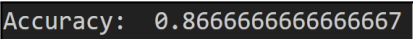

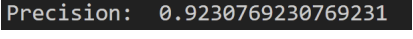
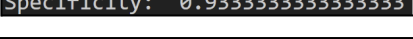

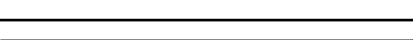
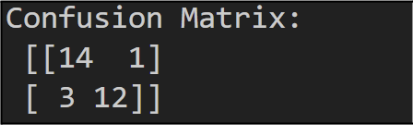
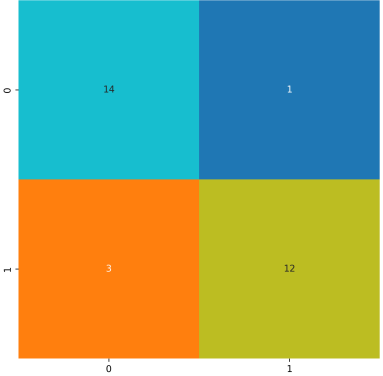


## MODEL PERFORMANCE TESTING

Date	10 November 2022
Team ID	PNT2022TMID35637
Project Name	Detecting Parkinsons' Disease Using Machine Learning
Maximum Marks	10 Marks

### SPIRAL MODEL → RANDOM FOREST CLASSIFIER

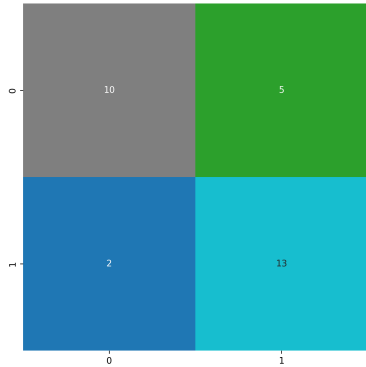
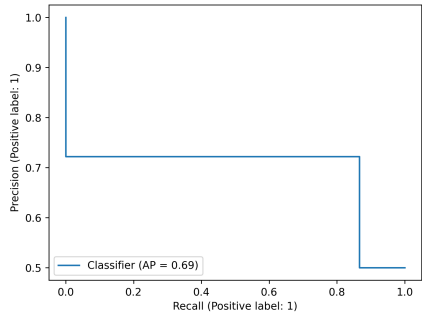
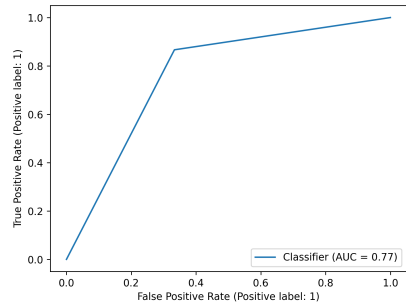
S.No.	Parameter	Value	Screenshot
1	Accuracy	86.667%	
2	Recall	80%	
3	Precision	92.308%	
4	Specificity	93.333%	
5	F1 Score	85.714%	
6	ROC AUC Score	86.667%	
7	Confusion Matrix	$\begin{bmatrix} 14 & 1 \\ 3 & 12 \end{bmatrix}$	<div> </div>

8	Precision-Recall Curve	Precision: [0.5 0.923 1] Recall: [1 0.8 0] Threshold: [0 1]	<pre>PR CURVE:- Precision: [0.5      0.92307692 1.      ] Recall: [1.  0.8 0. ] Threshold: [0 1]</pre>
9	ROC Curve	FPR: [0 0.067 1] TPR: [0 0.8 1] Threshold: [2 1 0]	<pre>ROC CURVE:- Fpr: [0.      0.06666667 1.      ] Tpr: [0.  0.8 1. ] Threshold: [2 1 0]</pre>

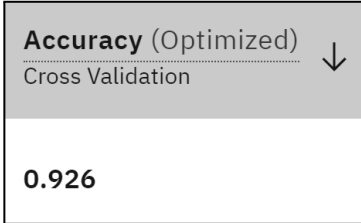
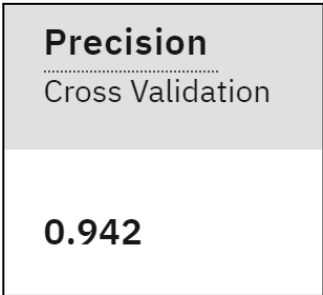
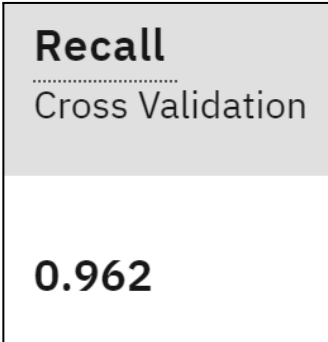
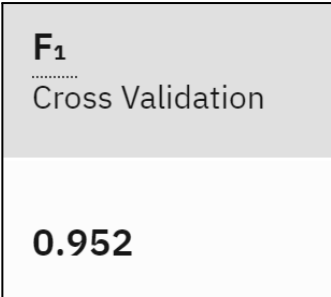
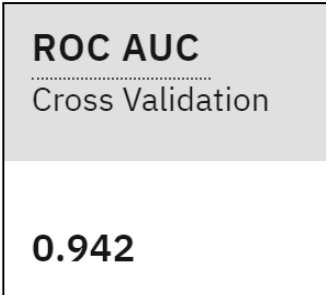
**Hyperparameter** →  $n_{\text{estimators}} = 1000$

**WAVE MODEL** → K-NEIGHBOR CLASSIFIER

S.N o.	Parameter	Value	Screenshot
1	Accuracy	76.667%	Accuracy: 0.7666666666666667
2	Recall	86.667%	Recall: 0.8666666666666667
3	Precision	72.222%	Precision: 0.7222222222222222
4	Specificity	66.667%	Specificity: 0.6666666666666666
5	F1 Score	78.788%	F1 score: 0.7878787878787877

6	ROC AUC Score	76.667%	ROC AUC Score: 0.7666666666666668
7	Confusion Matrix	[[10 5] [2 13]]	<p>Confusion Matrix:</p> <pre>[[10  5]  [ 2 13]]</pre>  <p>A 2x2 heatmap representing the confusion matrix. The x-axis is labeled 0 and 1, and the y-axis is labeled 0 and 1. The top-left cell (0,0) is grey and contains the value 10. The top-right cell (0,1) is green and contains the value 5. The bottom-left cell (1,0) is blue and contains the value 2. The bottom-right cell (1,1) is cyan and contains the value 13.</p>
8	Precision Recall Curve	Precision: [0.5 0.722 1] Recall: [1 0.867 0] Threshold: [0 1]	<p>PR CURVE:-</p> <pre>Precision: [0.5      0.72222222 1.      ] Recall: [1.      0.86666667 0.      ] Threshold: [0 1]</pre>  <p>A Precision-Recall curve plot. The x-axis is 'Recall (Positive label: 1)' ranging from 0.0 to 1.0. The y-axis is 'Precision (Positive label: 1)' ranging from 0.5 to 1.0. The curve starts at (0.0, 1.0), drops vertically to (0.0, 0.722), then remains horizontal at precision = 0.722 until recall = 0.867, and finally drops vertically to (1.0, 0.5). A legend indicates 'Classifier (AP = 0.69)'.</p>
9	ROC Curve	FPR: [0 0.333 1] TPR: [0 0.867 1] Threshold: [2 1 0]	<p>ROC CURVE:-</p> <pre>Fpr: [0.      0.33333333 1.      ] Tpr: [0.      0.86666667 1.      ] Threshold: [2 1 0]</pre>  <p>An ROC curve plot. The x-axis is 'False Positive Rate (Positive label: 1)' ranging from 0.0 to 1.0. The y-axis is 'True Positive Rate (Positive label: 1)' ranging from 0.0 to 1.0. The curve starts at (0.0, 0.0), goes linearly to (0.333, 0.867), and then continues linearly to (1.0, 1.0). A legend indicates 'Classifier (AUC = 0.77)'.</p>

**VOICE MODEL → SNAP BOOSTING MACHINE CLASSIFIER (AUTO AI)**

S. No	Parameter	Value	Screenshot
1	Accuracy	92.6%	 A screenshot of a software interface showing the 'Accuracy (Optimized)' metric for 'Cross Validation'. The value '0.926' is displayed in a large, bold font at the bottom of the panel.
2	Precision	94.2%	 A screenshot of a software interface showing the 'Precision' metric for 'Cross Validation'. The value '0.942' is displayed in a large, bold font at the bottom of the panel.
3	Recall	96.2%	 A screenshot of a software interface showing the 'Recall' metric for 'Cross Validation'. The value '0.962' is displayed in a large, bold font at the bottom of the panel.
4	F1 Score	95.2%	 A screenshot of a software interface showing the 'F1' metric for 'Cross Validation'. The value '0.952' is displayed in a large, bold font at the bottom of the panel.
5	ROC AUC Score	94.2%	 A screenshot of a software interface showing the 'ROC AUC' metric for 'Cross Validation'. The value '0.942' is displayed in a large, bold font at the bottom of the panel.

6	Confusion Matrix	[[15 0] [0 5]]	<p>Confusion matrix ⓘ</p> <table> <tr> <th rowspan="2">Observed</th><th colspan="3">Predicted</th></tr> <tr> <th>1</th><th>0</th><th>Percent correct</th></tr> <tr> <th>1</th><td>15</td><td>0</td><td>100.0%</td></tr> <tr> <th>0</th><td>0</td><td>5</td><td>100.0%</td></tr> <tr> <th>Percent correct</th><td>100.0%</td><td>100.0%</td><td>100.0%</td></tr> </table> <p>Less correct <span style="display: inline-block; width: 100px; height: 10px; background: linear-gradient(to right, blue, green);"></span> More correct</p>	Observed	Predicted			1	0	Percent correct	1	15	0	100.0%	0	0	5	100.0%	Percent correct	100.0%	100.0%	100.0%
Observed	Predicted																					
	1	0	Percent correct																			
1	15	0	100.0%																			
0	0	5	100.0%																			
Percent correct	100.0%	100.0%	100.0%																			
7	ROC Curve		<p>The ROC curve is a diagonal line from (0,0) to (1,1) on a grid where both axes range from 0 to 1. This indicates that the classifier's performance is no better than random guessing.</p>																			
8	Precision Recall Curve		<p>The Precision-Recall curve shows a horizontal line at a precision of 1.0 for recall values from 0 to 1. This indicates that the classifier is perfectly precise, correctly identifying all positive instances without any false positives.</p>																			

**Hyperparameter** → HPO - 1, FE, HPO - 2