**Results and Evaluation**

Precision =TP/TP+FP

Recall =TP/TP+TN

F1=1/Precision+1/Recall

**Before Graph Features**

**CONFUSION MATRIX OF SVM**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195909 | 145 |
| Actual: Fraud | 1140 | 1020 |

Precision: .8755364

Recall: .472222222

F1 Score: .803111451

**CONFUSION MATRIX OF DECISION TREE**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195724 | 330 |
| Actual: Fraud | 595 | 1565 |

Precision: .825857519

Recall: .72453703

F1 Score: .8716542486

**CONFUSION MATRIX OF RANDOM FOREST**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195829 | 225 |
| Actual: Fraud | 618 | 1542 |

Precision: .8726655348

Recall: .713888888

F1 Score: .8796208589

**CONFUSION MATRIX OF EXTREME GRADIENT BOOSTING**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195944 | 110 |
| Actual: Fraud | 691 | 1469 |

Precision: .930335655

Recall: .6800925925

F1 Score: .893761777764

CONFUSION MATRIX OF CAT BOOST

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195925 | 129 |
| Actual: Fraud | 566 | 1594 |

Precision: .925130586

Recall: .73796296296

F1 Score: .9047867769

**After Graph Features**

**CONFUSION MATRIX OF SVM**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195912 | 142 |
| Actual: Fraud | 1135 | 1025 |

Precision: .8783204

Recall: .47453703

F1 Score: .8135087

**CONFUSION MATRIX OF DECISION TREE**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 194435 | 1048 |
| Actual: Fraud | 464 | 2268 |

Precision: .68395657

Recall: .830161054

F1 Score: .873063435

**CONFUSION MATRIX OF RANDOM FOREST**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 194922 | 561 |
| Actual: Fraud | 539 | 2193 |

Precision: .79629629

Recall: .802708638

F1 Score: .898337953

**CONFUSION MATRIX OF EXTREME GRADIENT BOOSTING**

|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195133 | 350 |
| Actual: Fraud | 552 | 2180 |

Precision: .86166007905

Recall: .7979502196

F1 Score: .913138186

**CONFUSION MATRIX OF CAT BOOST**

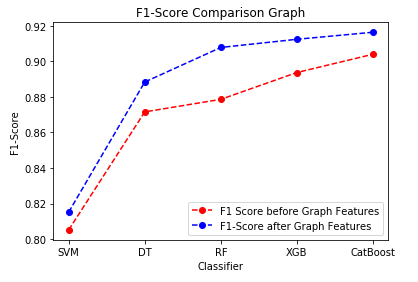
|  |  |  |
| --- | --- | --- |
|  | Predicted: Non Fraud | Predicted: Fraud |
| Actual: Non Fraud | 195017 | 466 |
| Actual: Fraud | 465 | 2267 |

Precision: .82949140

Recall: .829795021

F1 Score: .9136309482

1. **Performance Measures Using F-1 Scores**



1. **Performance Measures – Accuracy**

