

FINAL PROJECT PRESENTATION

Student Adaptability Level In Online Education

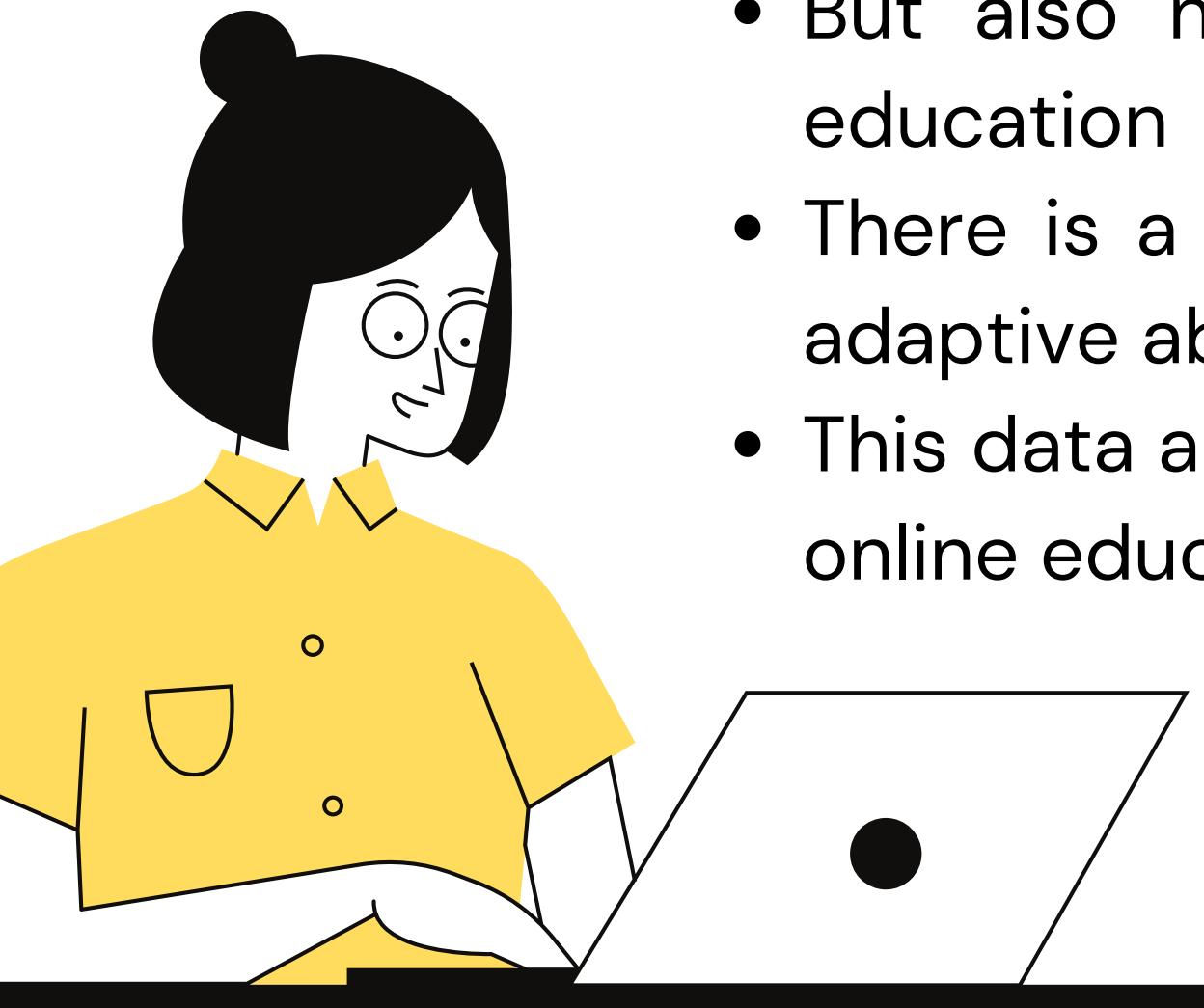


By Tyovendi Arisandy

SATURDAY, 25 JUNE 2022

Introduction

- Since the emergence of the Covid-19 virus pandemic, the world of education seems to have stopped for a moment
- Online education is a solution for implementing learning during the pandemic
- But also need to know how adaptive students are in this online education
- There is a need for data that records the extent to which students' adaptive abilities during online education are needed
- This data analysis can be used to answer students' adaptive abilities in online education



Data Understanding

Column Group	Columns Name	Data Type
User Profil	Gender, Age, Financial Condition, IT Student, Location, Load Shedding	Categorical Data
Education Profil	Education Level, Institution Type, Self LMS, Class Duration	
User Service	Internet Type, Network Type, Device	
Target Column	Adaptivity Level	

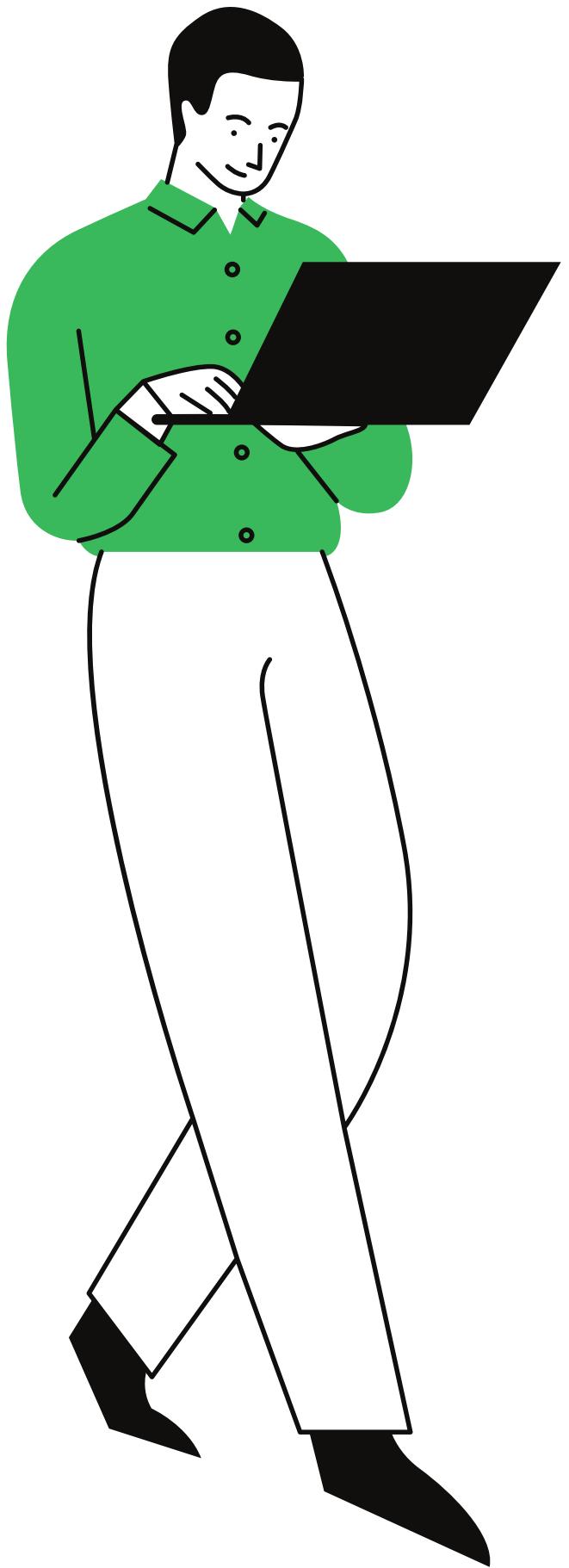


Data Preprocessing

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1205 entries, 0 to 1204
Data columns (total 14 columns):
 #   Column           Non-Null Count  Dtype  
--- 
 0   Gender            1205 non-null    object  
 1   Age               1205 non-null    object  
 2   Education_Level   1205 non-null    object  
 3   Institution_Type  1205 non-null    object  
 4   IT_Student         1205 non-null    object  
 5   Location           1205 non-null    object  
 6   Load_Shedding      1205 non-null    object  
 7   Financial_Condition 1205 non-null    object  
 8   Internet_Type      1205 non-null    object  
 9   Network_Type        1205 non-null    object  
 10  Class_Duration     1205 non-null    object  
 11  Self_LMS            1205 non-null    object  
 12  Device              1205 non-null    object  
 13  Adaptivity_Level   1205 non-null    object  
dtypes: object(14)
```

- The total data recorded is **1205**
- There are **13 category features** and **1 target feature**
- The data set has **no missing value**
- All data type is "**object**"



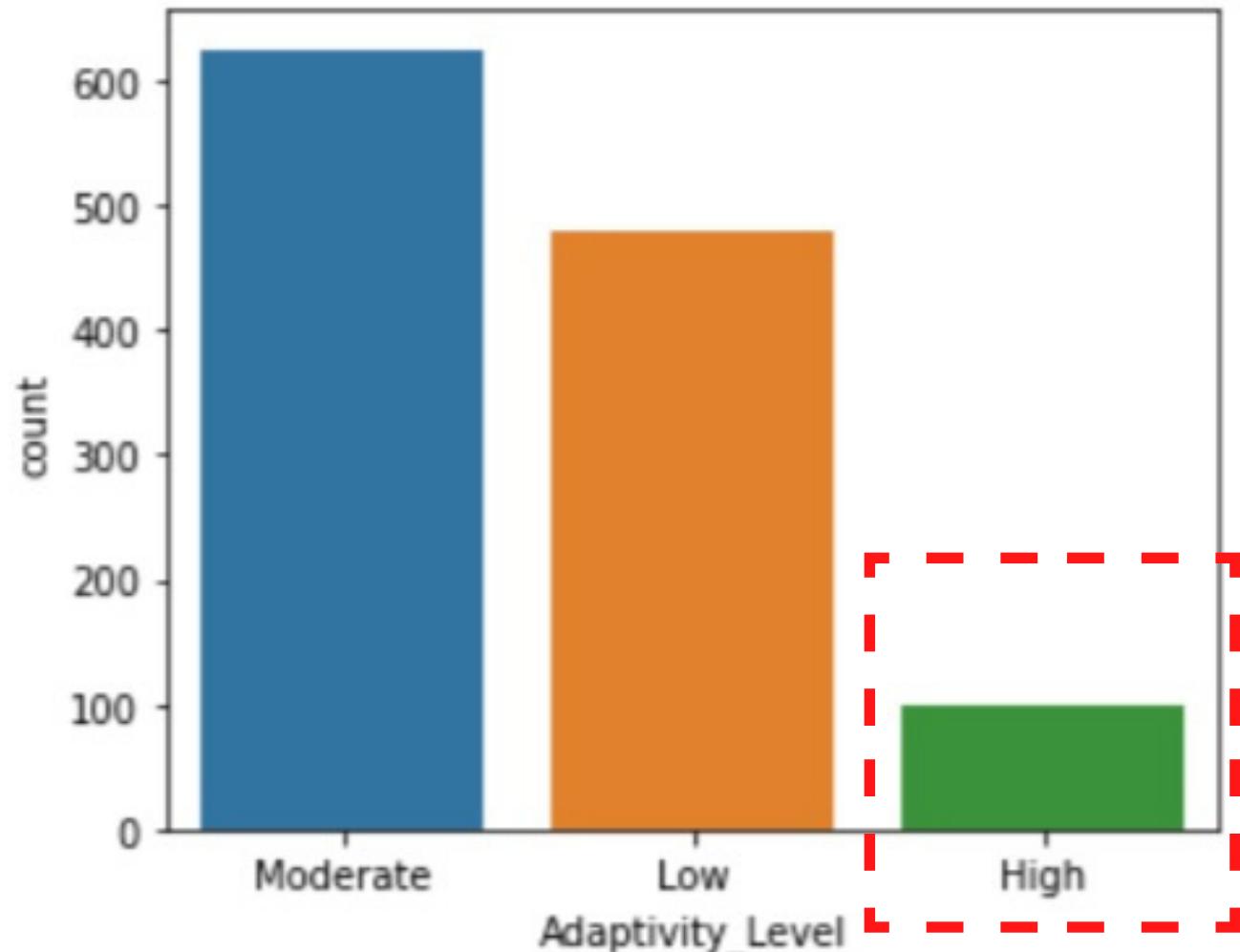


Exploratory Data Analysis (EDA)



Exploratory Data Analysis (EDA)

```
% Adaptavity are
  Moderate 51.867
  Low      39.834
  High     8.299
Name: Adaptivity_Level, dtype: float64
```



Question 1:

How is the level of student adaptability in online education?

Answer:

- 100 students (**8.3%**) with **high adaptability**
- 625 students (**51.9%**) with **moderate adaptability**
- 480 students (**39.8%**) with **low adaptability**
- In general, the adaptability of students in online education is **relatively low** (the number of students who have high adaptability is low).



Exploratory Data Analysis (EDA)

Question 2 :

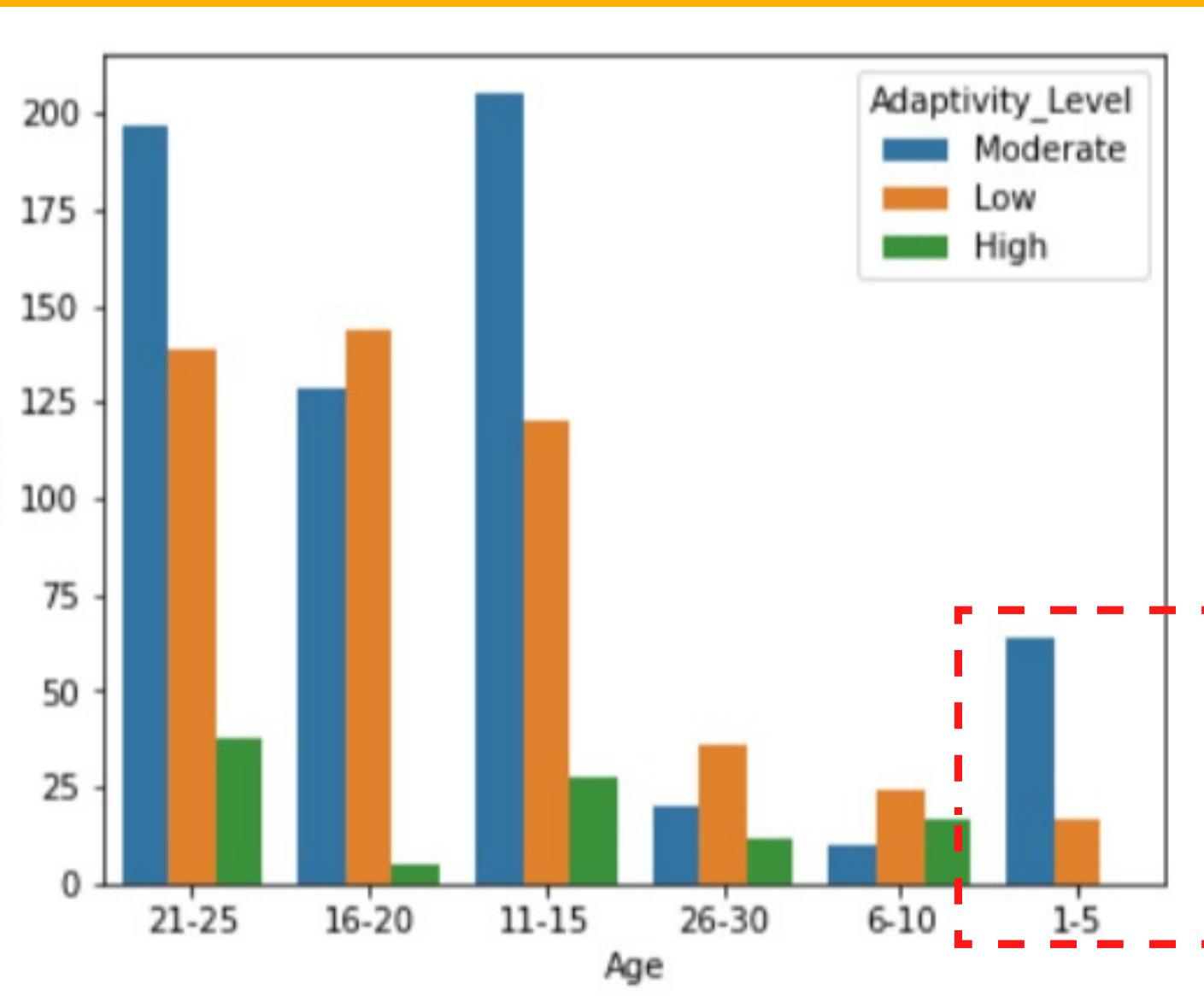
Students with what gender and education level have the most high adaptability?

Answer :

- Students with **high adaptability** are **mostly male** with **university** education levels
- There are **no male students** at the **college** education level who have **high adaptability**

Education_Level	Gender	Adaptivity_Level	Count
College	Female	High	3
University	Female	High	6
School	Female	High	20
School	Male	High	27
University	Male	High	44

Exploratory Data Analysis (EDA)



Question 3 :

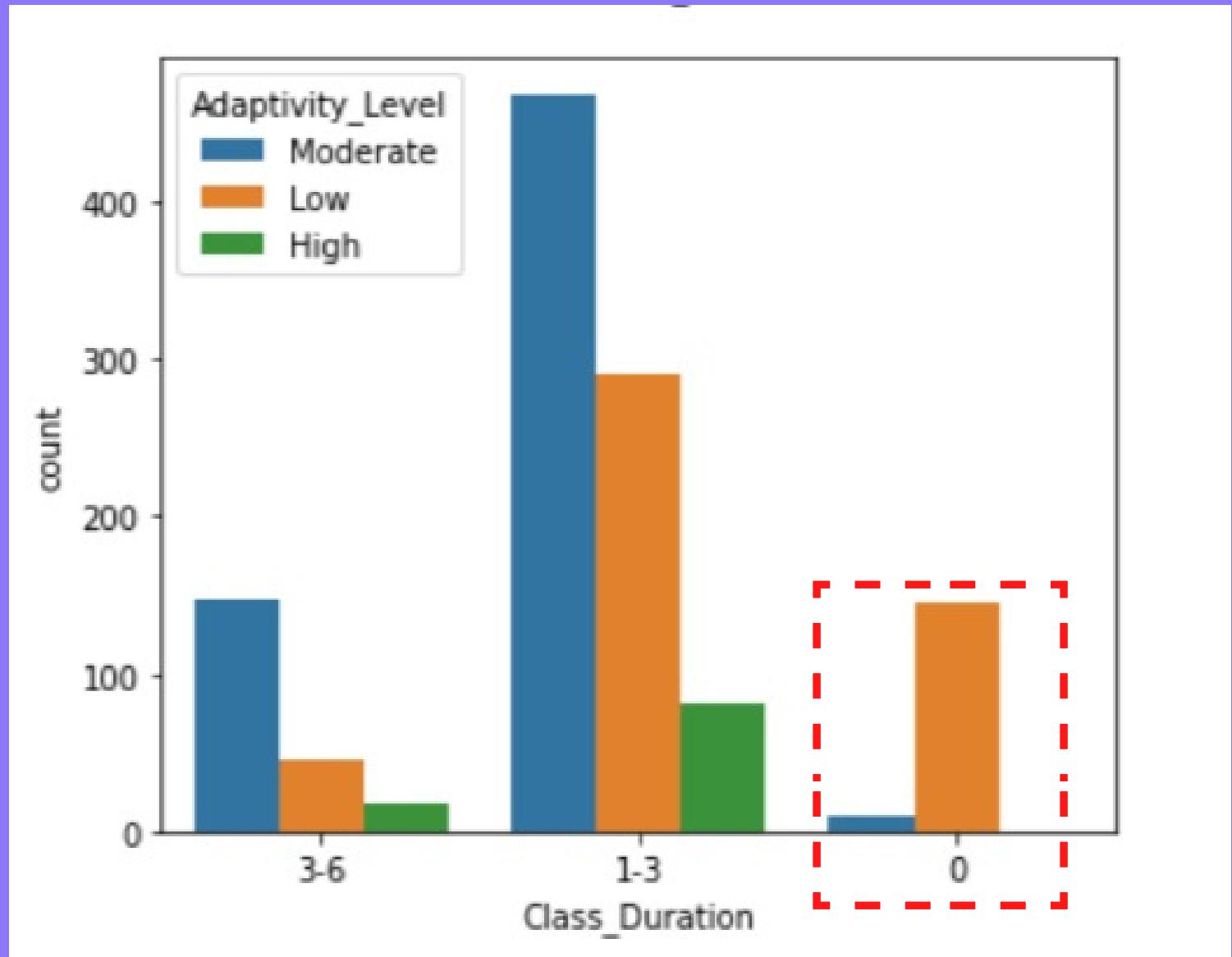
How is the adaptability of students based on age??

Answer:

- Students aged **1-5 years** do not have **high adaptability**
- Students aged **21-25 years** have the **most high adaptability**



Exploratory Data Analysis (EDA)



Question 4 :

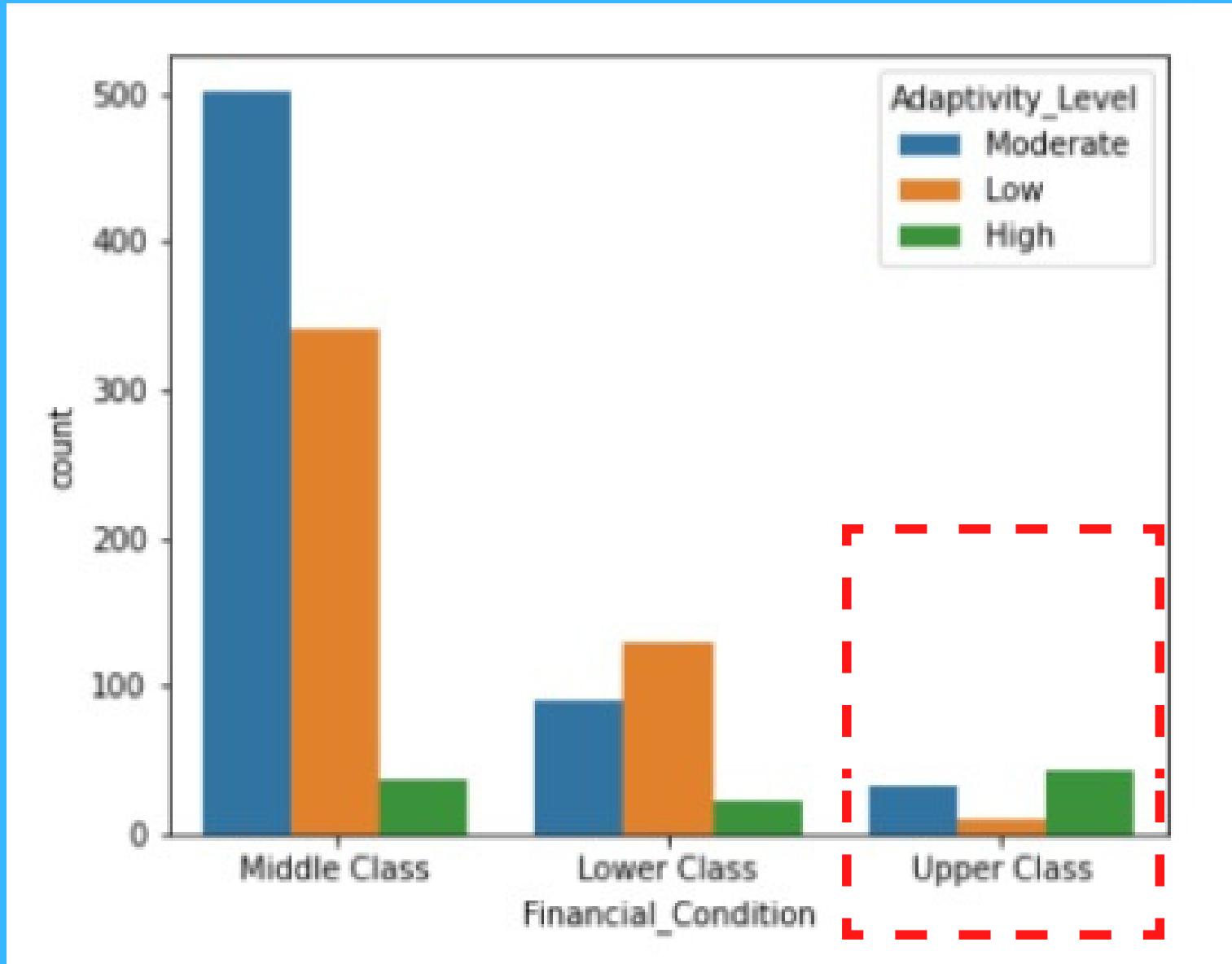
How is the adaptability of students based on age??

Answer:

- Students who **take classes** with a duration **less than 1 hour** , **don't have high adaptability**



Exploratory Data Analysis (EDA)

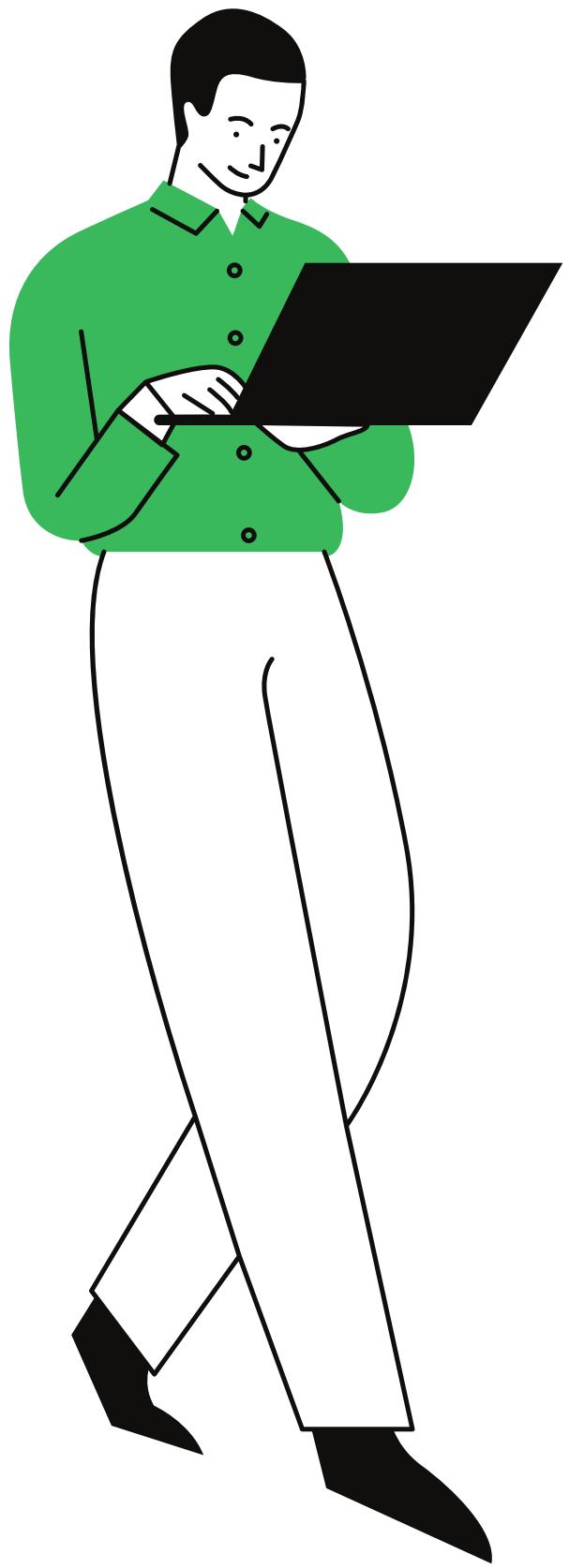


Question 5:

How is the student's adaptability based on financial conditions???

Answer:

- Students with **upper class** financial conditions, **have the highest high adaptability** among other classes
- On the contrary, students with **lower class** financial conditions, have the **lowest high adaptability** and tend to have **low adaptation**



**Split Dataset
(Resampling Data)**



SMOTE Resampling

Shape of X before SMOTE: (1205, 13)

Shape of X after SMOTE: (1875, 13)

Balance of positive and negative classes (%):

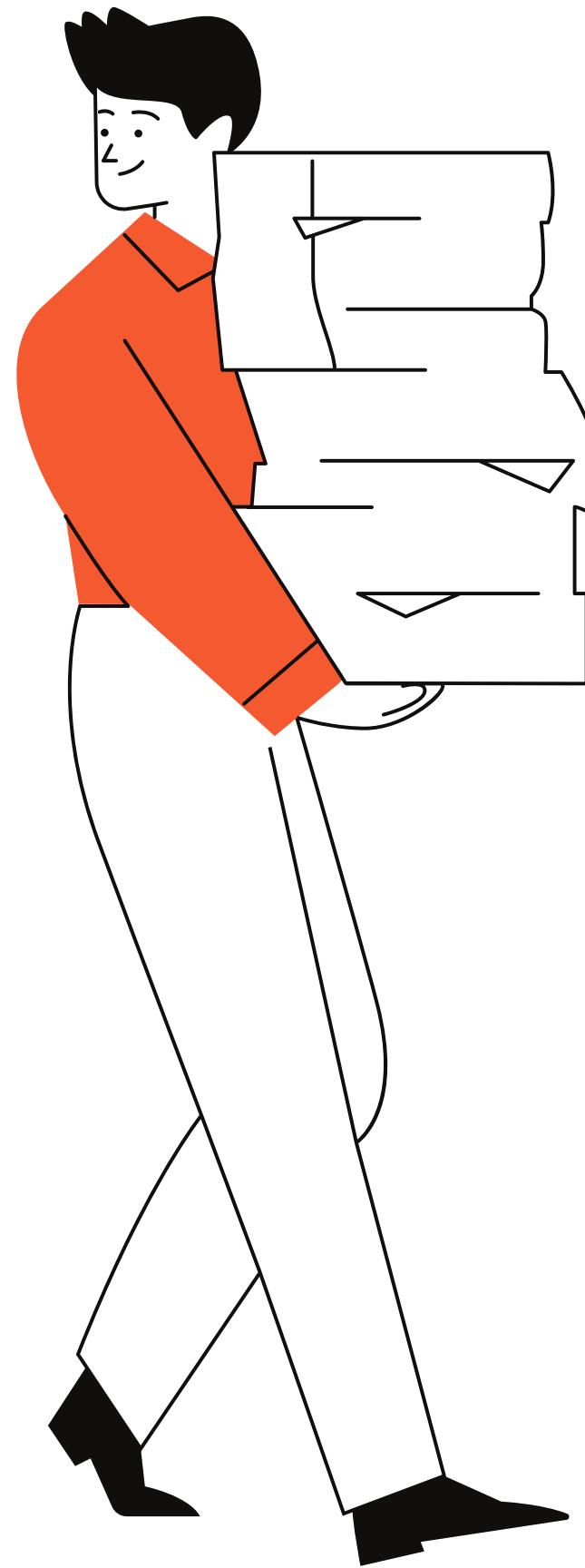
2	33.333333
1	33.333333
0	33.333333

Name: Adaptivity_Level, dtype: float64

- Because the target feature has **imbalanced data classes**, it is necessary to do data **balancing** using the **SMOTE method**
 - Data is oversampled from **1205** to **1875**
 - All data classes are **divided by 33%**



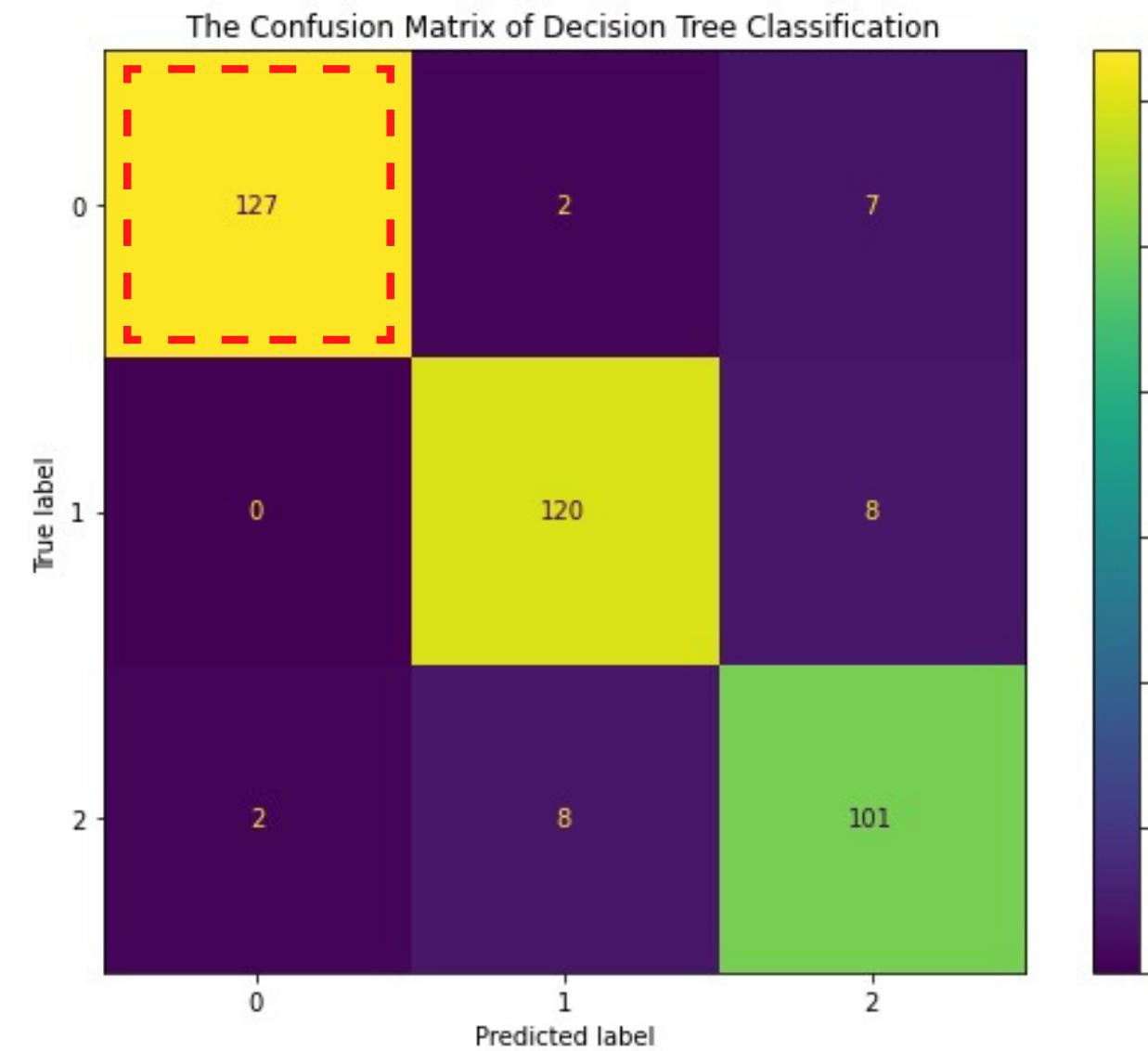
Modelling Machine Learning (ML)



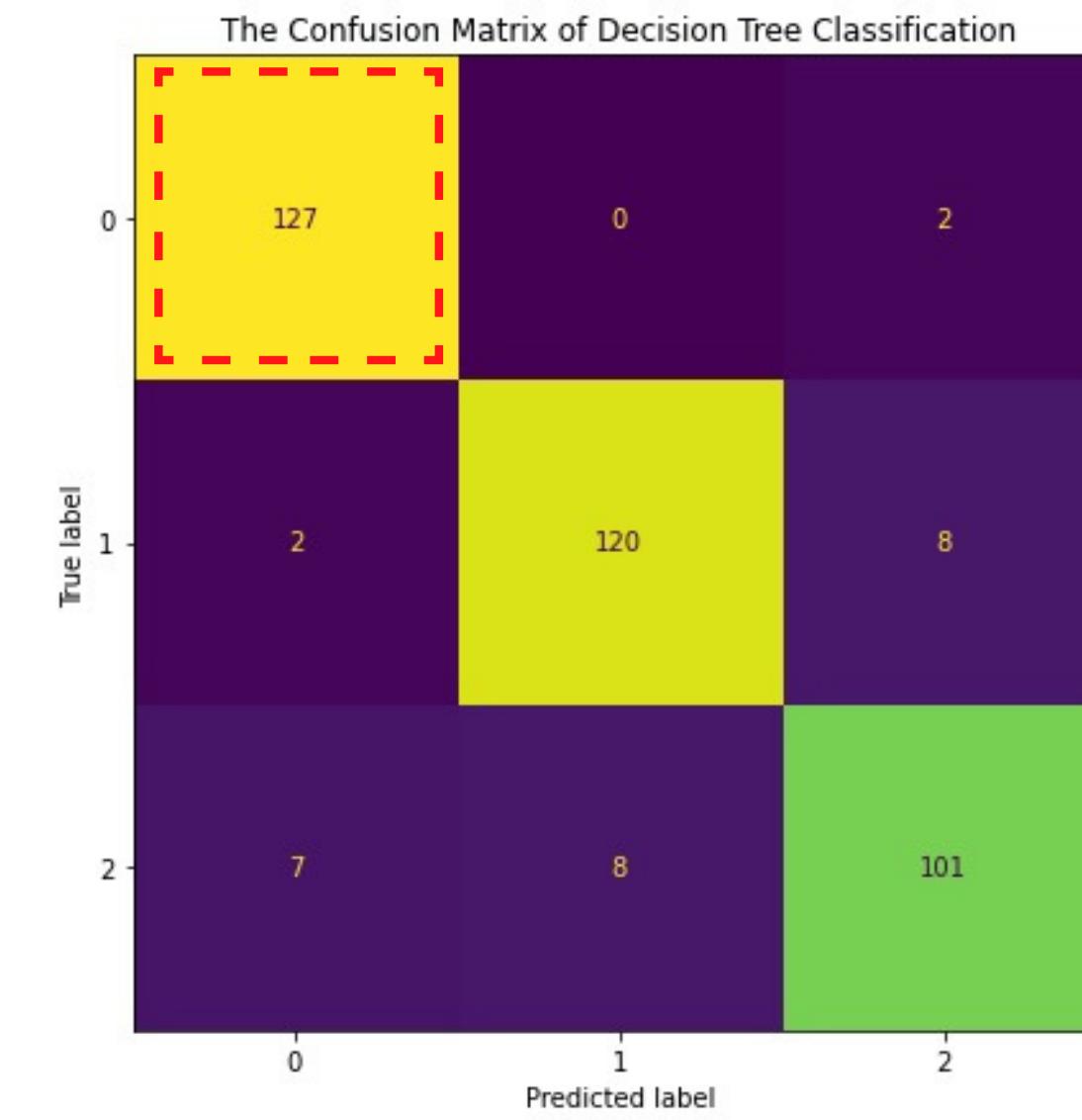
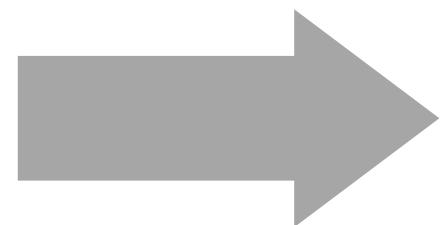


Decision Tree Model

Confusion
Matrix Score



Before Tuning



After Tuning



Decision Tree Model

Classification Report

	precision	recall	f1-score	support
0	0.93	0.98	0.96	129
1	0.94	0.92	0.93	130
2	0.91	0.87	0.89	116
accuracy			0.93	375
macro avg	0.93	0.93	0.93	375
weighted avg	0.93	0.93	0.93	375

Before Tuning

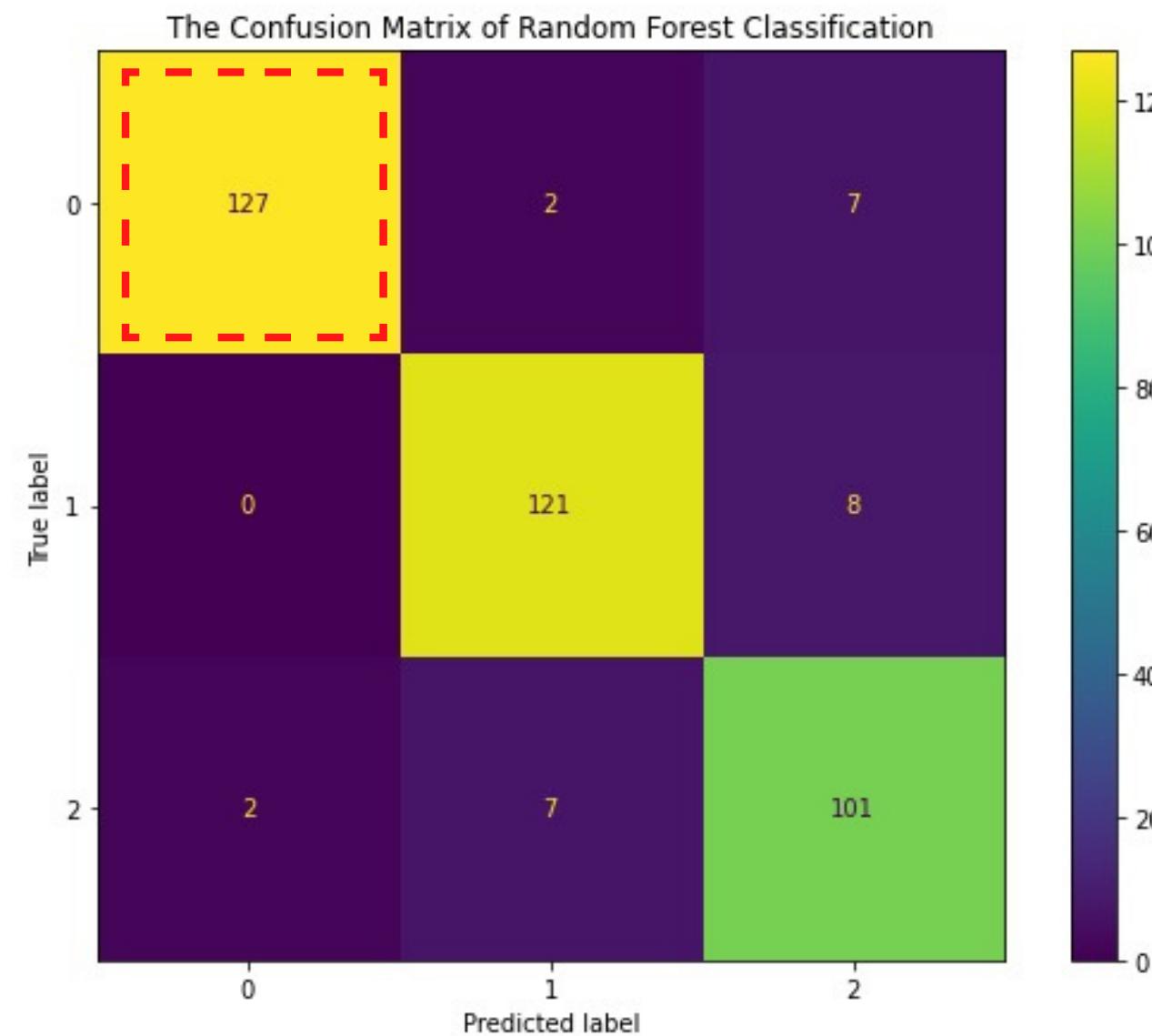
params	mean_test_score	rank_test_score	
{'criterion': 'gini', 'max_depth': 90}	0.918000	1	
precision	recall	f1-score	support
0	0.93	0.98	0.96
1	0.94	0.92	0.93
2	0.91	0.87	0.89
accuracy			0.93
macro avg	0.93	0.93	0.93
weighted avg	0.93	0.93	0.93

After Tuning

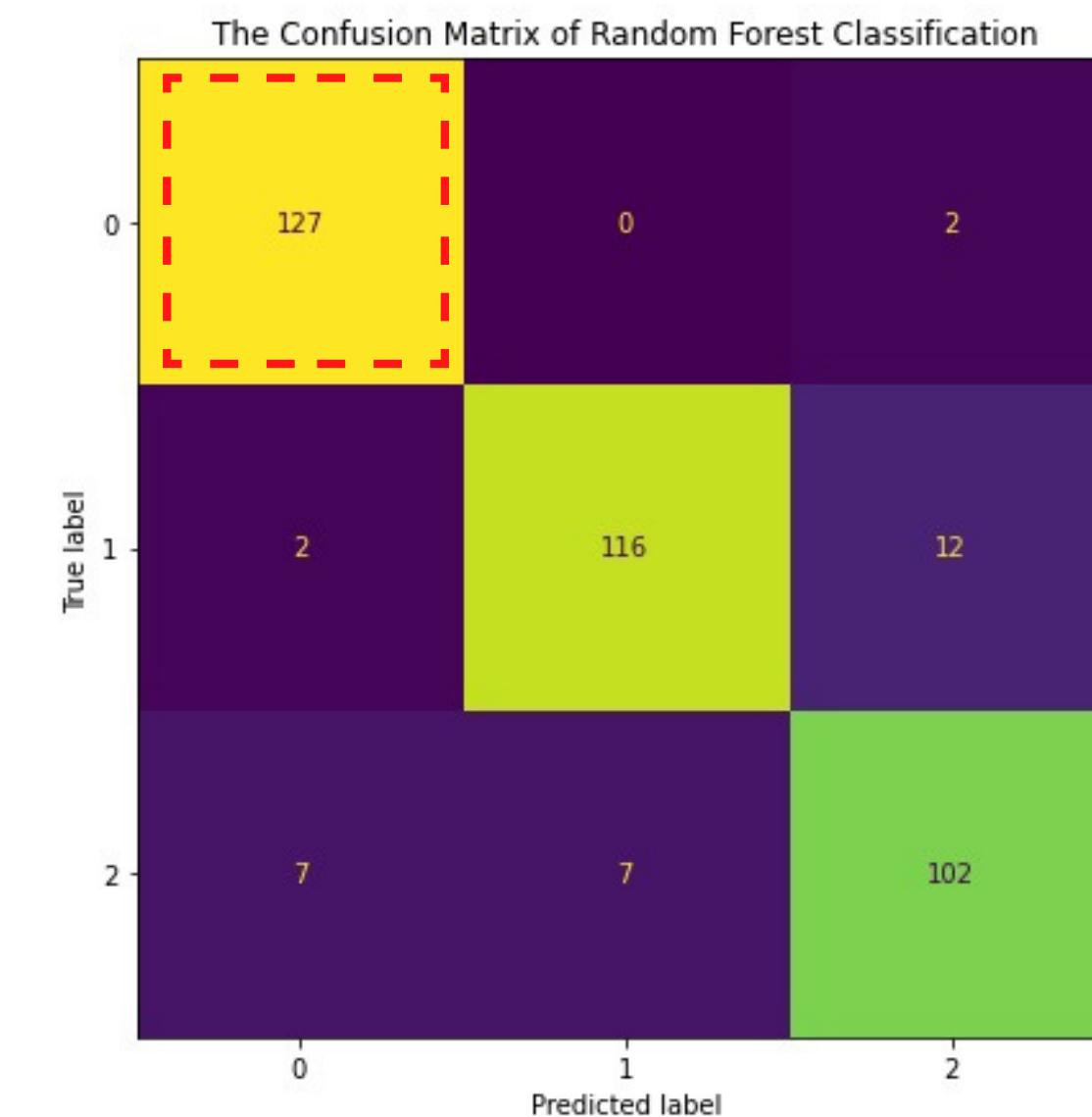
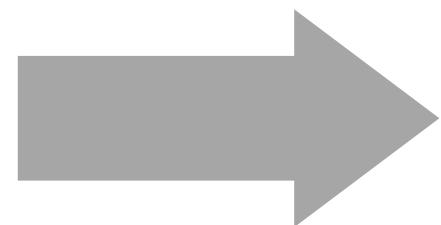


Random Forest Model

Confusion
Matrix Score



Before Tuning



After Tuning



Random Forest Model

Classification Report

	precision	recall	f1-score	support
0	0.93	0.98	0.96	129
1	0.94	0.93	0.93	130
2	0.92	0.87	0.89	116
accuracy			0.93	375
macro avg	0.93	0.93	0.93	375
weighted avg	0.93	0.93	0.93	375

Before Tuning

params	mean_test_score	rank_test_score	
{'max_depth': 10, 'n_estimators': 80}	0.906000	1	
precision	recall	f1-score	support
0	0.93	0.98	0.96
1	0.94	0.89	0.92
2	0.88	0.88	0.88
accuracy			0.92
macro avg	0.92	0.92	0.92
weighted avg	0.92	0.92	0.92

After Tuning



Model Evaluation



Decision Tree

	precision	recall	f1-score	support
0	0.93	0.98	0.96	129
1	0.94	0.92	0.93	130
2	0.91	0.87	0.89	116
accuracy			0.93	375
macro avg	0.93	0.93	0.93	375
weighted avg	0.93	0.93	0.93	375

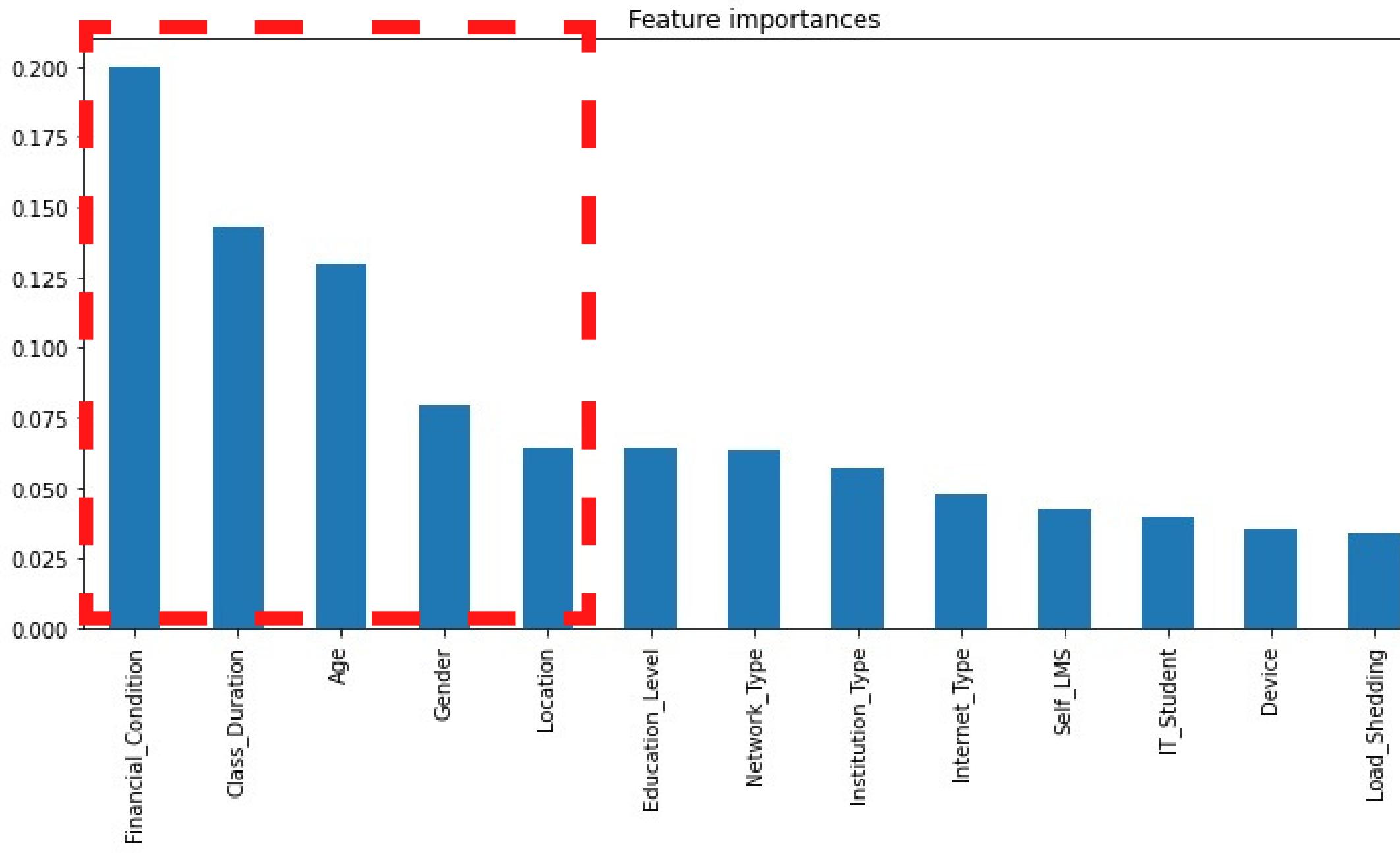
Random Forest

	precision	recall	f1-score	support
0	0.93	0.98	0.96	129
1	0.94	0.89	0.92	130
2	0.88	0.88	0.88	116
accuracy			0.92	375
macro avg	0.92	0.92	0.92	375
weighted avg	0.92	0.92	0.92	375

- The decision tree model can predict 93% of students with high adaptability (7% of students don't predict high adaptability)
- The random forest model can predict 92% of students with high adaptability (8% of students don't predict high adaptability)
- Stakeholders can make decisions with 7% or 8% of students who are predicted not to have high adaptability

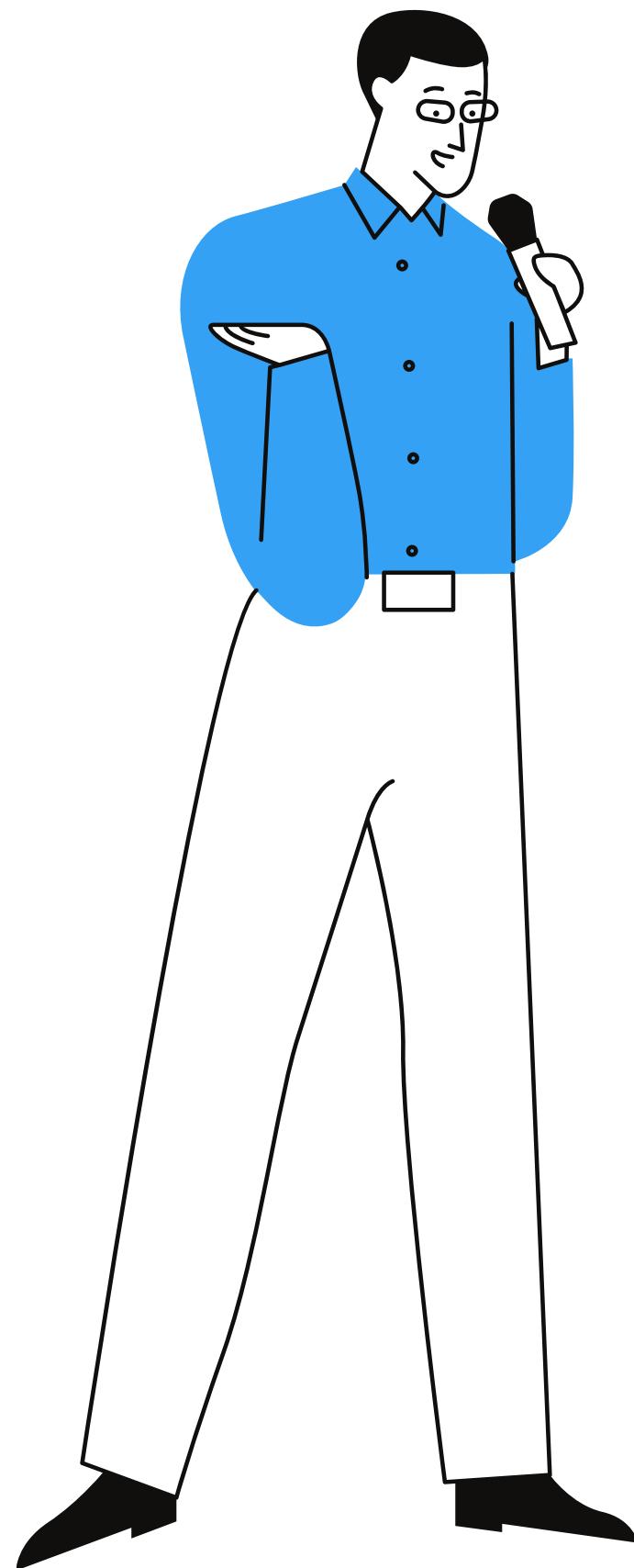


Feature Importance



There are **5 important features** of random forest modeling:

- **Financial condition**
- **Class duration**
- **Age**
- **Gender**
- **Location**



Insight & Recomendation



Insight

These are some of the insights gleaned after the dataset was analyzed:

- The financial condition of parents also has a **great influence** on the **adaptability of students** in online education, this is certainly **correlated** with their **privileges**. it can be seen that students with **upper class** financial conditions have the **highest high adaptability** among other classes.
- Class duration that is **too short** causes children **not to have good adaptability**. it can be seen that the class duration is **less than 1 hour** and there are **no students who have high adaptability**.
- Children aged **1–5 years don't have high adaptability** in online education, while ages **11–15** and **21–25** have **good high adaptability**. although in general, **all age groups** are still **relatively low in adaptability**.
- Location also has an **influence on students' adaptability** in online education. It can be seen that students who live in **urban areas have high adaptability**. this is closely related to the **availability of better educational facilities and services if students live in urban areas**

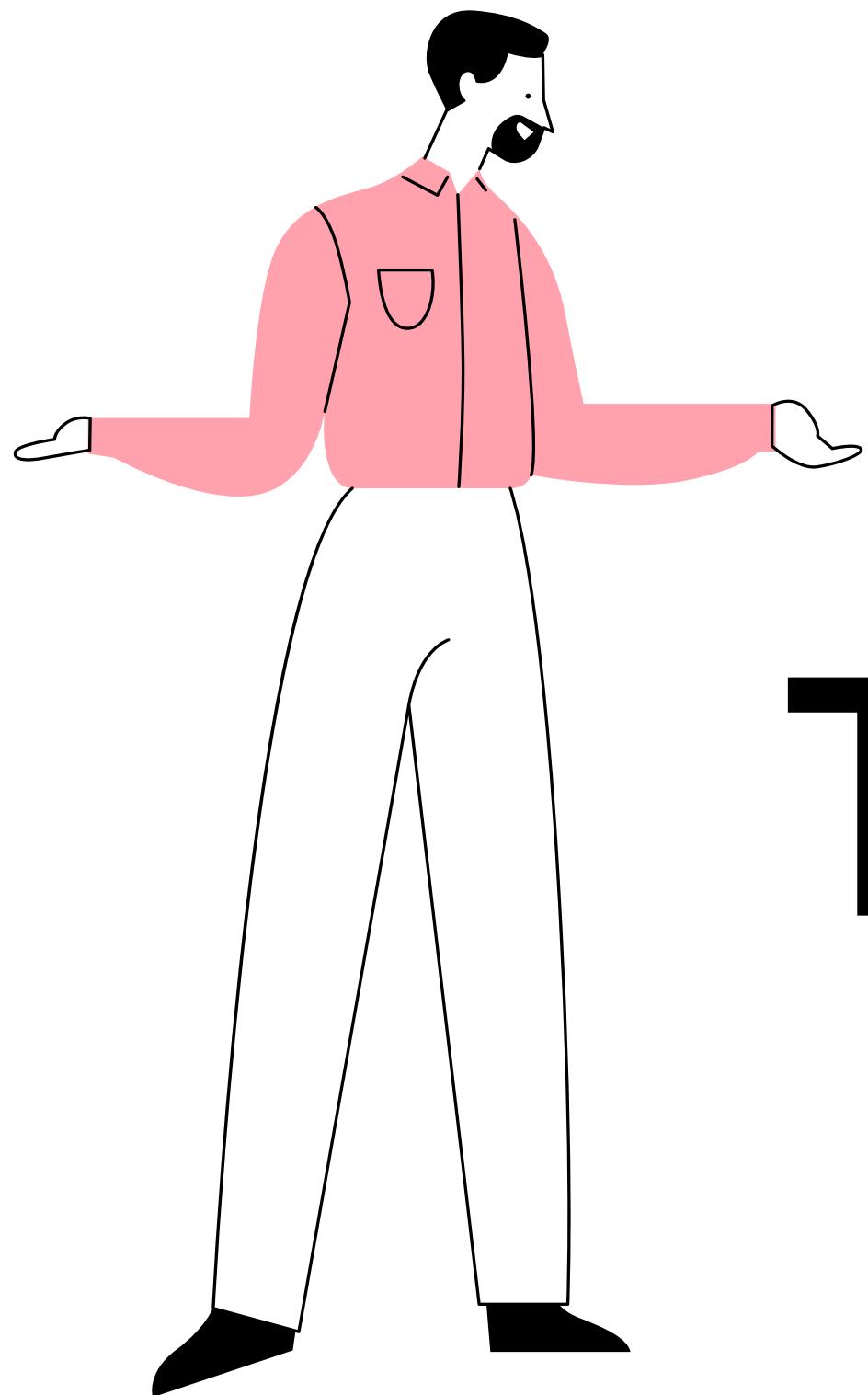


Recommendation

These are some recommendations that can be applied in multisectoral:

- The government needs to provide **more equitable** online education **facilities and services for all student**
- Educational institutions need to **ensure** the duration of the class can **make students adapt well / high adaptability**. from the results of dataset analysis, the duration of **class 1–3** is the duration with the **best high adaptability of students**
- Parents need to **accompany** students aged **1–5 year** so that they can adapt well in online education.
- The government needs to **improve student learning facilities in rural areas** so that students can have **high adaptability**

Thank You!



Appendix!



Dataset:

<https://www.kaggle.com/datasets/mdmahmudulhasansuzan/students-adaptability-level-in-online-education/code>

Pyhton Script:

<https://colab.research.google.com/drive/1HtfH4bURchQ0-f5q1mc3xoJCah0ljNuf#scrollTo=XfcFwlHf4Uuz>