

## Model Development Phase

Date	9 <sup>th</sup> July 2024
Team ID	SWTID1720017249
Project Title	Panic Disorder Detection
Maximum Marks	4 Marks

### Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

### Initial Model Training Code:

#### ✓ Training and Testing The Model In Multiple Algorithms

```
[ ] # Assuming x_train, x_test, y_train, y_test are defined and preprocessed

# Initialize models
models = {
    'Logistic Regression': LogisticRegression(),
    'Decision Tree': DecisionTreeClassifier(),
    'Extra Trees': ExtraTreesClassifier(),
    'Random Forest': RandomForestClassifier(),
    'Gradient Boosting': GradientBoostingClassifier(),
    'SVM': SVC(),
    'K-Nearest Neighbors': KNeighborsClassifier(),
    'XGBoost': XGBClassifier()
}
```

## Testing and Comparing Model With Multiple Evaluation Metrics

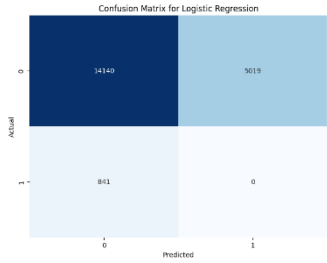
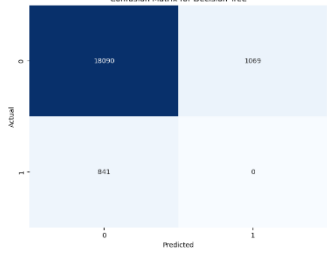
```
# Train and evaluate each model
for model_name, model in models.items():
    model.fit(x_train_selected, y_train_selected)
    y_pred = model.predict(x_test_selected)

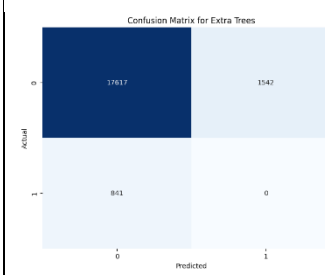
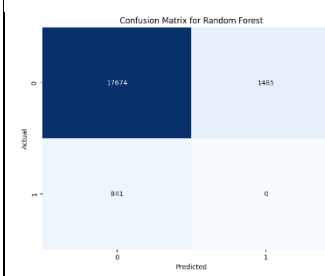
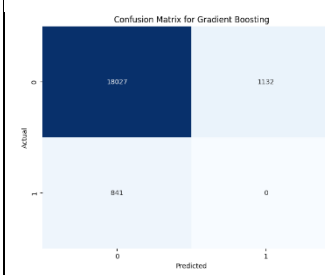
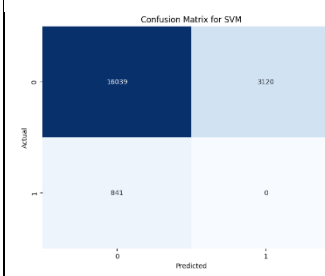
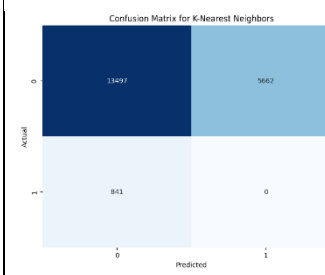
    # Calculate accuracy
    accuracy = accuracy_score(y_test_selected, y_pred)
    print(f"{model_name} - Accuracy: {accuracy:.4f}")

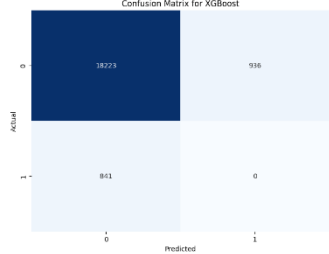
    # Display confusion matrix
    plt.figure(figsize=(8, 6))
    cm = confusion_matrix(y_test, y_pred)
    sns.heatmap(cm, annot=True, cmap='Blues', fmt='d', cbar=False)
    plt.title(f"Confusion Matrix for {model_name}")
    plt.xlabel('Predicted')
    plt.ylabel('Actual')
    plt.show()

    # Display classification report
    print(f"Classification Report for {model_name}:")
    print(classification_report(y_test_selected, y_pred))
```

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix									
Logistic Regression	<pre>Classification Report for Logistic Regression: precision    recall  f1-score   support     0       0.94      0.74      0.83      19159    1       0.00      0.00      0.00         841   accuracy          0.47      0.37      0.41      20000  macro avg          0.47      0.37      0.41      20000  weighted avg          0.90      0.71      0.79      20000</pre>	70.70	 <p>Confusion Matrix for Logistic Regression</p> <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>14140</td><td>5019</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	14140	5019	1	841	0
Actual \ Predicted	0	1										
0	14140	5019										
1	841	0										
Decision Tree	<pre>Classification Report for Decision Tree: precision    recall  f1-score   support     0       0.96      0.94      0.95      19159    1       0.00      0.00      0.00         841   accuracy          0.48      0.47      0.47      20000  macro avg          0.48      0.47      0.47      20000  weighted avg          0.92      0.90      0.91      20000</pre>	90.45	 <p>Confusion Matrix for Decision Tree</p> <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>18090</td><td>1069</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	18090	1069	1	841	0
Actual \ Predicted	0	1										
0	18090	1069										
1	841	0										

Extra Trees	<pre>Classification Report for Extra Trees:               precision    recall  f1-score   support      0       0.95       0.92       0.94      19159     1       0.88       0.88       0.88       841   accuracy: 0.88 macro avg: 0.48       0.46       0.47      20000 weighted avg: 0.91       0.88       0.90      20000</pre>	88.09	<p>Confusion Matrix for Extra Trees</p>  <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>17617</td><td>1542</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	17617	1542	1	841	0
Actual \ Predicted	0	1										
0	17617	1542										
1	841	0										
Random Forest	<pre>Classification Report for Random Forest:               precision    recall  f1-score   support      0       0.95       0.92       0.94      19159     1       0.88       0.88       0.88       841   accuracy: 0.88 macro avg: 0.48       0.46       0.47      20000 weighted avg: 0.91       0.88       0.90      20000</pre>	88.37	<p>Confusion Matrix for Random Forest</p>  <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>17614</td><td>1483</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	17614	1483	1	841	0
Actual \ Predicted	0	1										
0	17614	1483										
1	841	0										
Gradient Boosting	<pre>Classification Report for Gradient Boosting:               precision    recall  f1-score   support      0       0.96       0.94       0.95      19159     1       0.88       0.88       0.88       841   accuracy: 0.90 macro avg: 0.48       0.47       0.47      20000 weighted avg: 0.92       0.90       0.91      20000</pre>	90.13	<p>Confusion Matrix for Gradient Boosting</p>  <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>18027</td><td>1132</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	18027	1132	1	841	0
Actual \ Predicted	0	1										
0	18027	1132										
1	841	0										
SVM	<pre>Classification Report for SVM:               precision    recall  f1-score   support      0       0.95       0.84       0.89      19159     1       0.88       0.88       0.88       841   accuracy: 0.88 macro avg: 0.48       0.42       0.45      20000 weighted avg: 0.91       0.80       0.85      20000</pre>	80.20	<p>Confusion Matrix for SVM</p>  <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>16039</td><td>8120</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	16039	8120	1	841	0
Actual \ Predicted	0	1										
0	16039	8120										
1	841	0										
K-Nearest Neighbors	<pre>Classification Report for K-Nearest Neighbors:               precision    recall  f1-score   support      0       0.94       0.70       0.81      19159     1       0.88       0.88       0.88       841   accuracy: 0.47 macro avg: 0.47       0.35       0.40      20000 weighted avg: 0.90       0.67       0.77      20000</pre>	67.48	<p>Confusion Matrix for K-Nearest Neighbors</p>  <table><tr><th>Actual \ Predicted</th><th>0</th><th>1</th></tr><tr><th>0</th><td>13497</td><td>3662</td></tr><tr><th>1</th><td>841</td><td>0</td></tr></table>	Actual \ Predicted	0	1	0	13497	3662	1	841	0
Actual \ Predicted	0	1										
0	13497	3662										
1	841	0										

XGBoost	<pre>Classification Report for Xgboost:               precision    recall  f1-score   support     0       0.96       0.95       0.95      19159    1       0.00       0.00       0.00         841   accuracy          0.48          0.48          0.91      20000  macro avg          0.48          0.48          0.48      20000  weighted avg          0.92          0.91          0.91      20000</pre>	0.9155									
	<p>Confusion Matrix for XGBoost</p>  <table><tr><th></th><th>Predicted 0</th><th>Predicted 1</th></tr><tr><th>Actual 0</th><td>18273</td><td>916</td></tr><tr><th>Actual 1</th><td>841</td><td>0</td></tr></table>		Predicted 0	Predicted 1	Actual 0	18273	916	Actual 1	841	0	
	Predicted 0	Predicted 1									
Actual 0	18273	916									
Actual 1	841	0									