MODEL PERFORMANCE REPORT

The models been trained on our data sets were the;

-Logistic Regression Model

- Random Forest Classifier Model.

Goal/Aim: Was to train these models to gain some level of accuracy in predicting our target variable [Thus, the **future return**: Uptrend, downtrend, or sideways]

1. Logistic Regression Model:

Logistic Regression Model's classification report

	precision	recall	f1-score	support
0	0.45	0.01	0.02	1356
1	0.39	0.17	0.24	1583
2	0.37	0.84	0.51	1712
accuracy			0.37	4651
macro avg	0.40	0.34	0.26	4651
weighted avg	0.40	0.37	0.27	4651

Insight:

Class 0 (downtrend):

- Precision 0.45 → only 43% of predicted class 0 were correct.
- Recall 0.01 → the model almost never correctly identifies true class 0
- F1-score 0.02 → extremely poor performance

Class 1 (sideways):

- Precision 0.39 → 39% of predictions for class 1 were correct
- Recall 0.17 → the model slightly identifies actual class 1 better, but still misses most instances
- F1-score 0.24 → low
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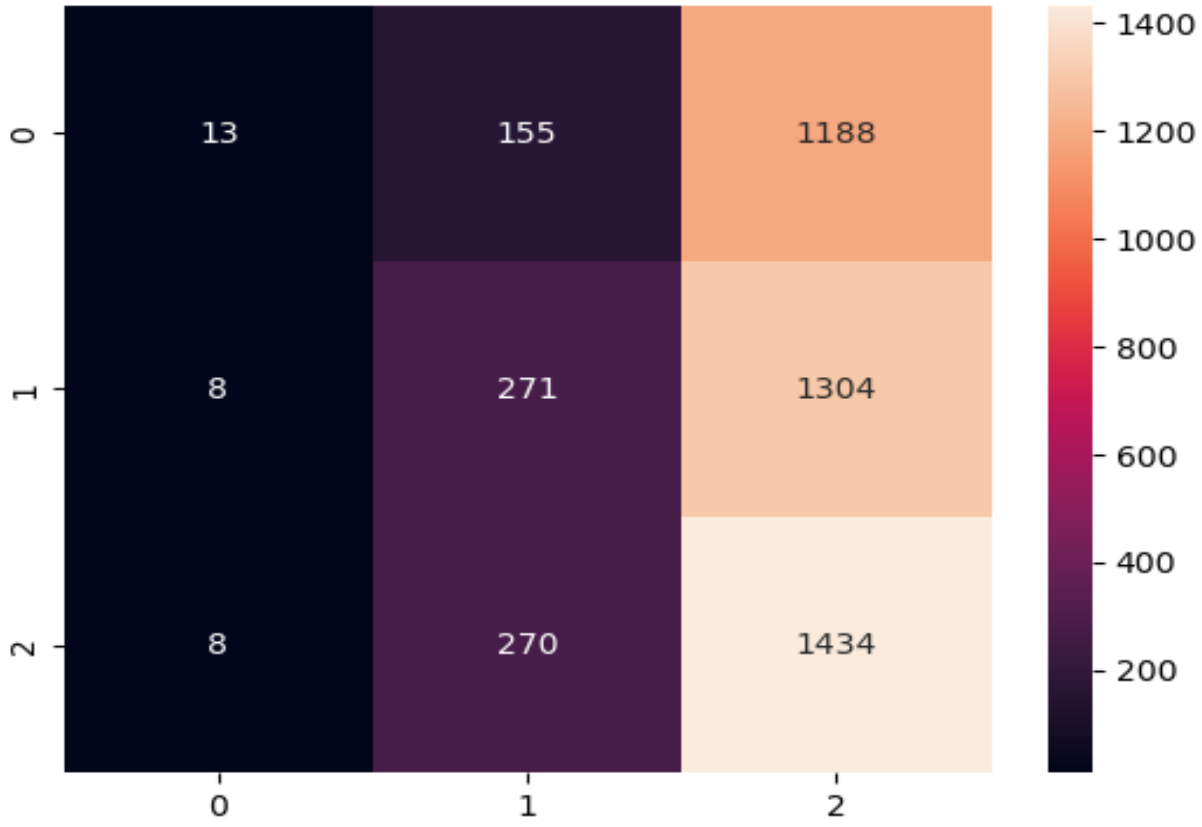
Class 2 (uptrend):

- Precision 0.37 → 37% of predictions for class 2 were correct
- Recall 0.84 → the model successfully captures most actual class 2 samples
- F1-score 0.51 → moderate performance

Observation: Using class weight='balanced' helped the model detect the minority class (1) better. Class 0 remains very difficult to predict. Overall, the model is still biased toward class 2,

but the macro and weighted F1-scores improved slightly. Logistic Regression may be limited for this dataset — more advanced models are likely needed.

Confusion Matrix



The confusion matrix helps see how well the model predicted the various classes accurately. In this for instance, the Logistic regression model accurately predicted:

- class 0, 13 times
- Class 1, 271times
- Class 3, 1434 times

2. **Random Forest Classifier Model**

Random Forest Model's classification report

Random Forest Model Accuracy after tuning: 0.35

Classification Report:

	precision	recall	f1-score	support
0	0.28	0.14	0.19	1356
1	0.38	0.38	0.38	1583
2	0.36	0.50	0.42	1712
accuracy			0.35	4651
macro avg	0.34	0.34	0.33	4651
weighted avg	0.34	0.35	0.34	4651

Class 0 (downtrend):

- Precision 0.28 → only 28% of predicted class 0 were correct.
- Recall 0.14 → the model slightly identifies true class 0
- F1-score 0.19 → slightly moderate performance

Class 1 (sideways):

- Precision 0.38 → 38% of predictions for class 1 were correct
- Recall 0.38 → The model moderately identifies actual class 1 better, but still misses most instances
- F1-score 0.38 → slightly moderate
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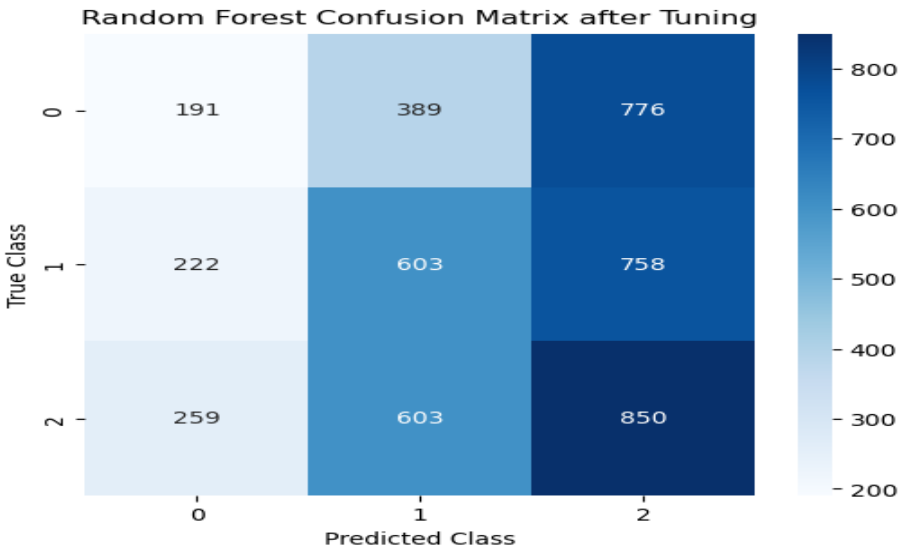
Class 2 (uptrend):

- Precision 0.36 → 36% of predictions for class 2 were correct
- Recall 0.50 → the model averagely captures most actual class 2 samples



- F1-score 0.4 2 →
  moderate performance