

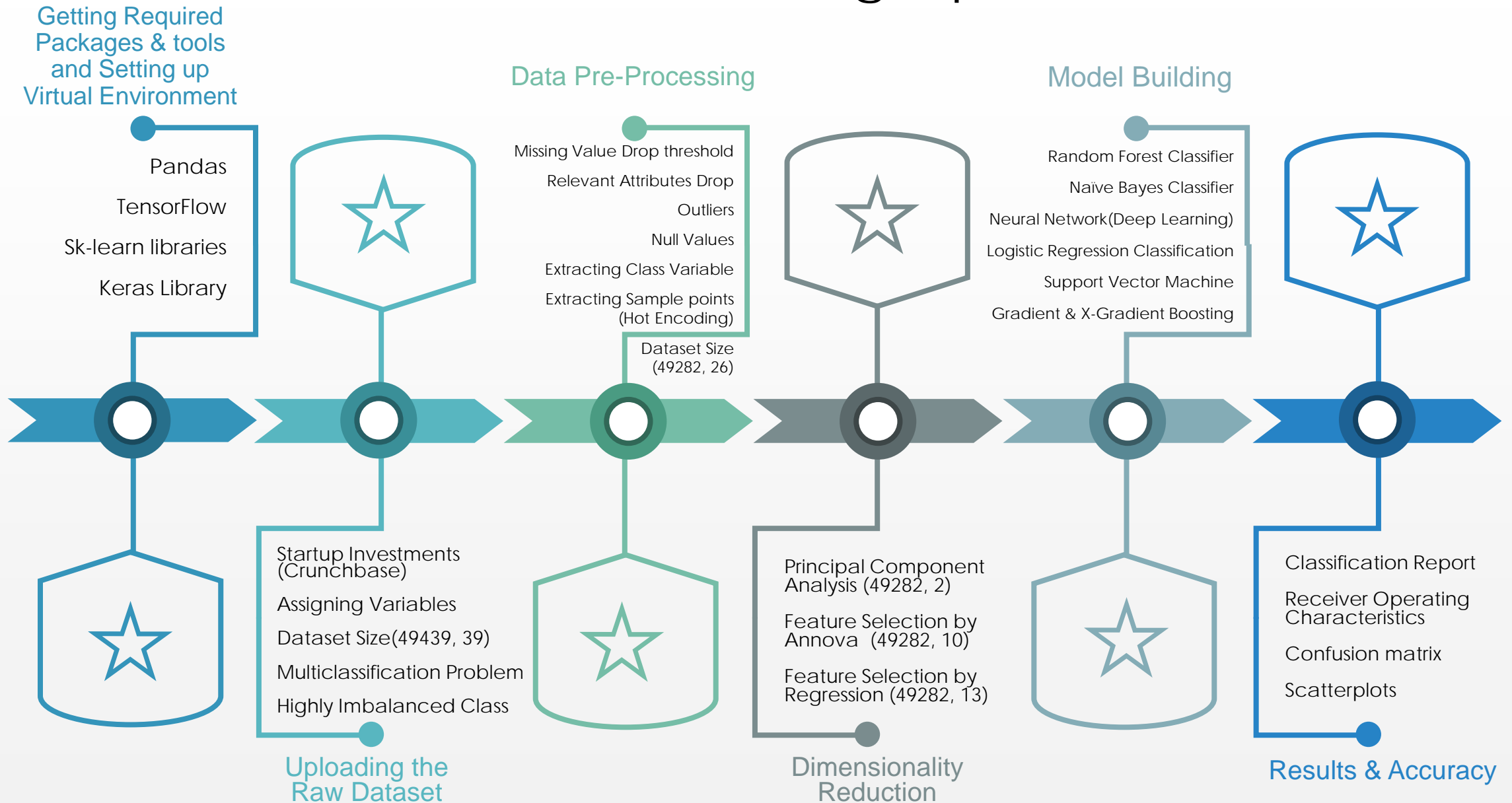
The background features a blurred financial chart with orange bars and white lines. A white line with circular markers connects several points across the chart. A teal bar at the bottom contains white text.

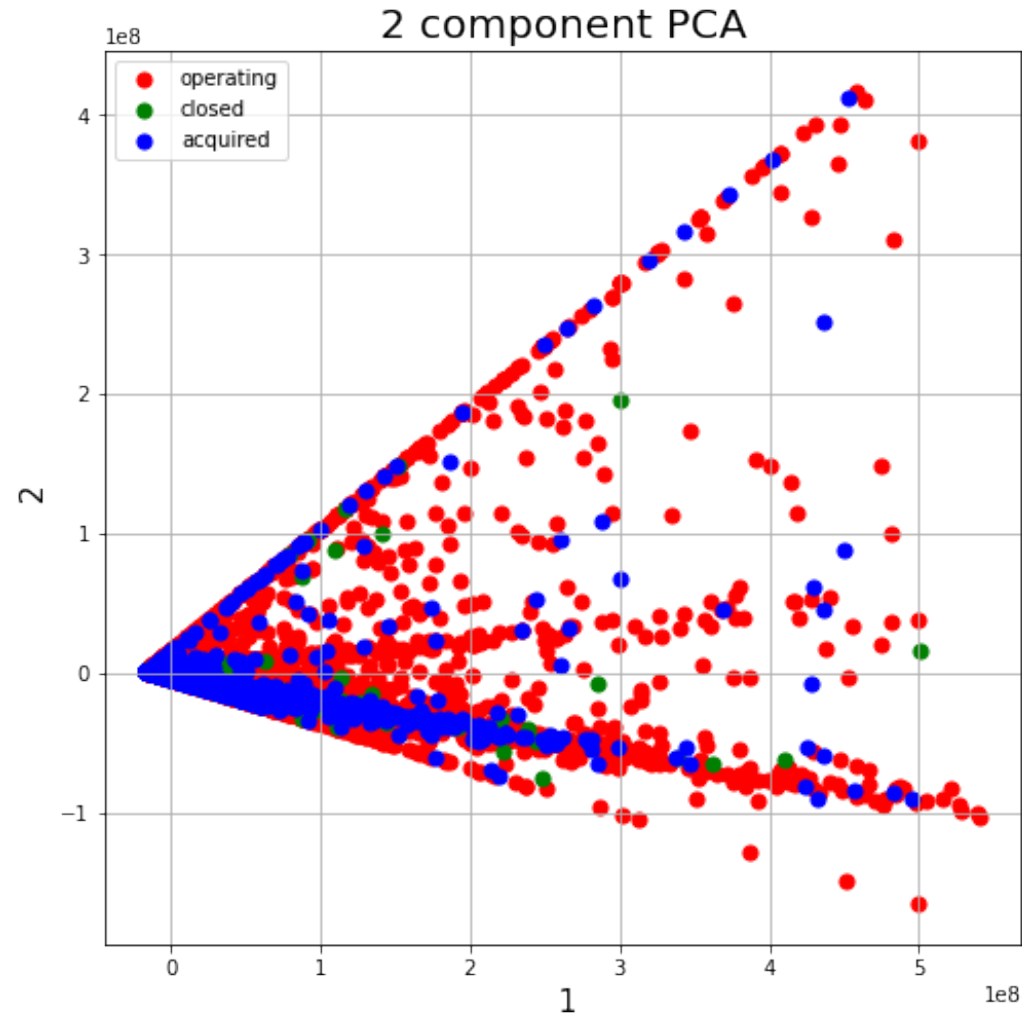
# Investment Decision Classification

Foundation to Data Science

Muhammad Saad  
18125

# Machine Learning Pipeline





# Dimensionality Reduction

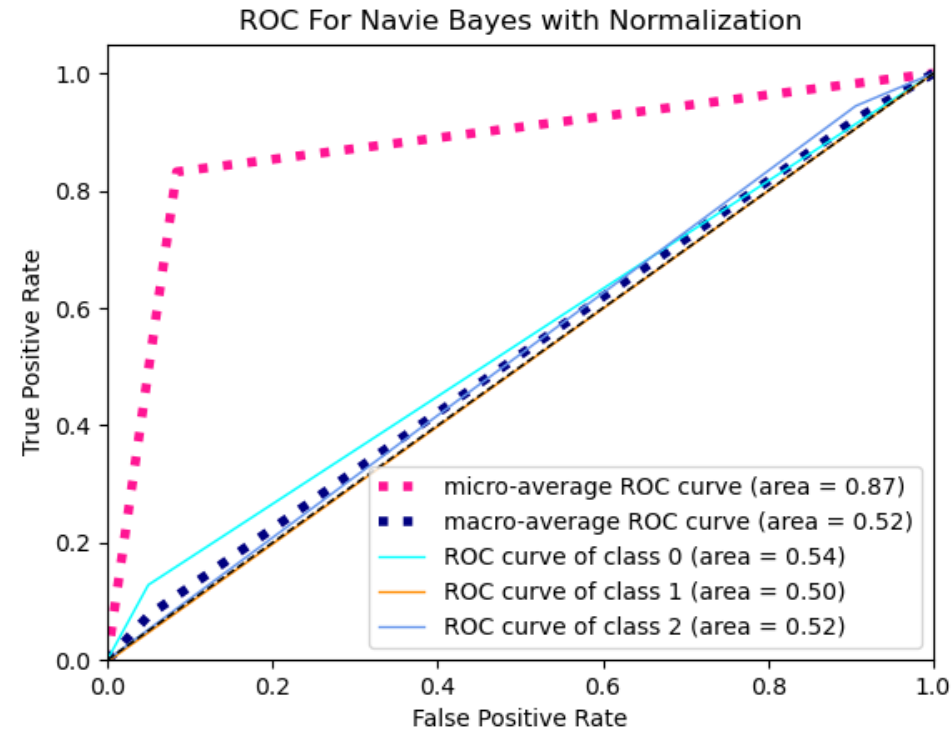
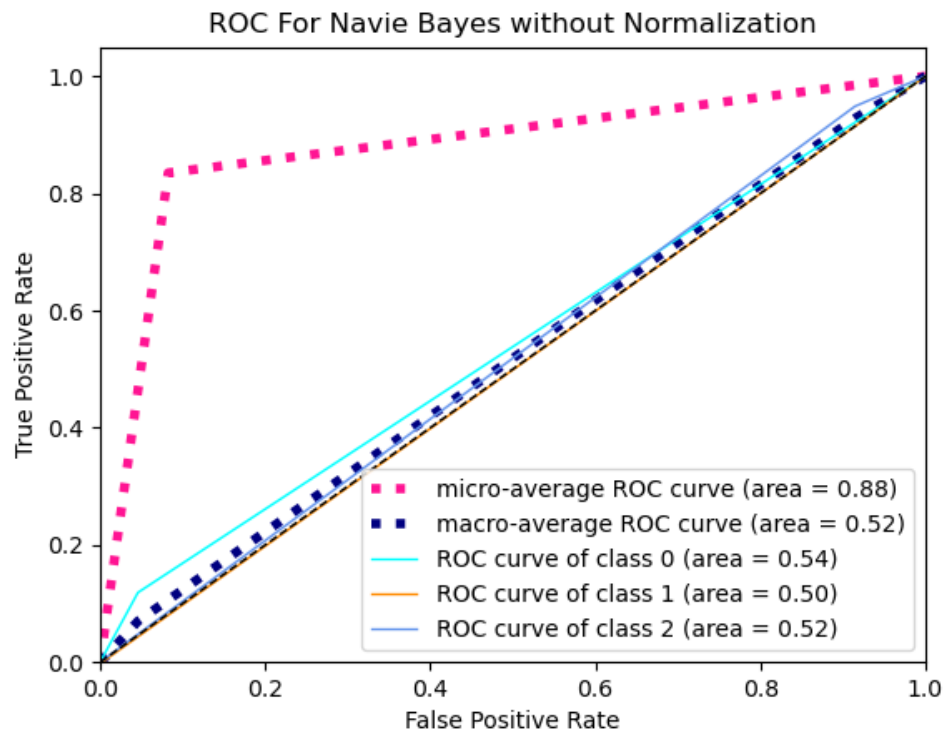
## Variance-Ratio

- [0.14207747 0.05265492]

## Variance-Ratio Threshold

- 0.85 or above

# Naïve Bayes Classifier



## Classification Report

Accuracy

Precision

Recall

F1-score

Naïve bayes

0.84

0.78

0.84

0.80

Normalize Naïve bayes

0.83

0.78

0.83

0.80

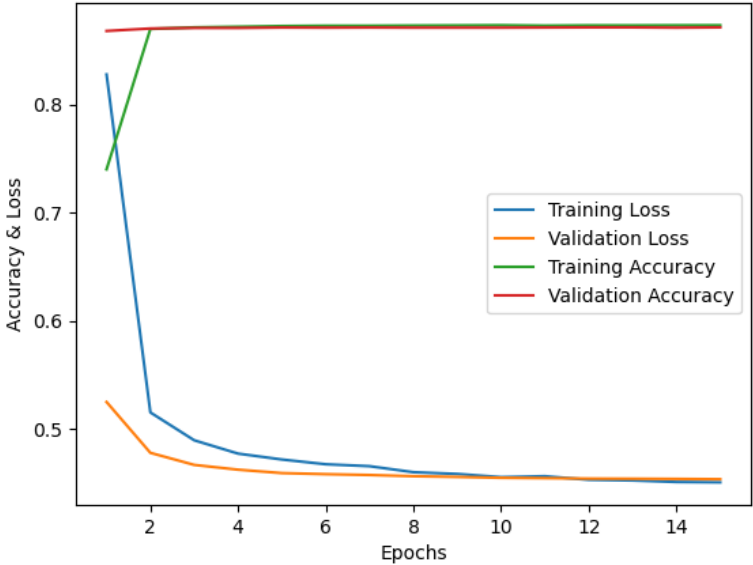
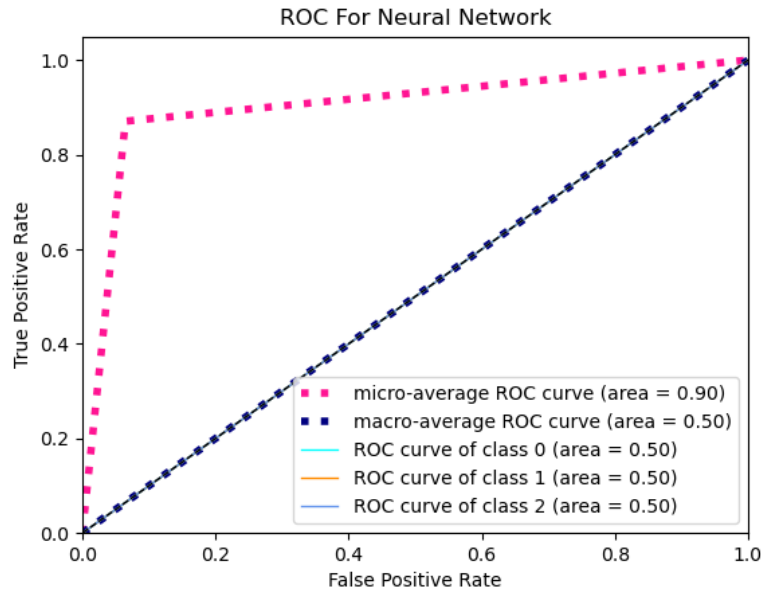
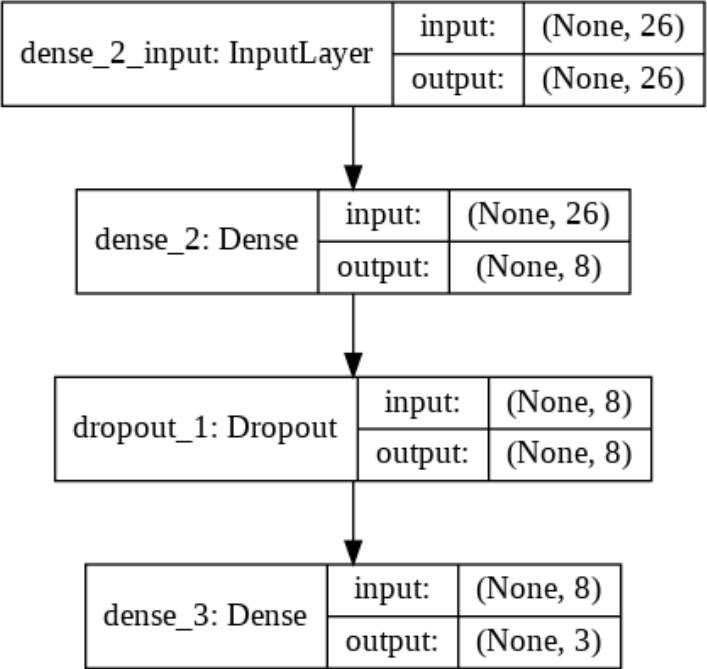
## Confusion Matrix

Predicted Value

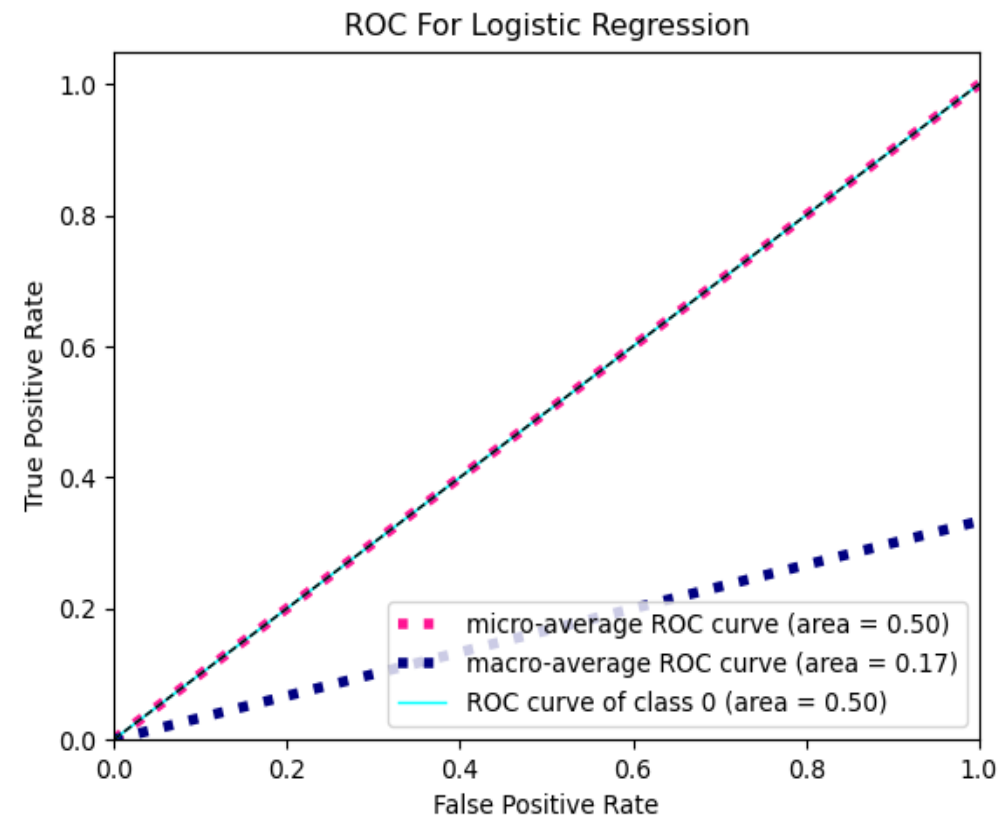
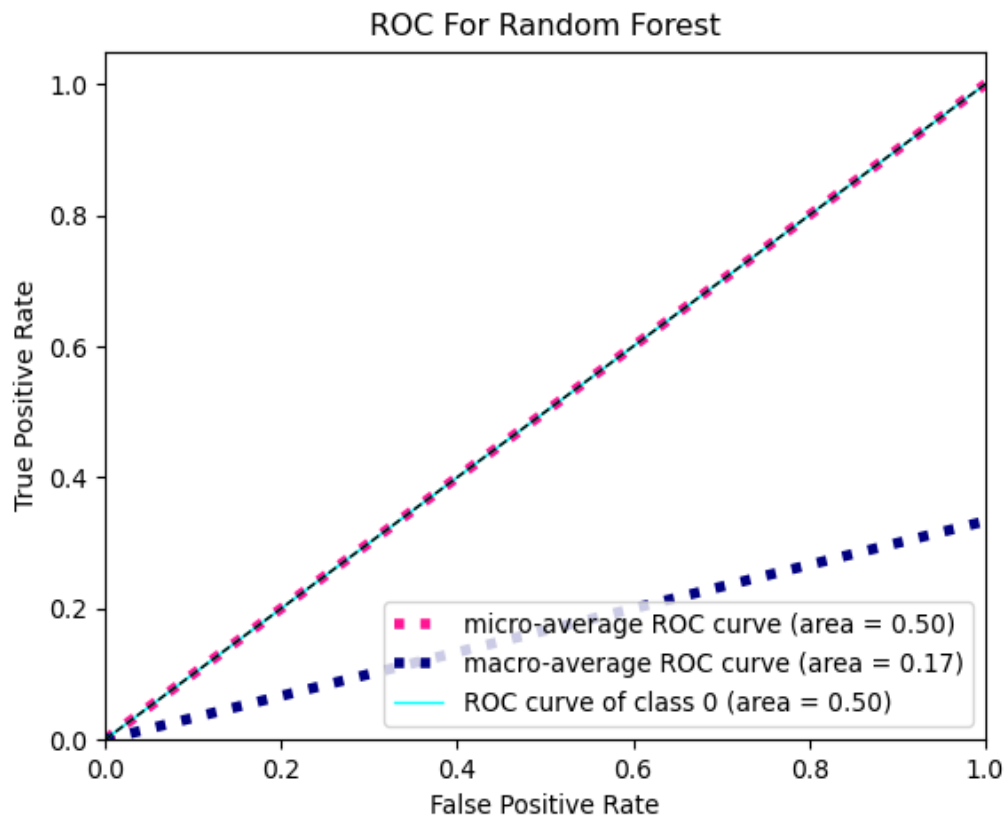
	0	1	2
0	97	6	665
1	16	1	500
2	436	42	8104

Actual Value

# Neural Network (Deep Learning)



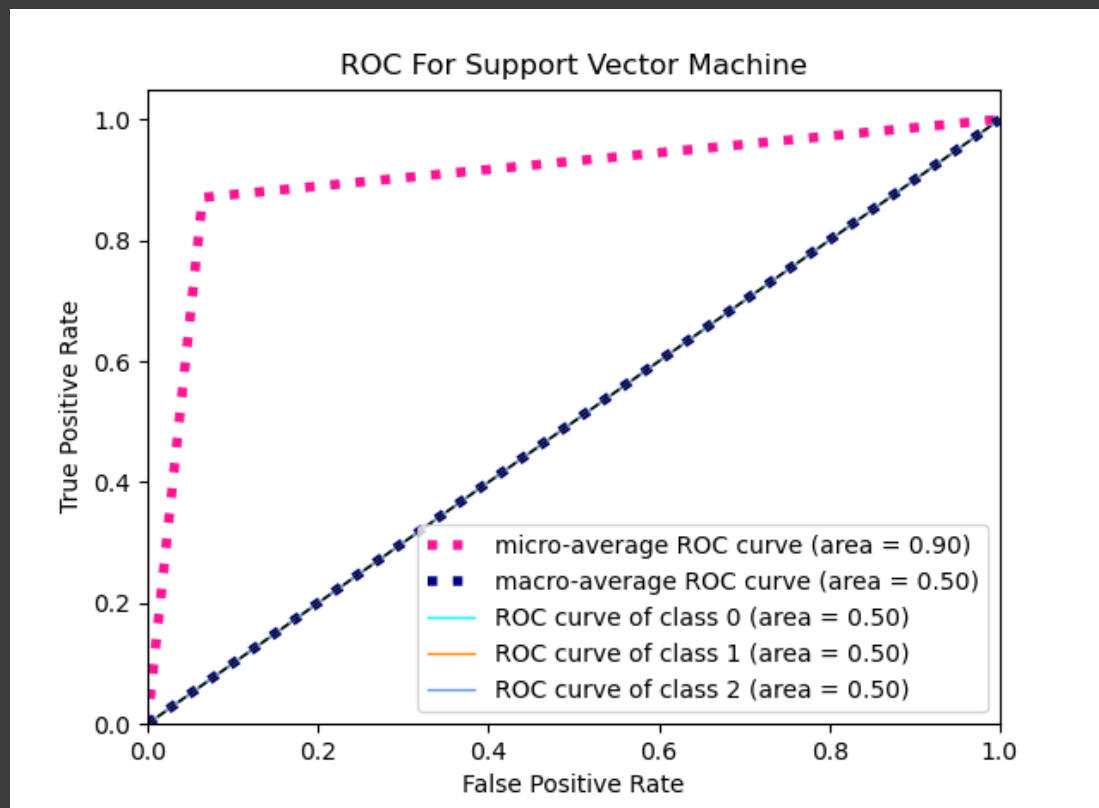
Classification Report				
	Accuracy	Precision	Recall	F1-score
Neural Network	0.87	0.76	0.87	0.81
The loss function of both training and validation data goes down to around 0.2. This shows that the model is robust and is accurately predicting classes even on validation data. The accuracy of both training and validation data quickly maximize and reach an accuracy of 100%				



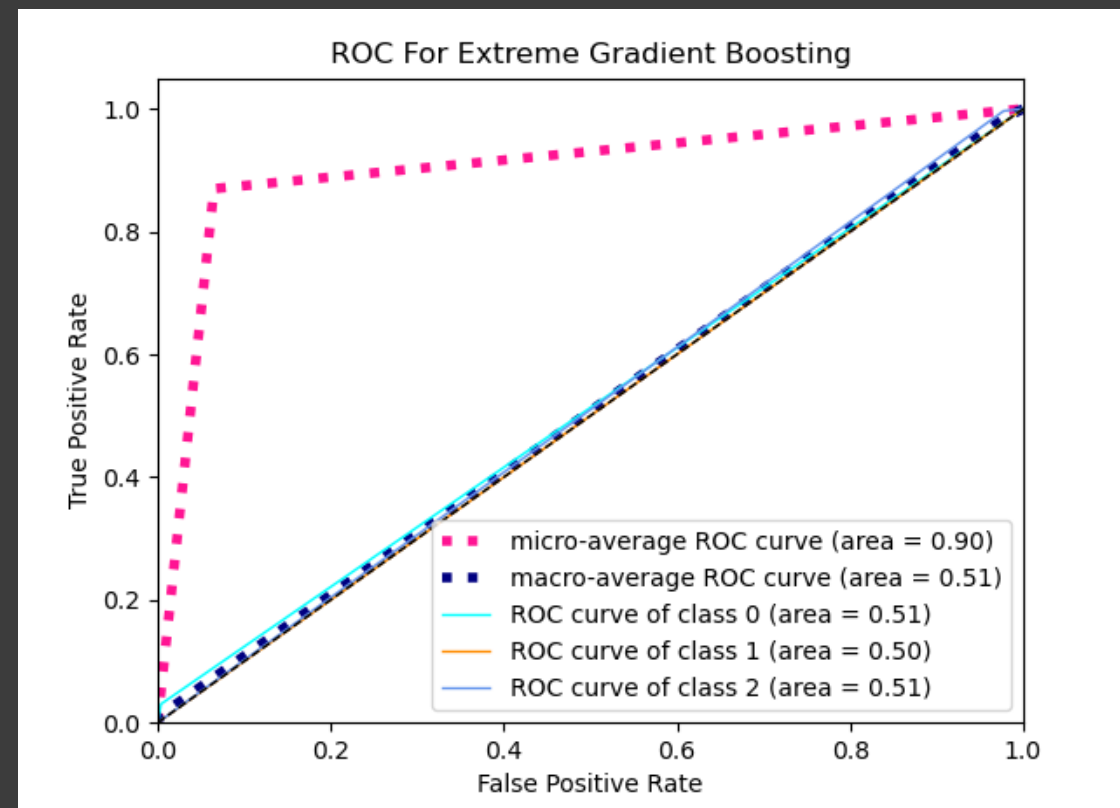
## Logistic Regression Classification

## Random Forest Classifier

	Classification Report			
	Accuracy	Precision	Recall	F1-score
<b>Random Forest</b>	0.95	0.90	0.95	0.92
<b>Logistic Regression</b>	0.95	0.90	0.95	0.92



Support Vector Machine



Gradient & Extreme Gradient Boosting

	Classification Report			
	Accuracy	Precision	Recall	F1-score
<b>Support Vector Machine</b>	0.87	0.76	0.87	0.81
<b>Gradient Boosting</b>	0.87	0.79	0.87	0.81
<b>Extreme Gradient Boosting</b>	0.87	0.81	0.87	0.81

# Classification Report

	Accuracy	Precision	Recall	F1-score
Random Forest	0.95	0.90	0.95	0.92
Naïve bayes	0.84	0.78	0.84	0.80
Normalize Naïve bayes	0.83	0.78	0.83	0.80
Neural Network	0.87	0.76	0.87	0.81
Support Vector Machine	0.87	0.76	0.87	0.81
Logistic Regression	0.95	0.90	0.95	0.92
Gradient Boosting	0.87	0.79	0.87	0.81
Extreme Gradient Boosting	0.87	0.81	0.87	0.81



An abstract geometric pattern featuring various shapes in teal and blue. The composition includes a large teal circle at the bottom left, a teal semi-circle in the center, a blue triangle at the top left, and a blue square at the bottom right. There are also several small teal circles, a blue circle at the top right, and several grey curved lines scattered throughout the white background.