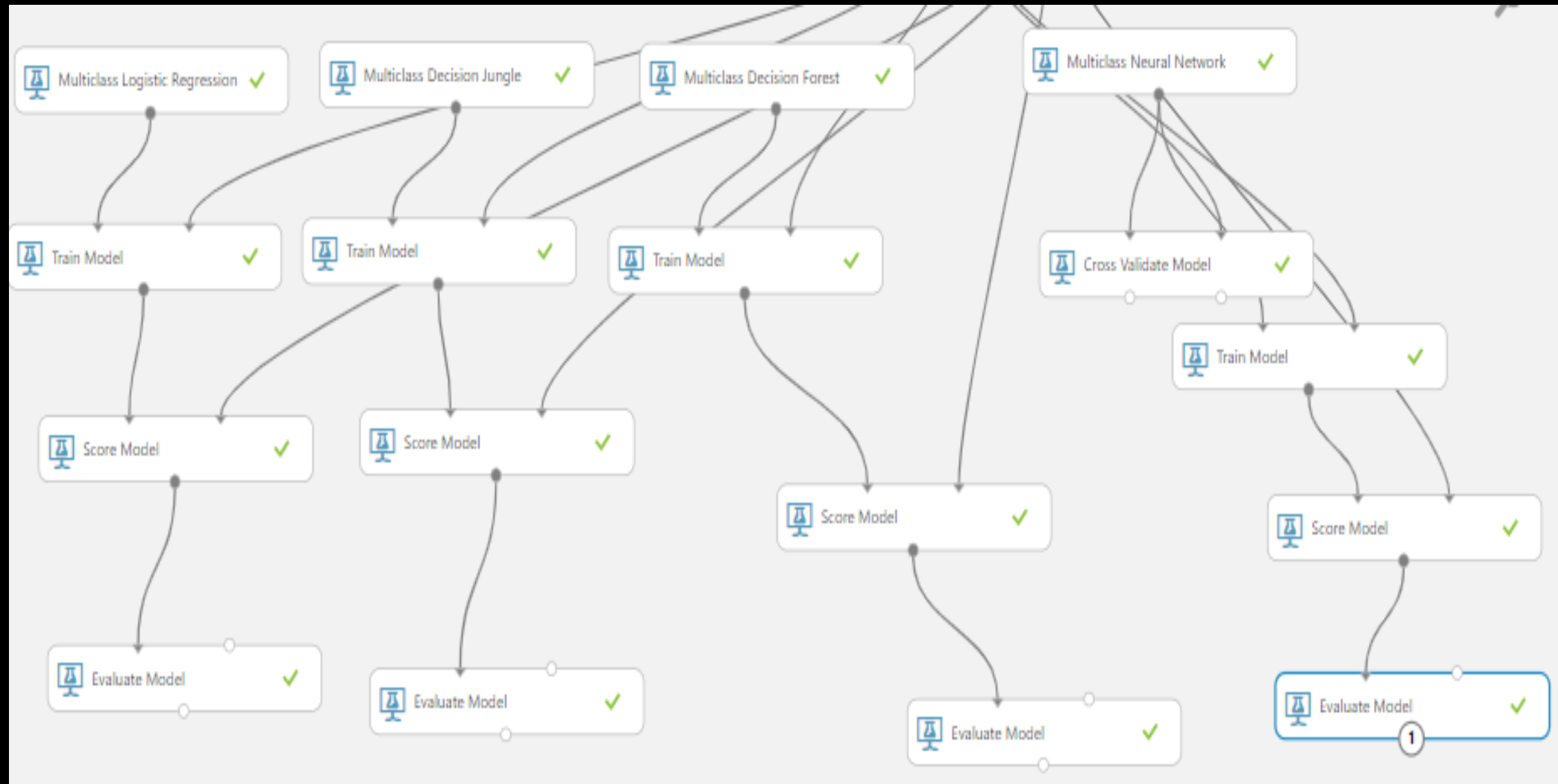
The data has 1205 rows total. I split it by a 0.8 ratio (80% for train and 20% for test).



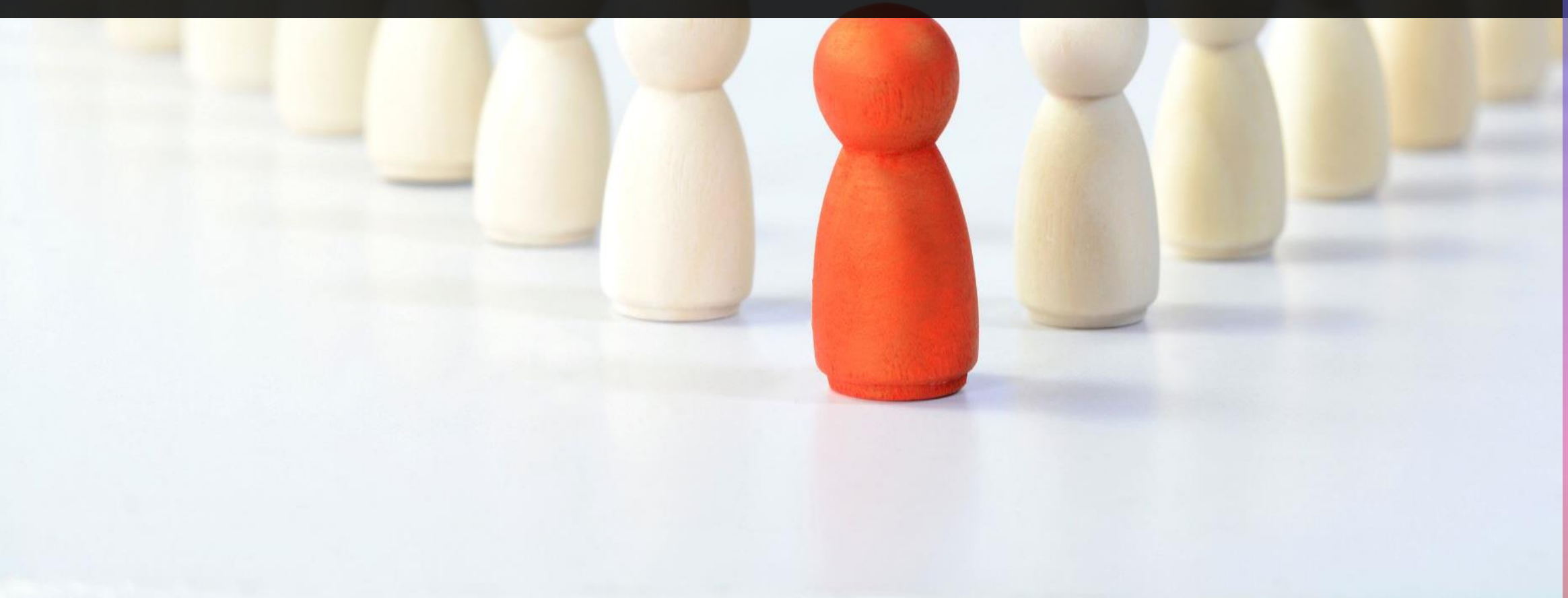
I tested all multiclass prediction models Azure ML had to offer in order to deploy the model with the best results.



Testing the
problem on
different
models



Evaluating the models



Multiclass Logistic Regression Results:

Metrics

Overall accuracy	0.697095
Average accuracy	0.798064
Micro-averaged precision	0.697095
Macro-averaged precision	0.765826
Micro-averaged recall	0.697095
Macro-averaged recall	0.607871

Confusion Matrix

		Predicted Class		
		High	Low	Moderate
Actual Class	High	42.9%	4.8%	52.4%
	Low		54.3%	45.7%
	Moderate	0.8%	14.1%	85.2%

Multiclass Decision Jungle Results:

Metrics

Overall accuracy	0.775934
Average accuracy	0.850622
Micro-averaged precision	0.775934
Macro-averaged precision	0.796144
Micro-averaged recall	0.775934
Macro-averaged recall	0.626693

Confusion Matrix

		Predicted Class		
		High	Low	Moderate
Actual Class	High	23.8%	4.8%	71.4%
	Low	1.1%	78.3%	20.7%
	Moderate		14.1%	85.9%

Multiclass Decision Forest Results:

Metrics

Overall accuracy	0.86722
Average accuracy	0.91148
Micro-averaged precision	0.86722
Macro-averaged precision	0.885398
Micro-averaged recall	0.86722
Macro-averaged recall	0.812575

Confusion Matrix

		Predicted Class		
		High	Low	Moderate
Actual Class	High	66.7%	4.8%	28.6%
	Low		88.0%	12.0%
	Moderate	0.8%	10.2%	89.1%

Multiclass Neural Network Results:

Metrics

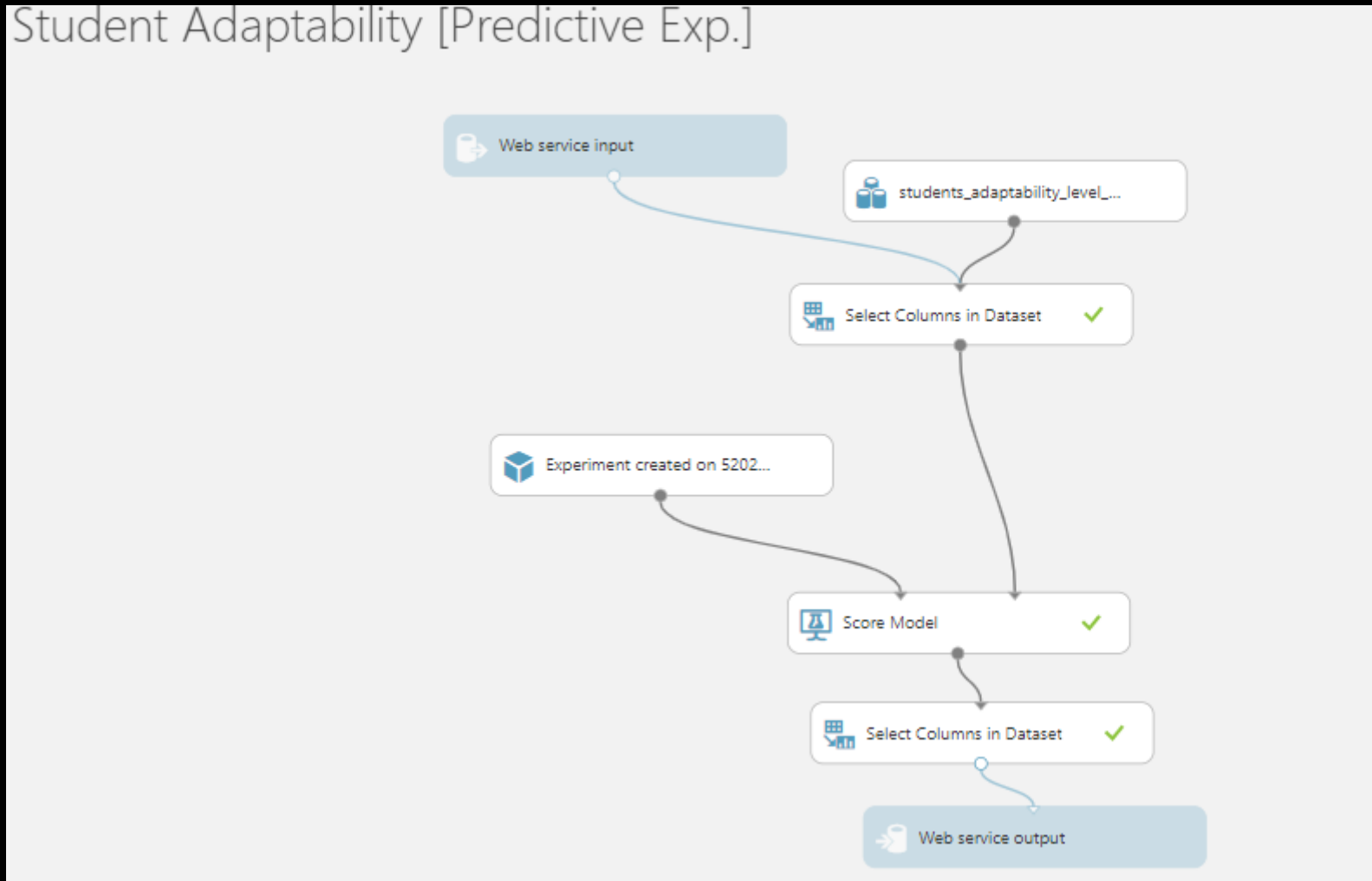
Overall accuracy	0.887967
Average accuracy	0.925311
Micro-averaged precision	0.887967
Macro-averaged precision	0.900892
Micro-averaged recall	0.887967
Macro-averaged recall	0.827634

*Best results compared to other models

Confusion Matrix

		Predicted Class		
		High	Low	Moderate
Actual Class	High	66.7%	4.8%	28.6%
	Low		90.2%	9.8%
	Moderate	0.8%	7.8%	91.4%

Model deployment: Setting up the web service



Deployment: Testing in AzureML vs Testing with Postman

Scored Labels Low

Gender	Girl
Age	21-25
Education Level	University
Institution Type	Non Government
IT Student	fdbjfdjhdjh
Location	No
Load-shedding	Low
Financial Condition	Mid
Internet Type	Wifi

POST https://ussouthcentral.services.azureml.net/workspaces/b5148029e5e04b39b081679e4c4c110c/services/e4fd8ce00cde4ee6823baac1c493de63/execu... Params Send Save

Authorization Headers (2) Body Pre-request Script Tests

form-data x-www-form-urlencoded raw binary JSON (application/json)

```
1 {
2   "Inputs": {
3     "input1": {
4       "ColumnNames": [
5         "Gender",
6         "Age",
7         "Education Level",
8         "Institution Type",
9         "IT Student",
10        "Location",
11        "Load-shedding",
12        "Financial Condition",
13        "Internet Type"
14      ]
15    }
16  }
```

Body Cookies Headers (7) Test Results Status: 200 OK Time: 693 ms

Pretty Raw Preview JSON

```
1 {
2   "Results": {
3     "output1": {
4       "type": "table",
5       "value": {
6         "ColumnNames": [
7           "Scored Labels"
8         ],
9         "ColumnTypes": [
10          "String"
11        ],
12        "Values": [
13          [
14            "Moderate"
15          ]
16        ]
17      }
18    }
19  }
```