Classification and Analysis of Intrusion Detection of Wireless Sensor Network

B.Sc. Thesis
Presentation
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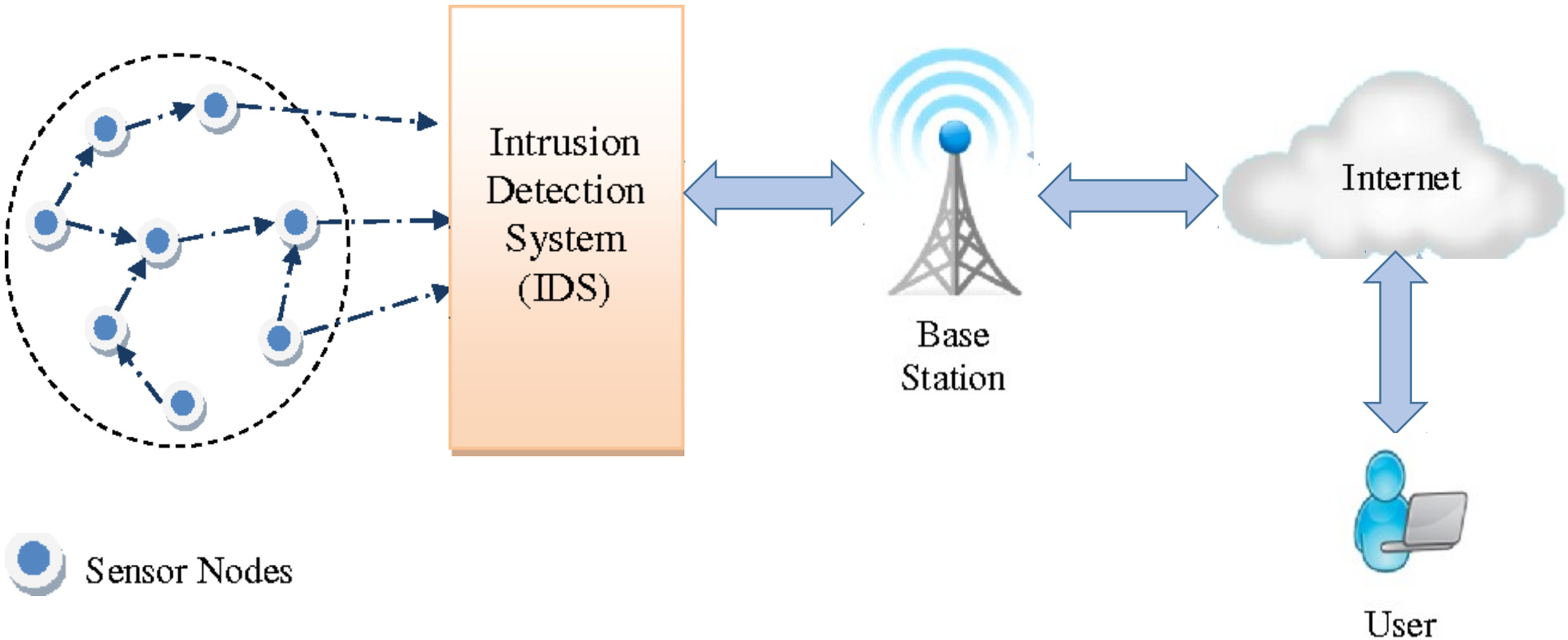
Presented By
Khadija Akter Trisha 2014-2-60-098
Sidratul Moontaha 2015-1-60-033
Alauddin Rezvi 2015-1-60-024
Dept. of Computer Science & Engineering
East West University

Supervised By
Dr. Shamim H Ripon
Associate Professor,
Dept. of Computer Science & Engineering
East West University

Intrusion Detection System in wireless Sensor Network



Objective

- To classify Attack Types
- To predict the probability of being attack of a new request
- To discover the performance of different algorithms for detect intrusion correctly and compare them

Outline

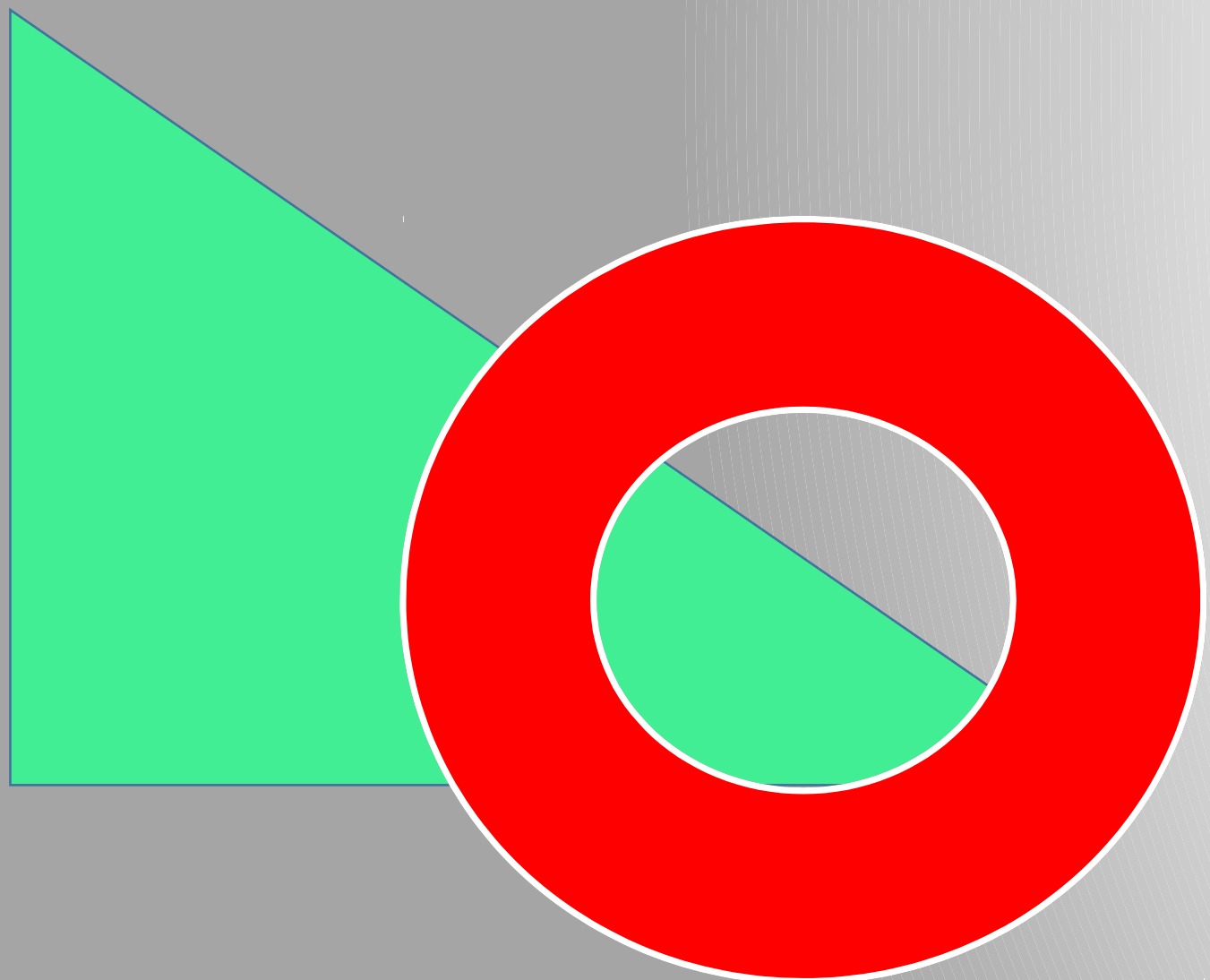
Proposed Method

Dataset Overview

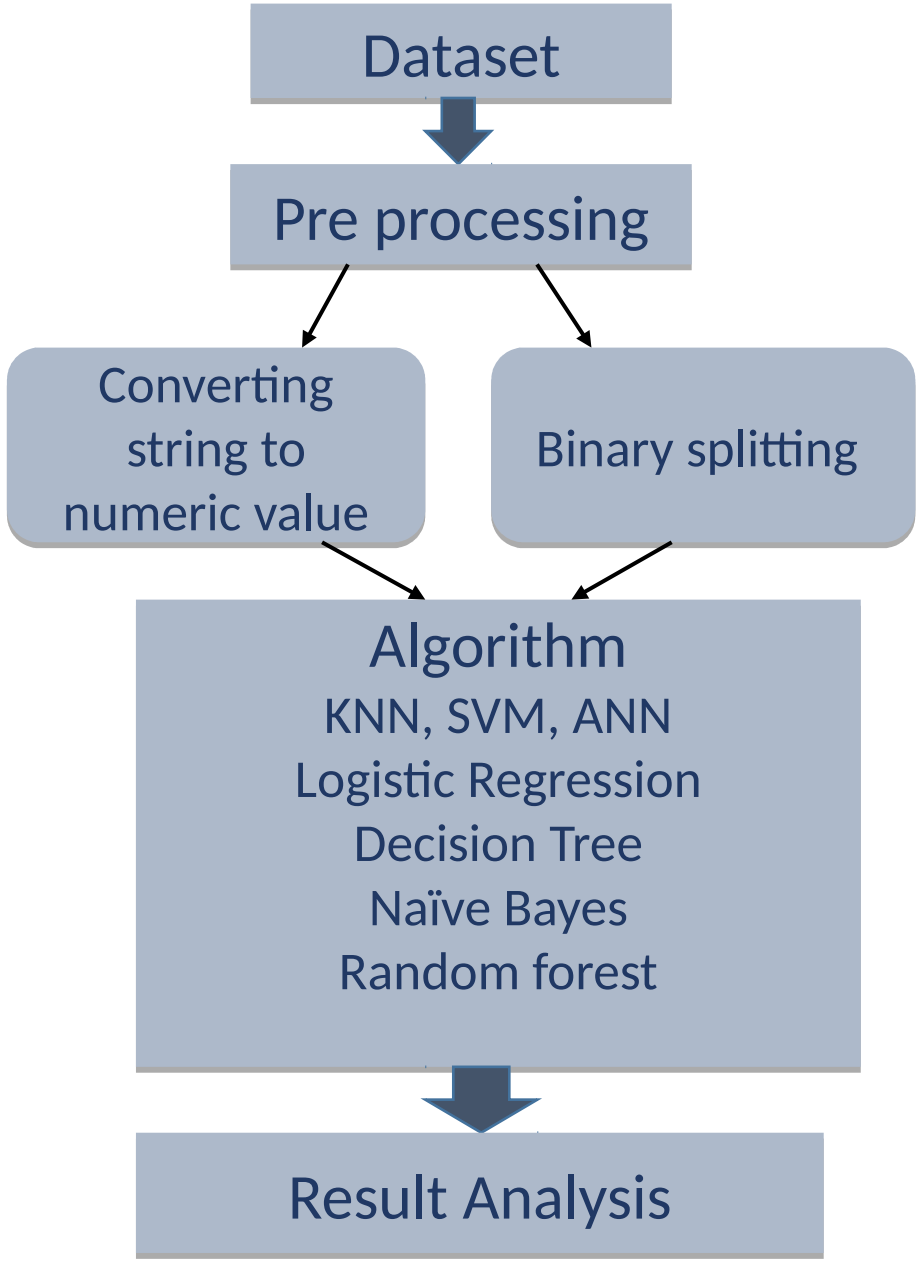
Result & Analysis

Conclusion & Future Work

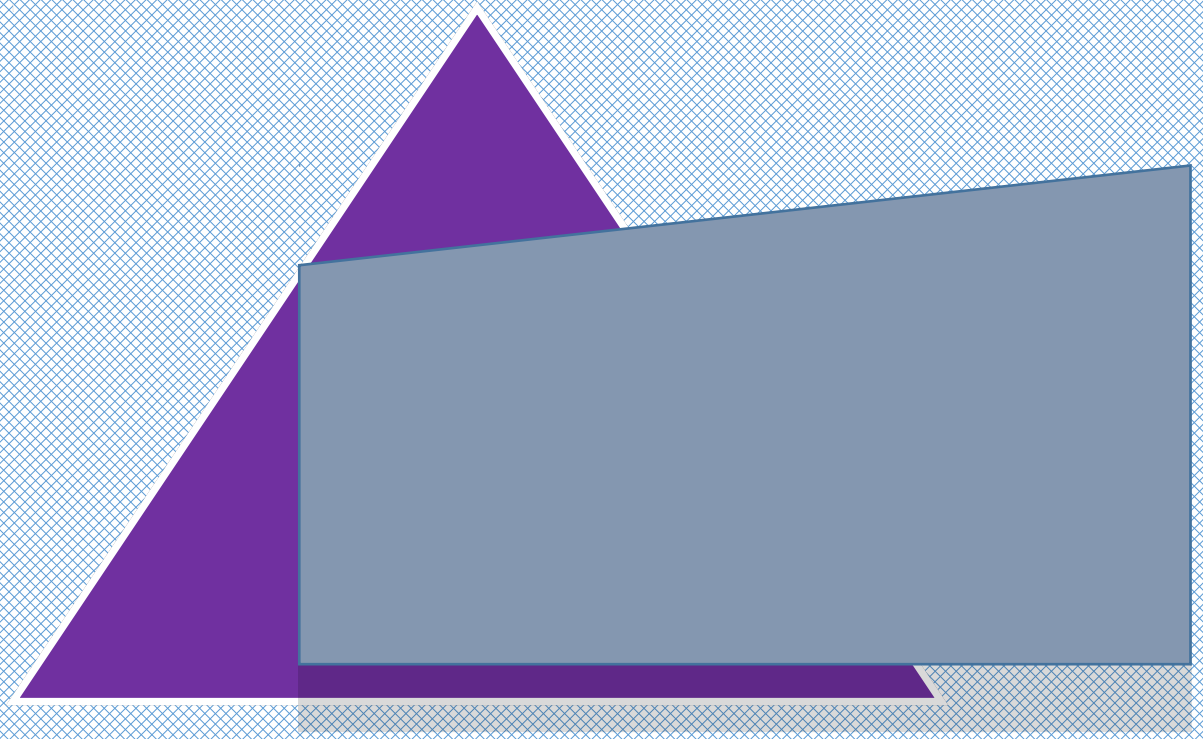
Reference

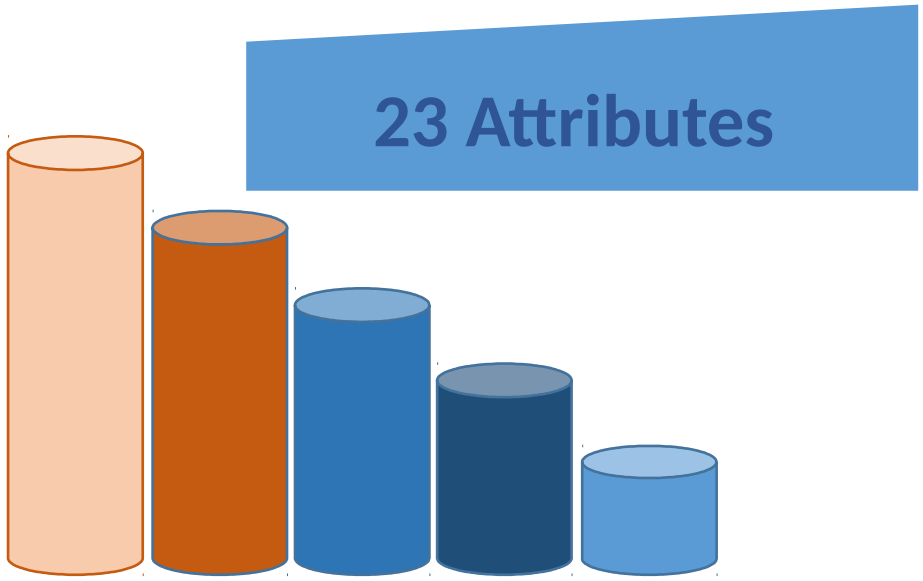


Proposed Method

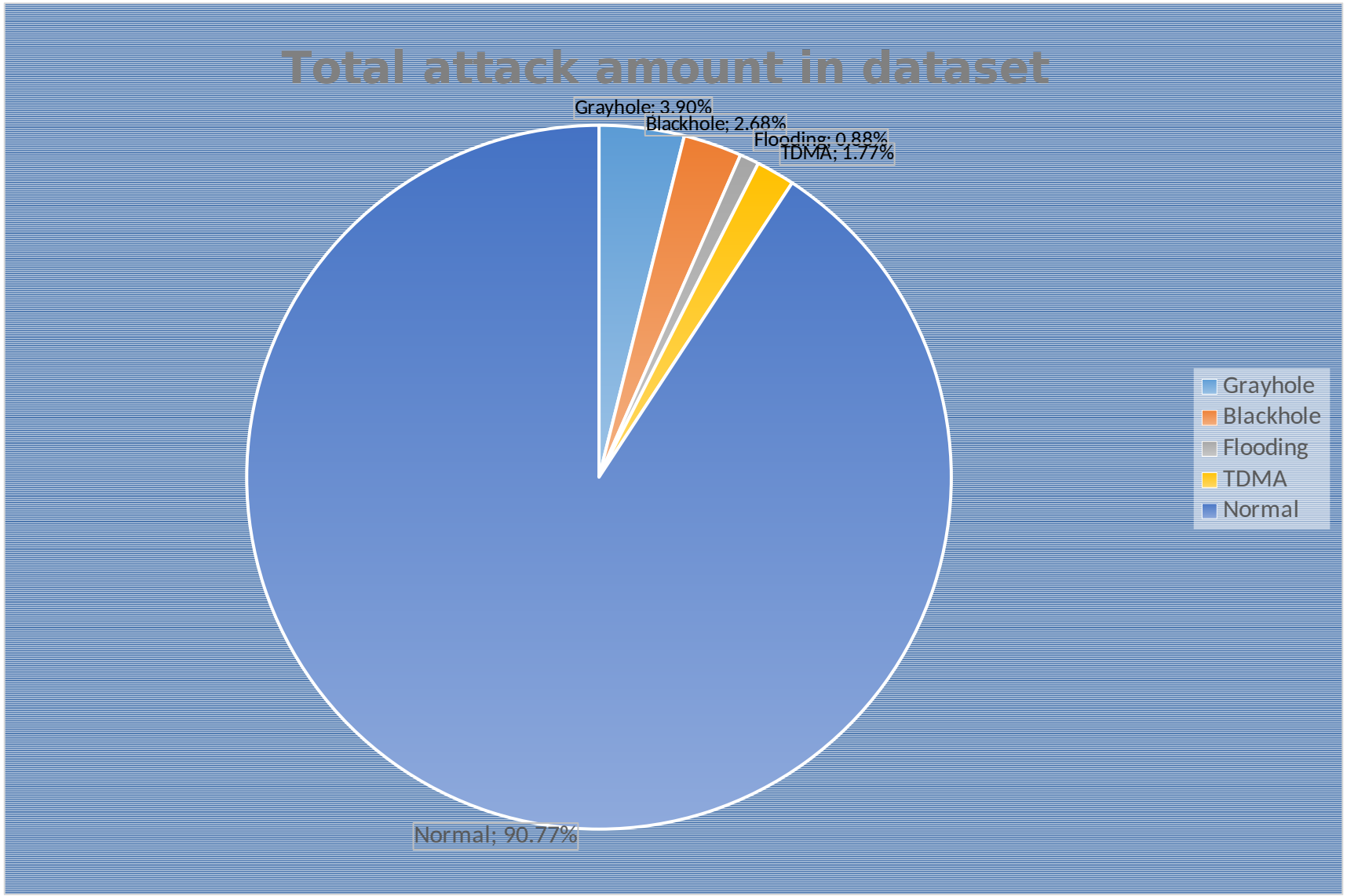

Dataset
Pre processing
Converting string to numeric value
Binary splitting
Algorithm
KNN, SVM, ANN
Logistic Regression
Decision Tree
Naïve Bayes
Random forest
Result Analysis

Dataset

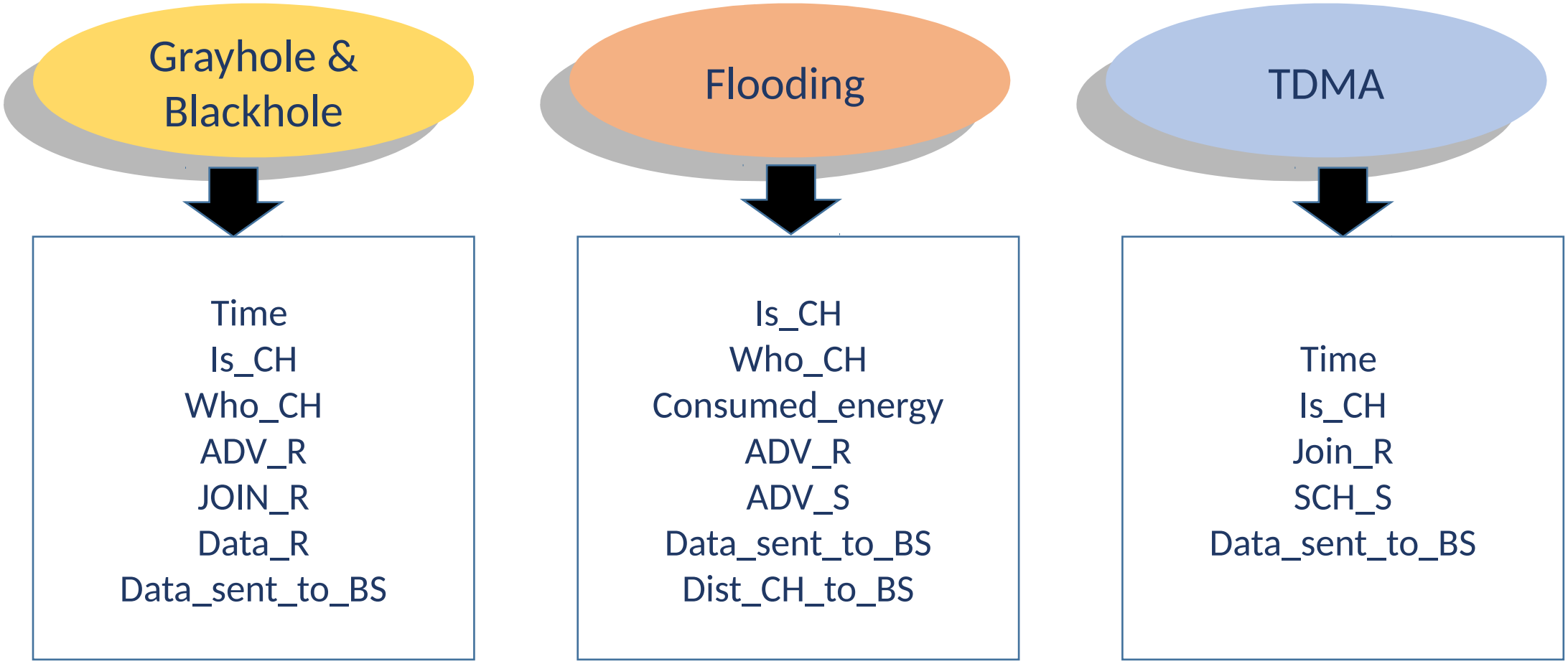



23 Attributes

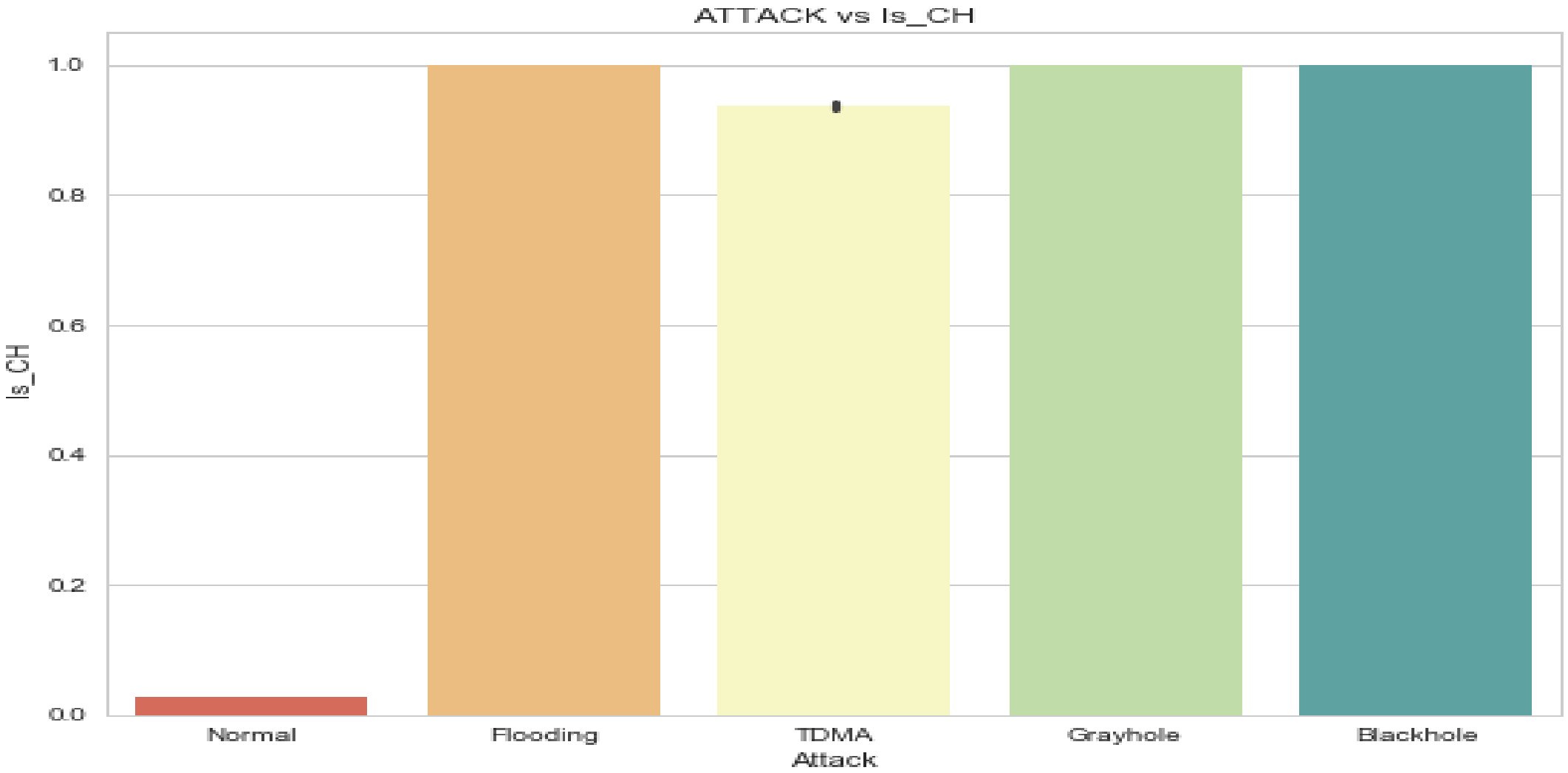

Grayhole
TDMA
Blackhole
Attack
Normal
Flooding


Total attack amount in dataset
Grayhole; 3.90%
Blackhole; 2.68%
Flooding; 0.88%
TDMA; 1.77%
Normal; 90.77%
Grayhole
Blackhole
Flooding
TDMA
Normal

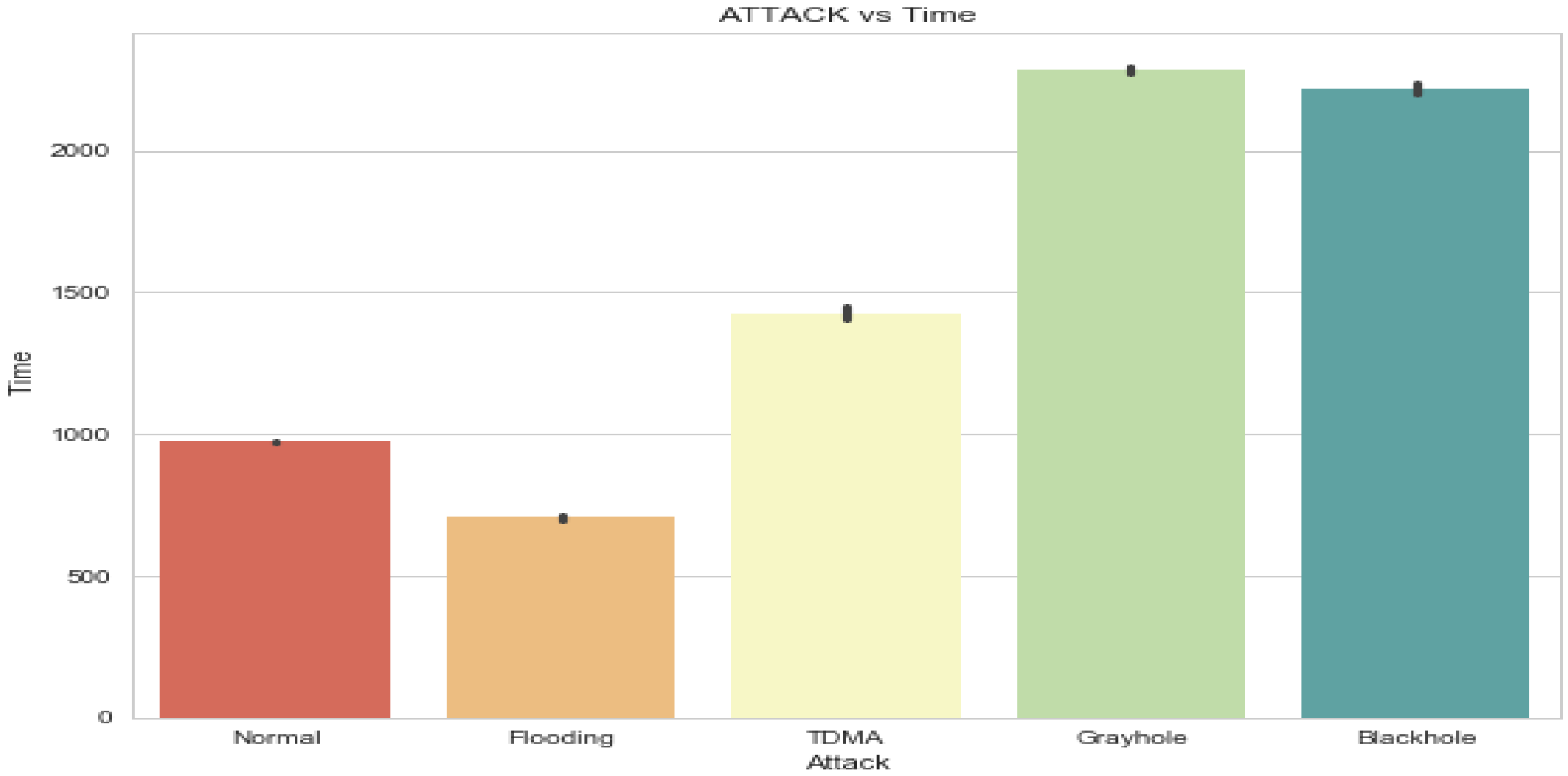
Attributes and Attacks



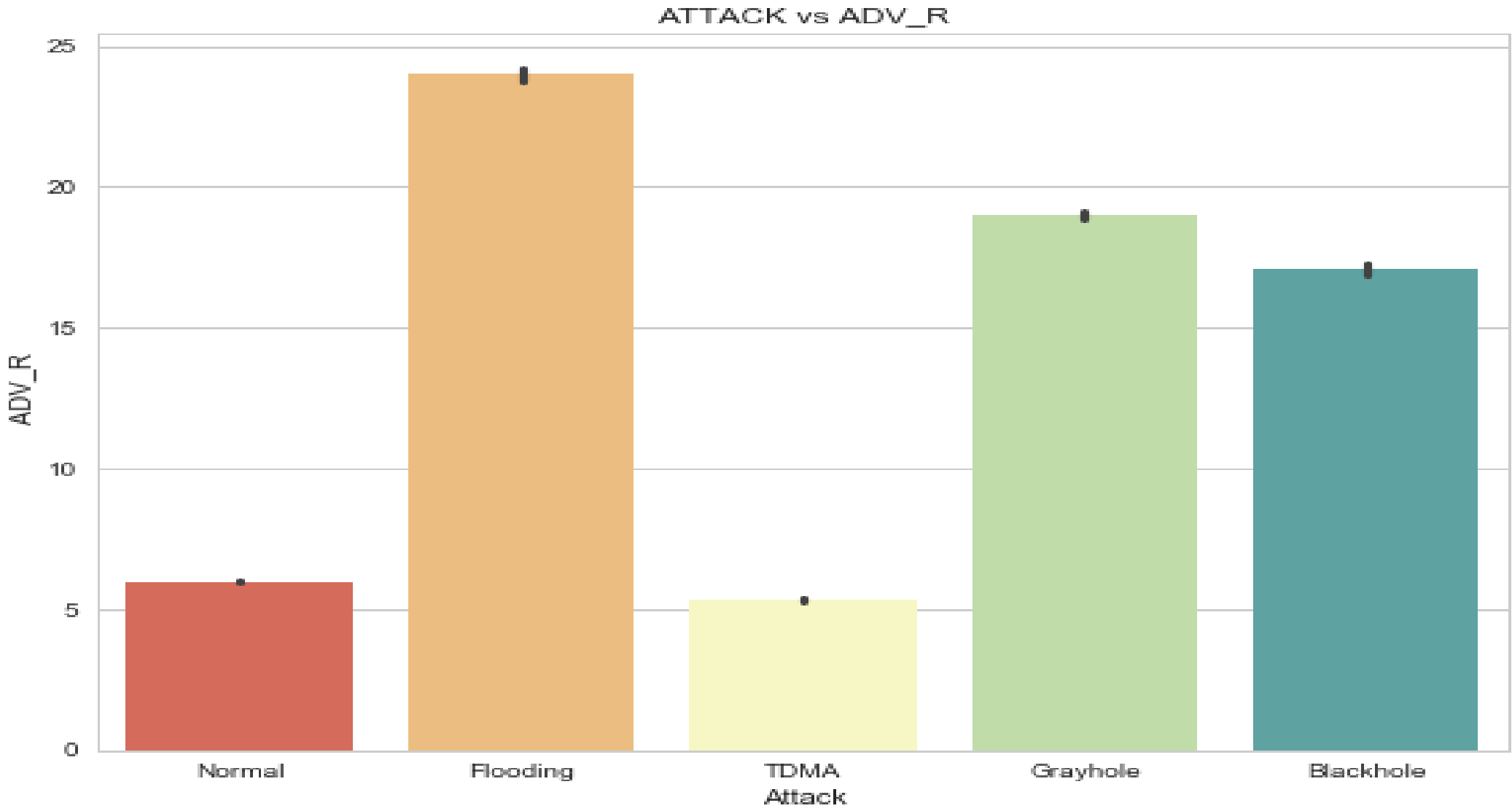
Attack VS Attributes



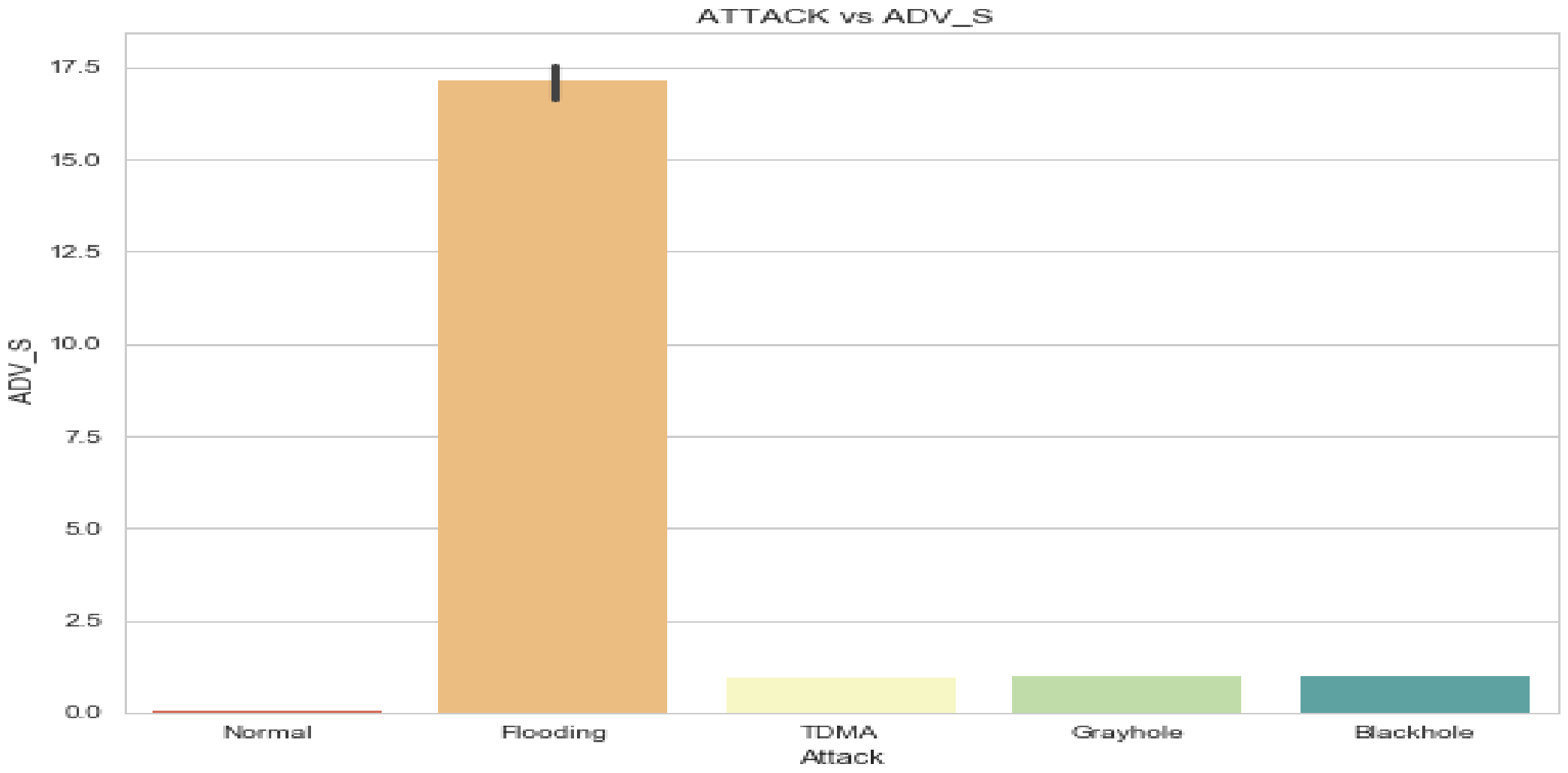
Attack VS Attributes



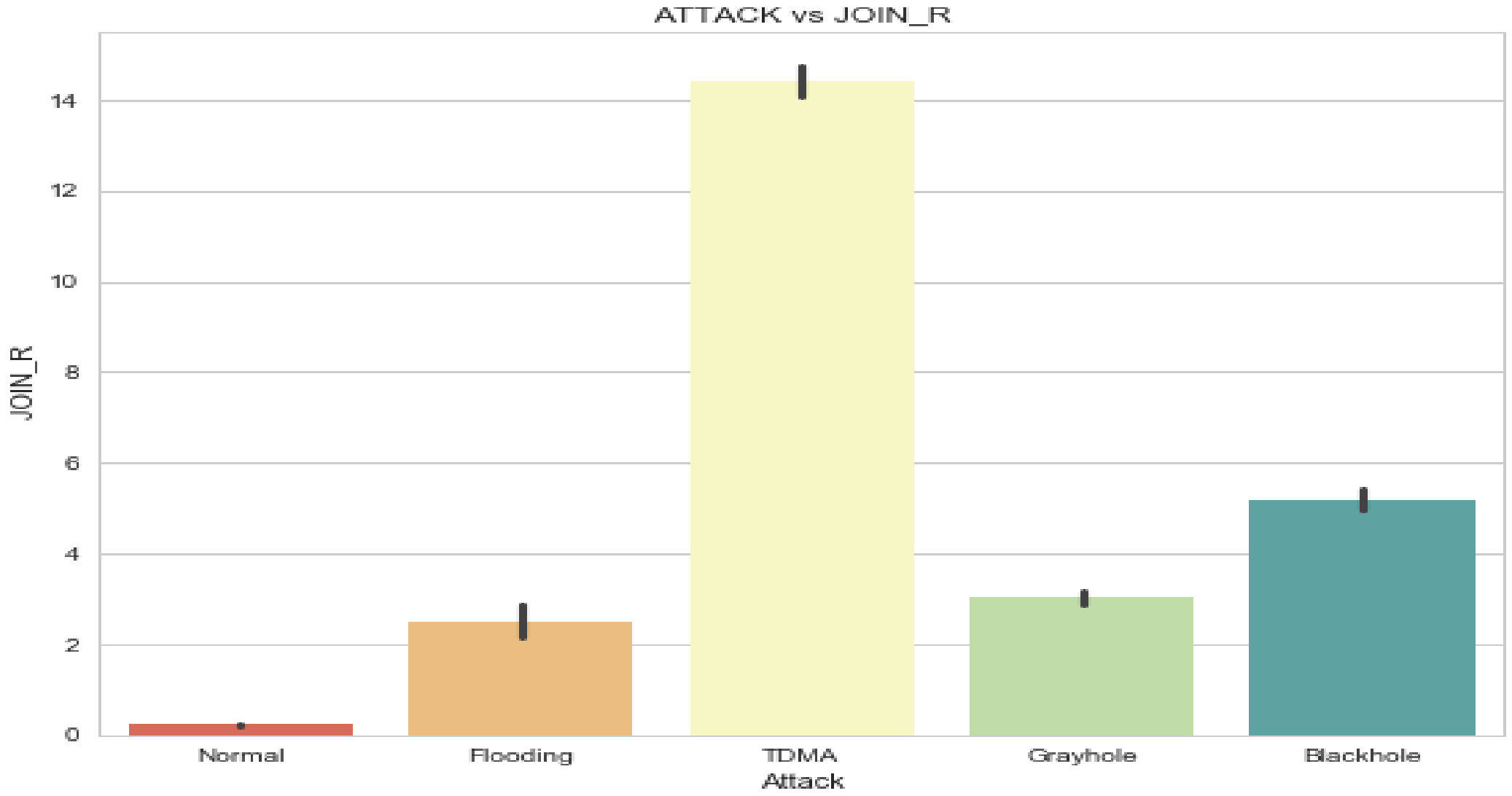
Attack VS Attributes

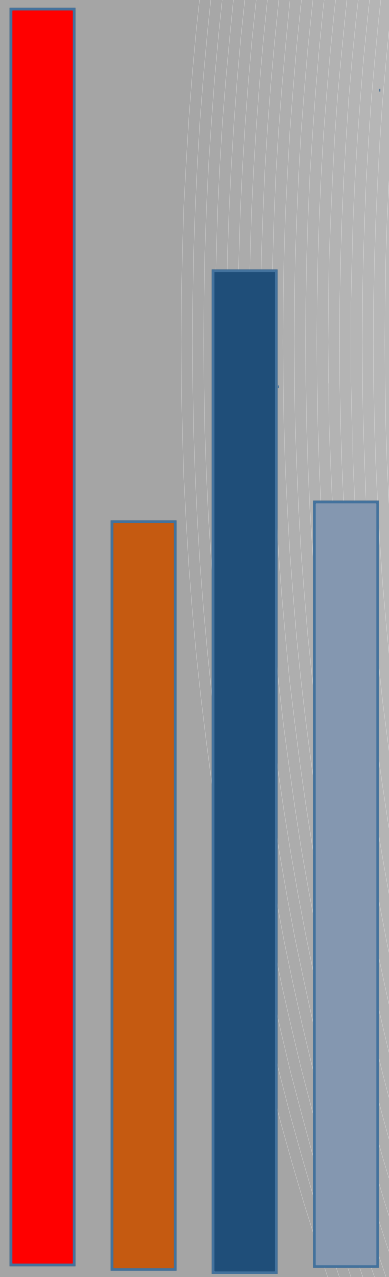


Attack VS Attributes

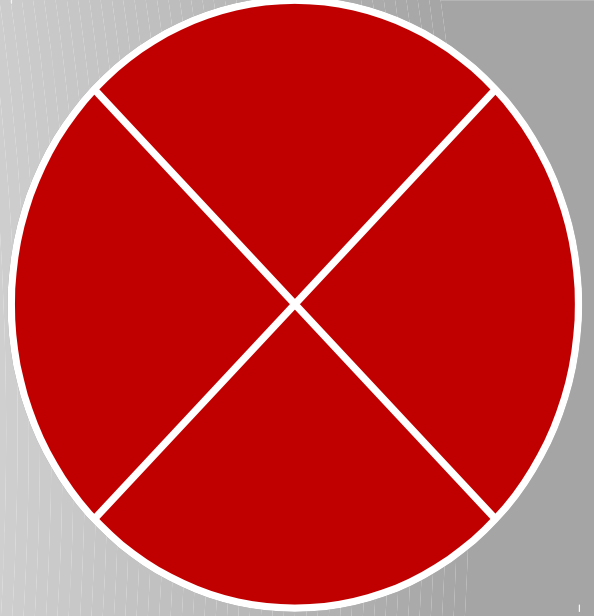


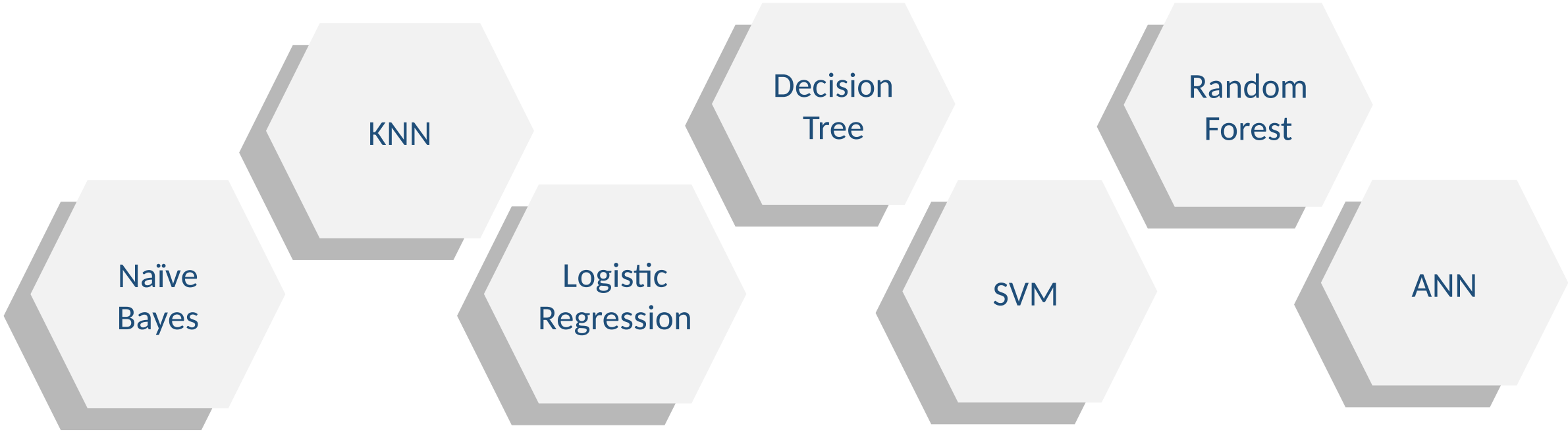
Attack VS Attributes





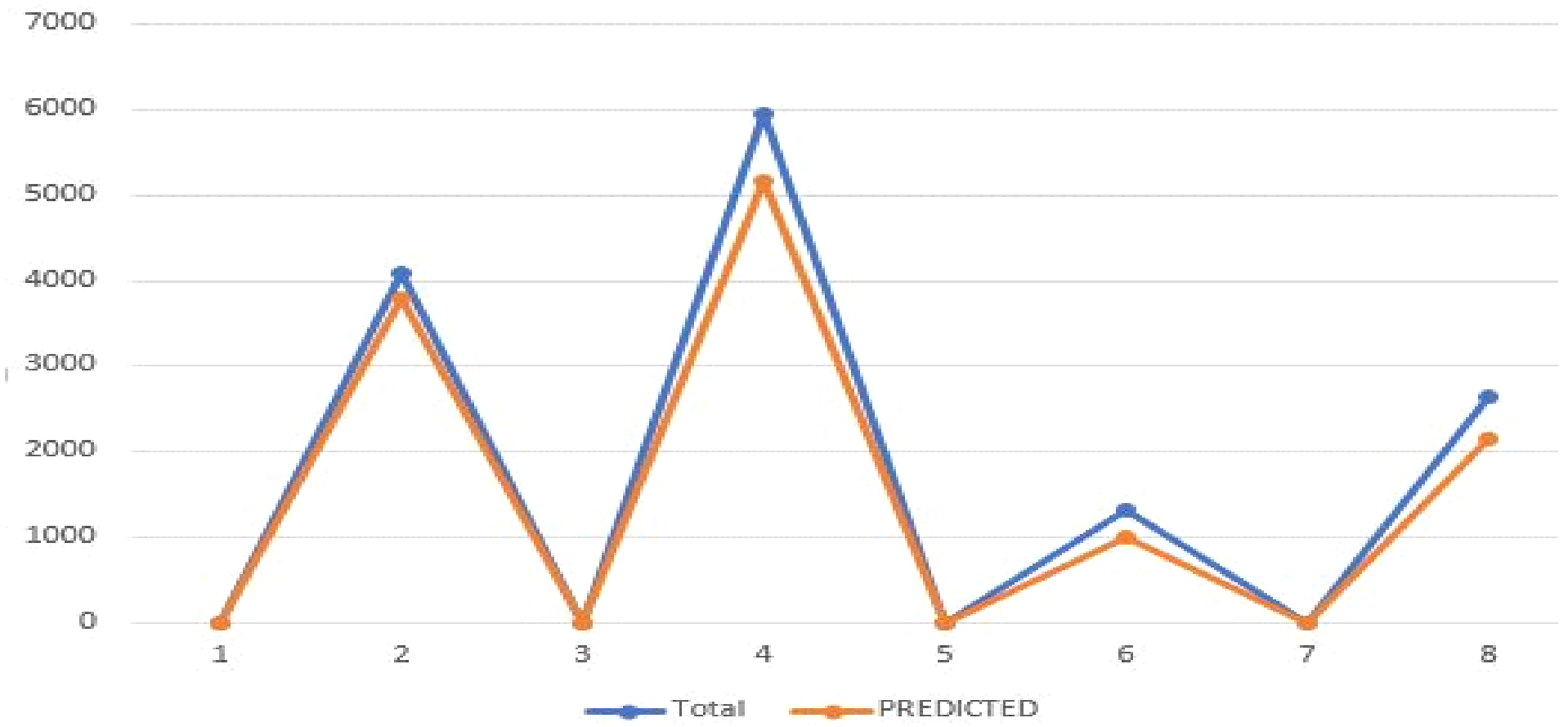
Result & Analysis



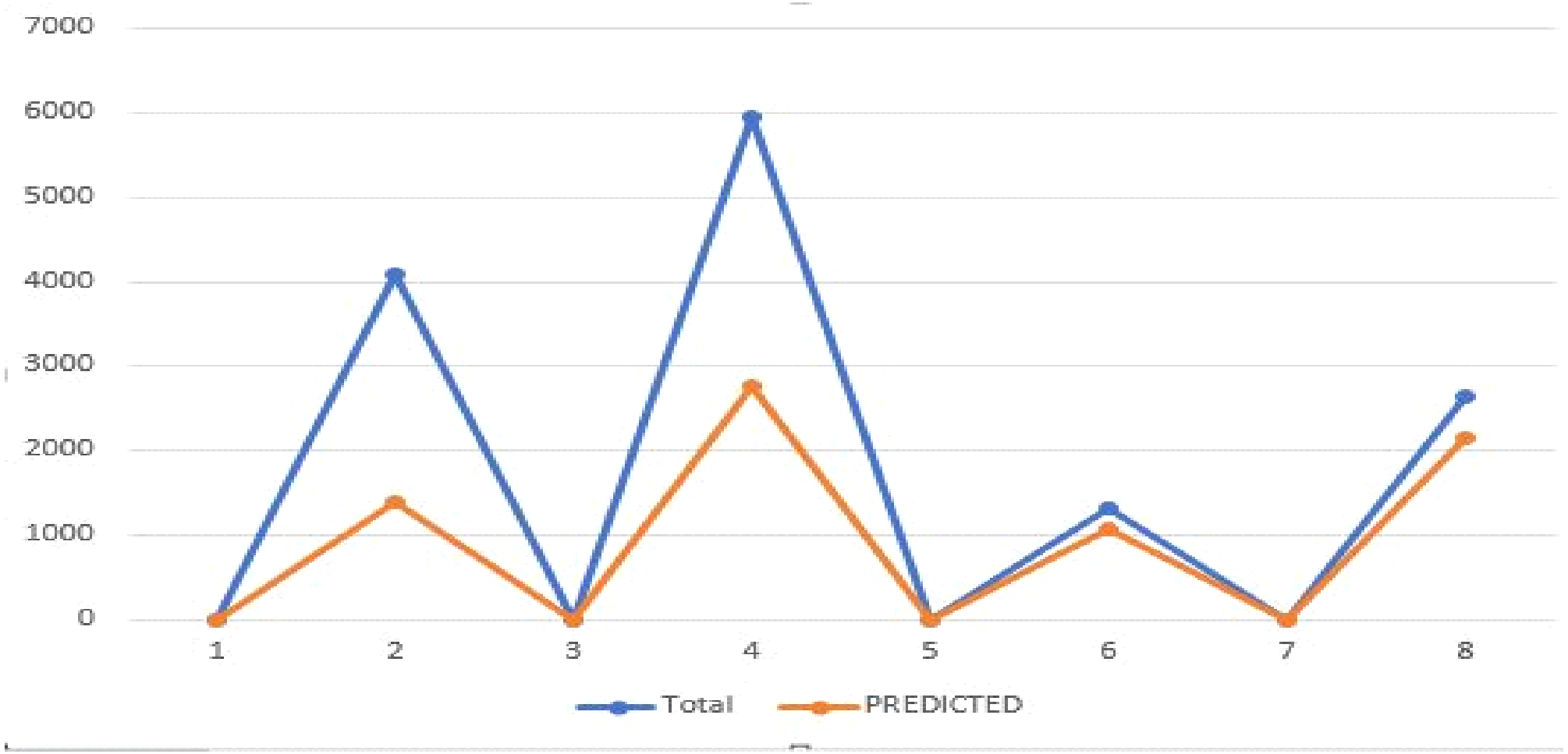

Naïve Bayes
KNN
Logistic Regression
Decision Tree
SVM
Random Forest
ANN

Algorithms

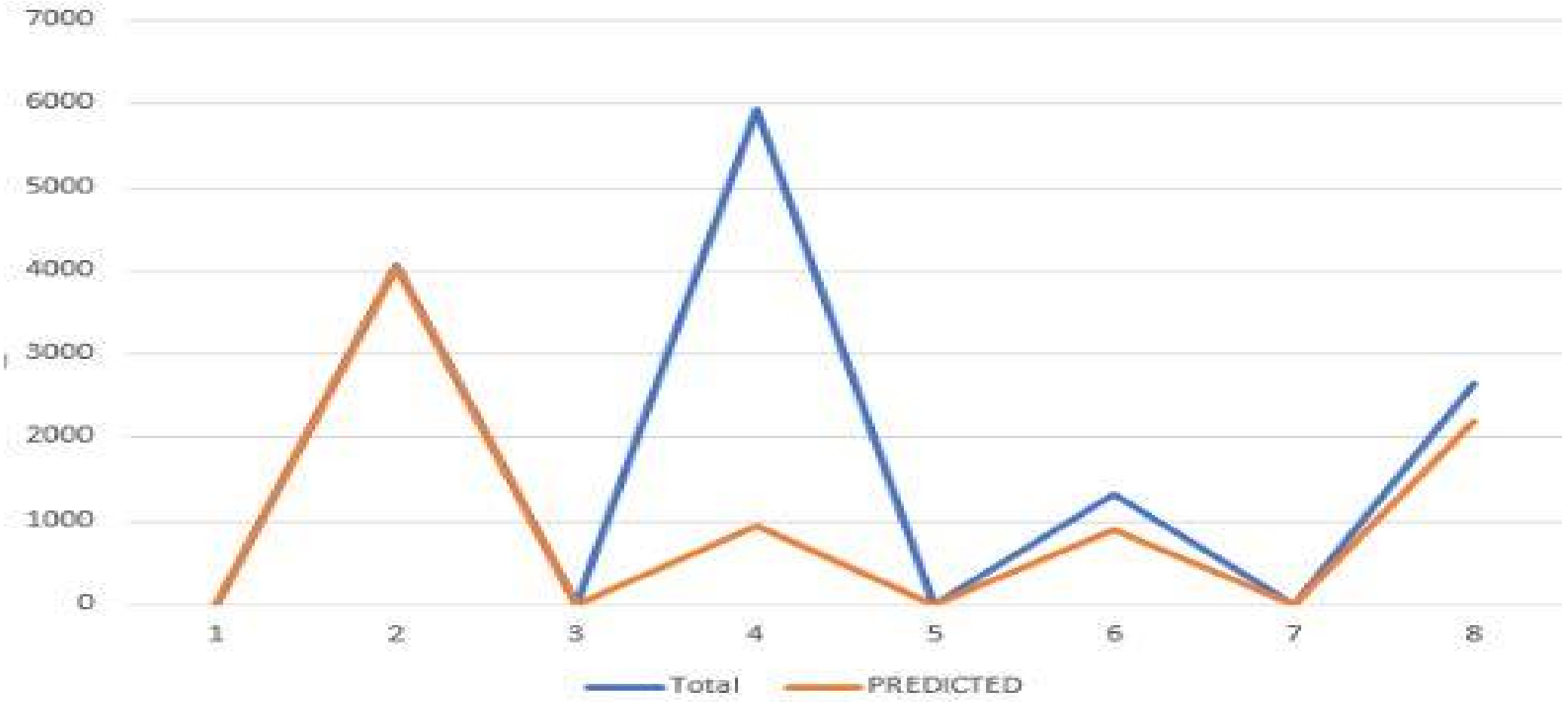
K – Nearest Neighbor



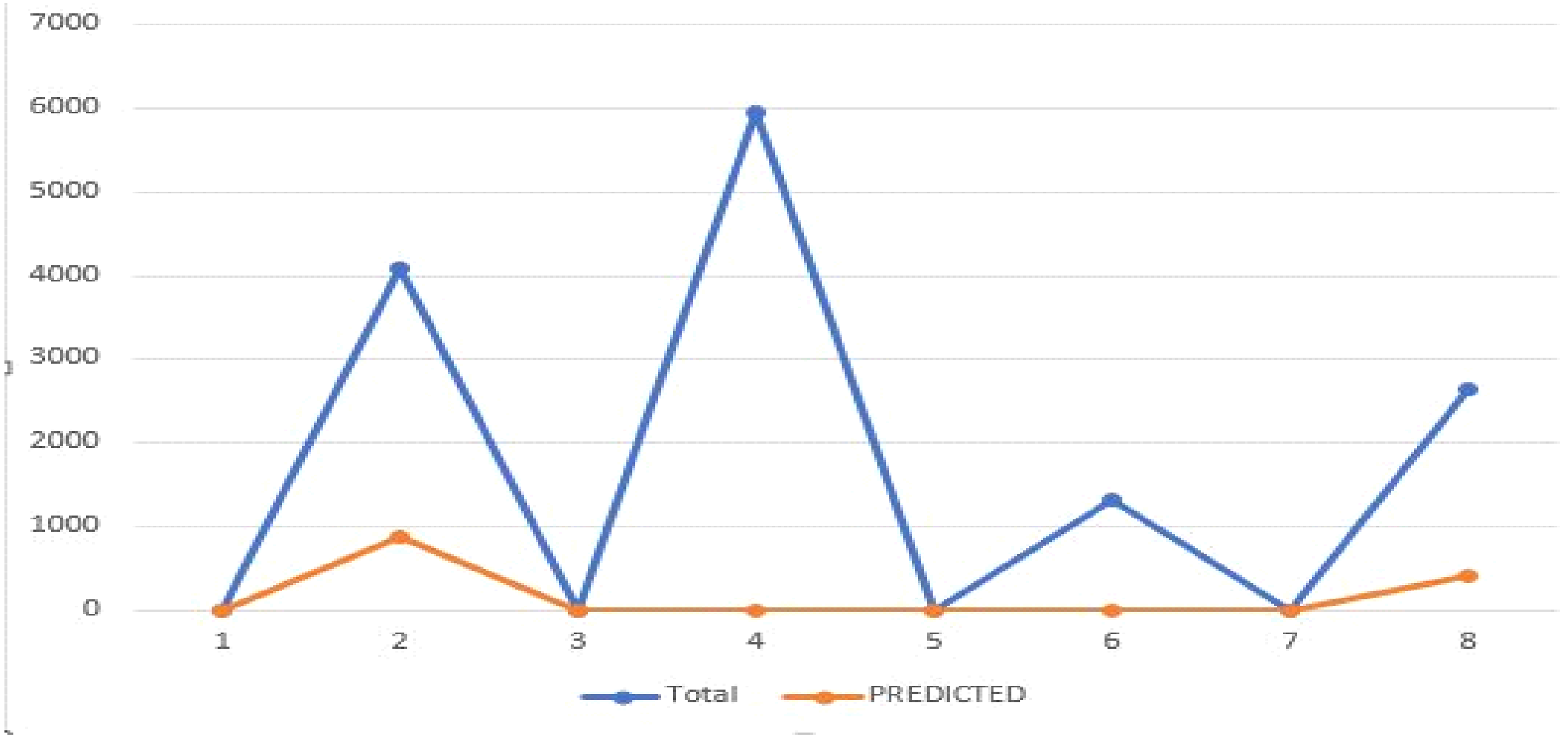
Naïve Bayes


7000
6000
5000
4000
3000
2000
1000
0
1
2
3
4
5
6
7
8
Total
PREDICTED

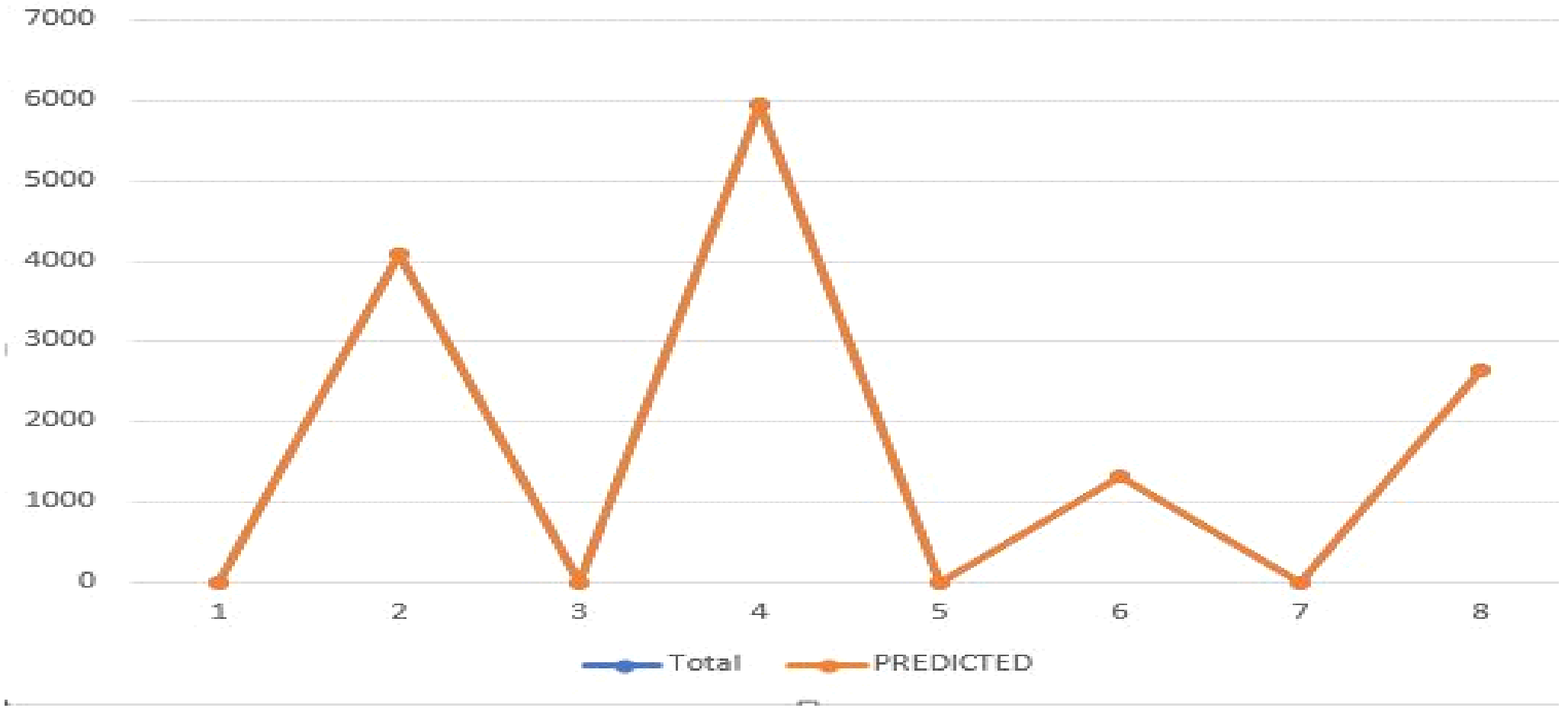
Logistic Regression



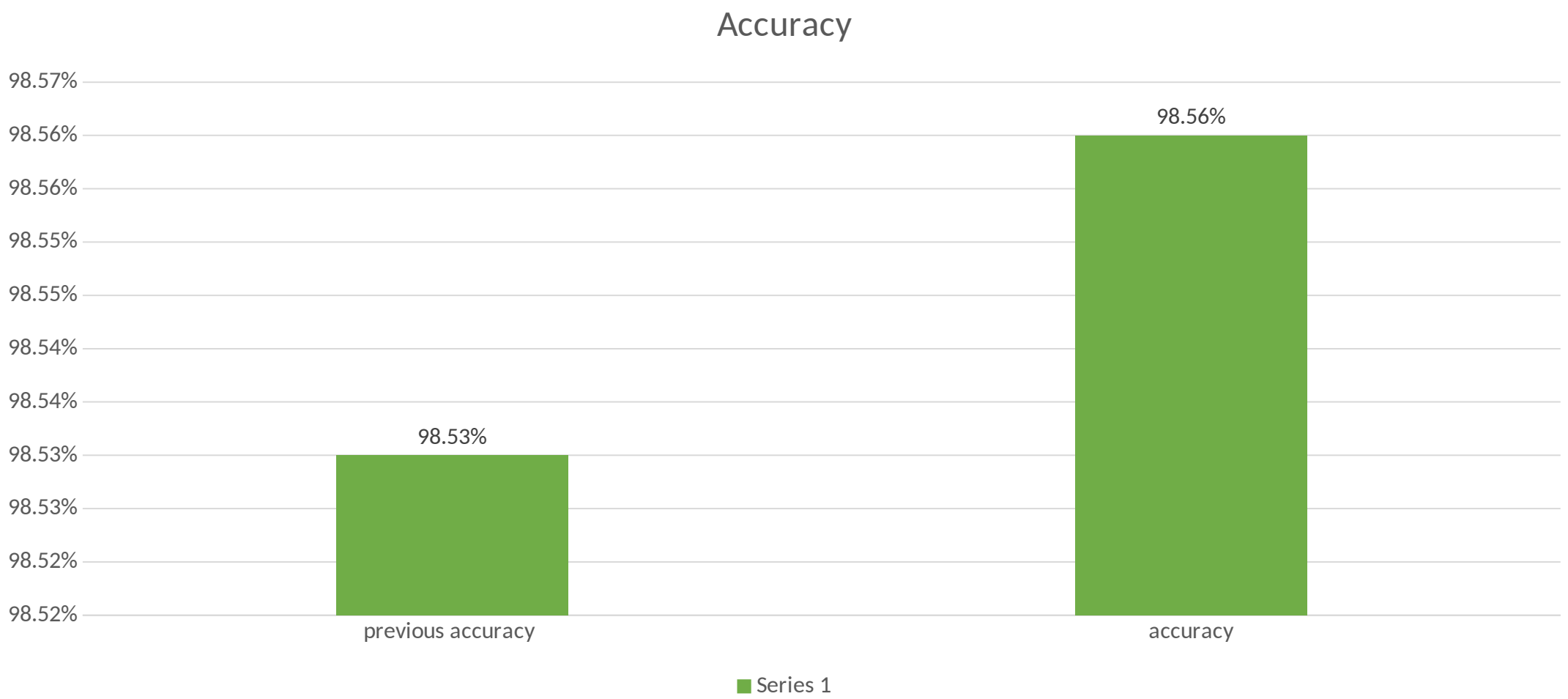
SVM


7000
6000
5000
4000
3000
2000
1000
0
1
2
3
4
5
6
7
8
Total
PREDICTED

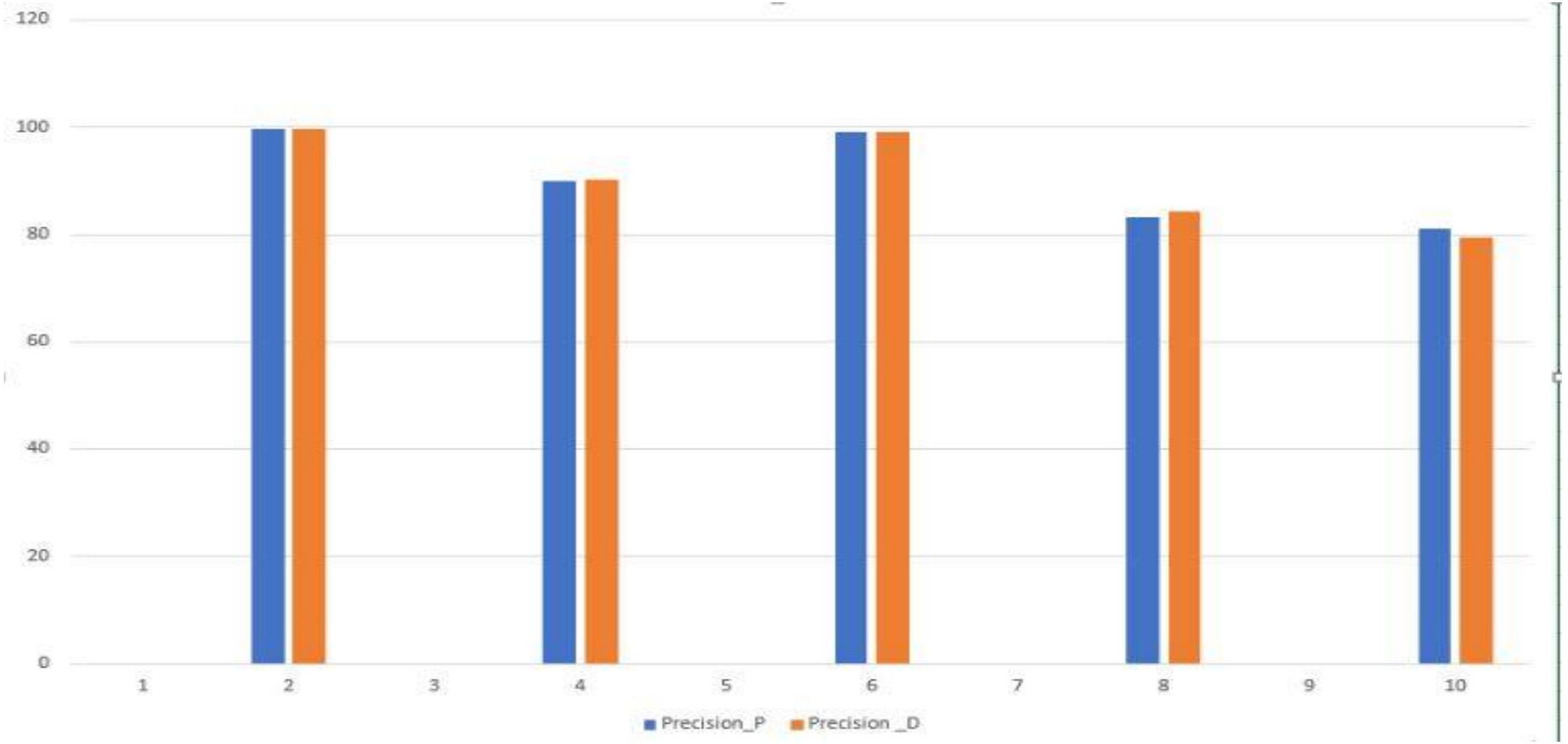
Decision Tree & Random Forest



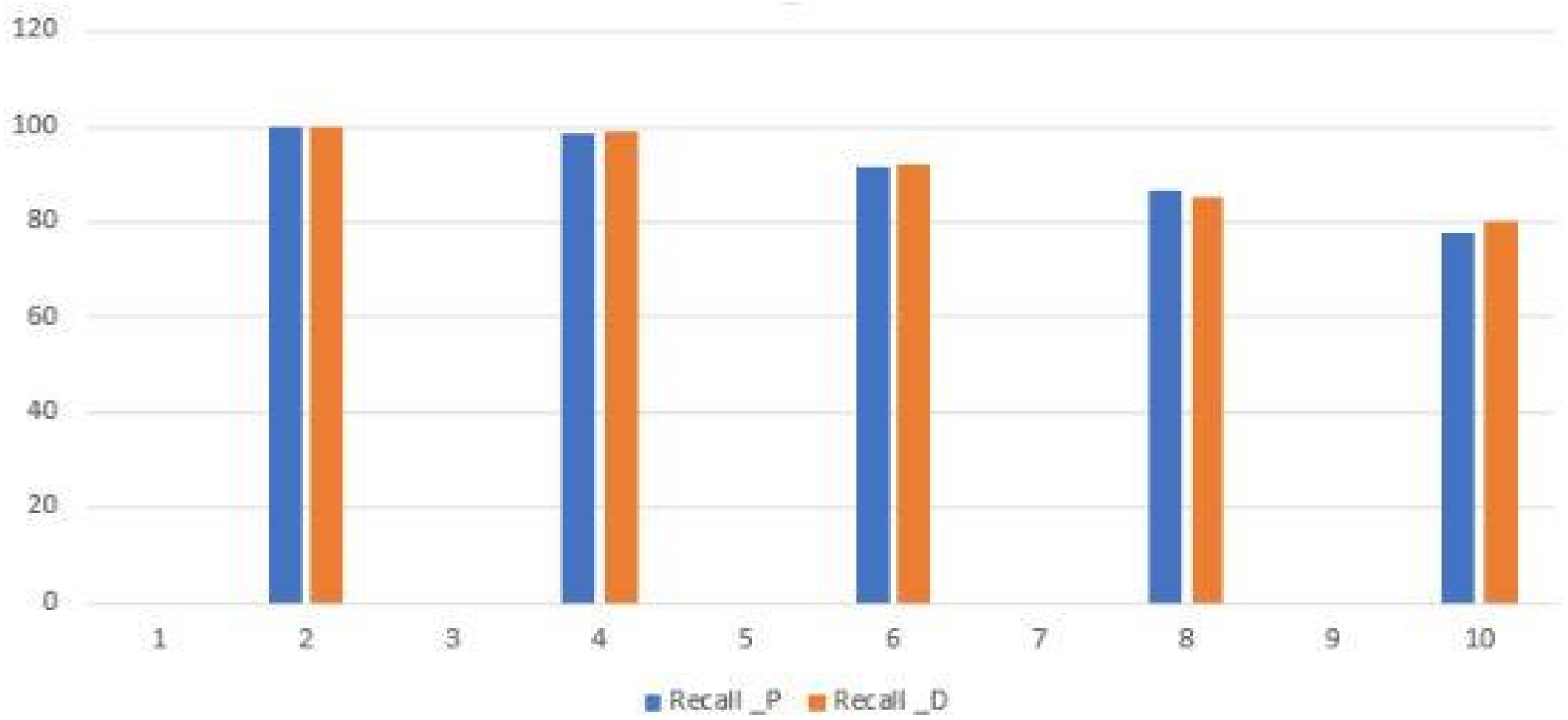
ANN


Accuracy
98.57%
98.56%
98.56%
98.55%
98.55%
98.54%
98.54%
98.53%
98.53%
98.52%
98.52%
98.56%
98.53%
previous accuracy
accuracy
Series 1

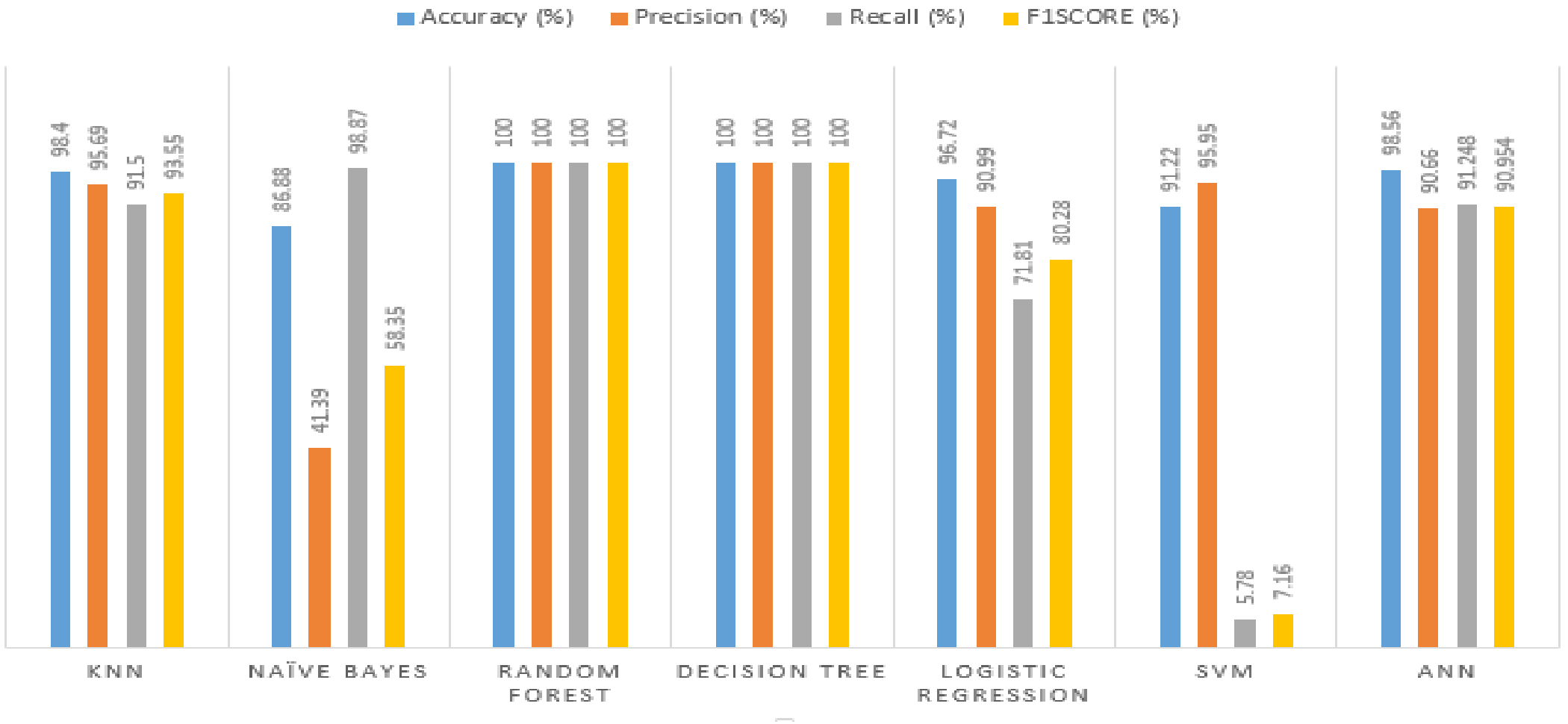
10 fold CSV 2 hidden layer



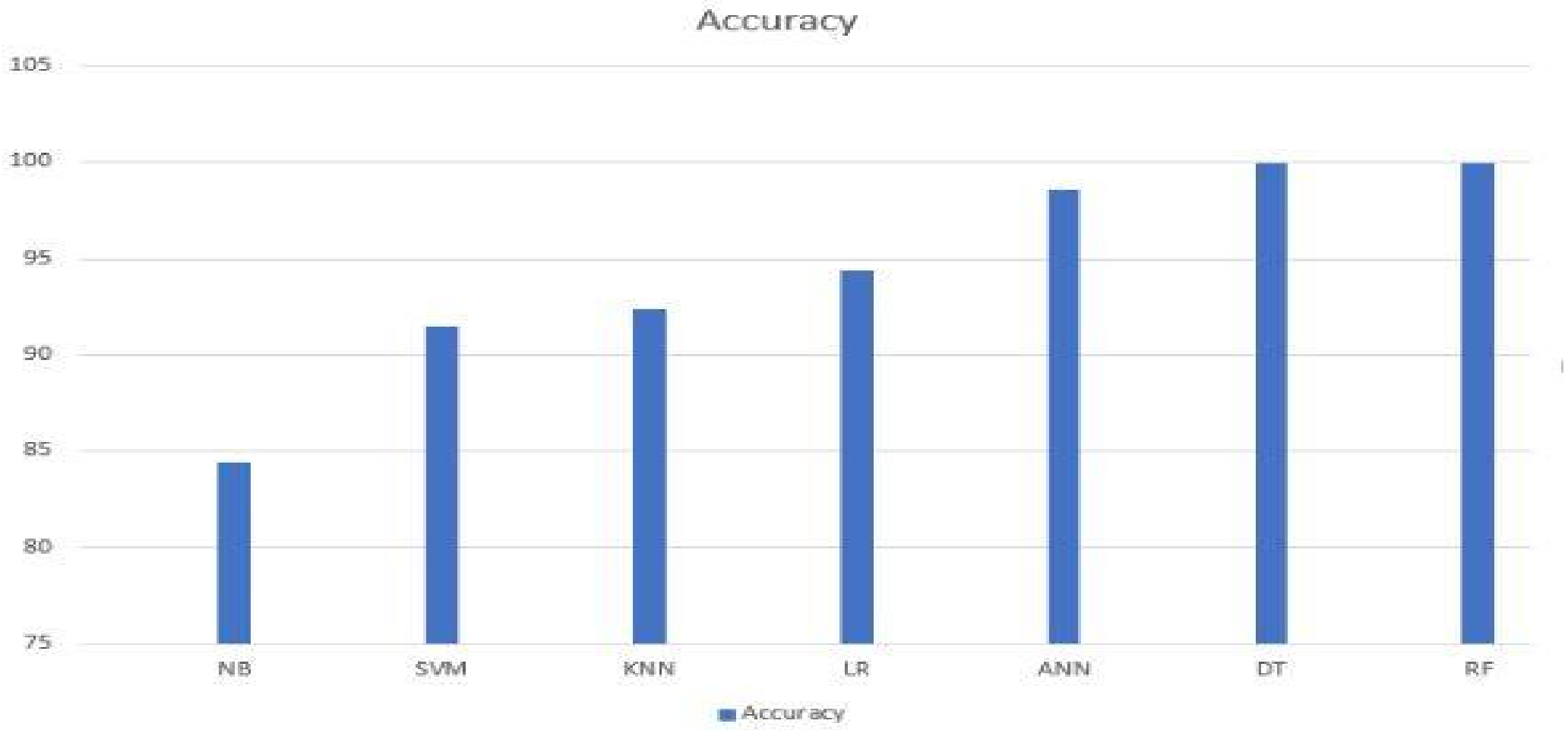
10 fold CSV 2 hidden layer



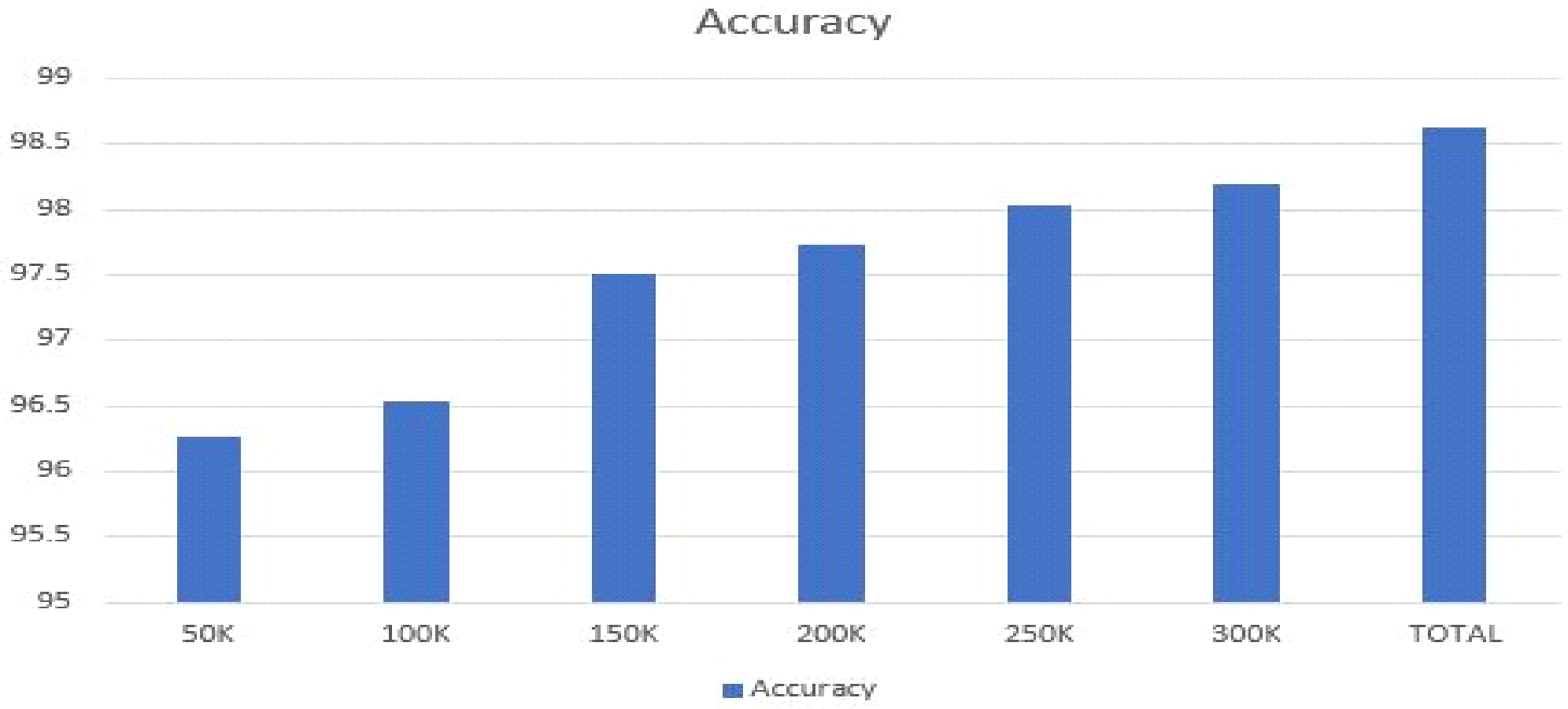
Results of Algorithms



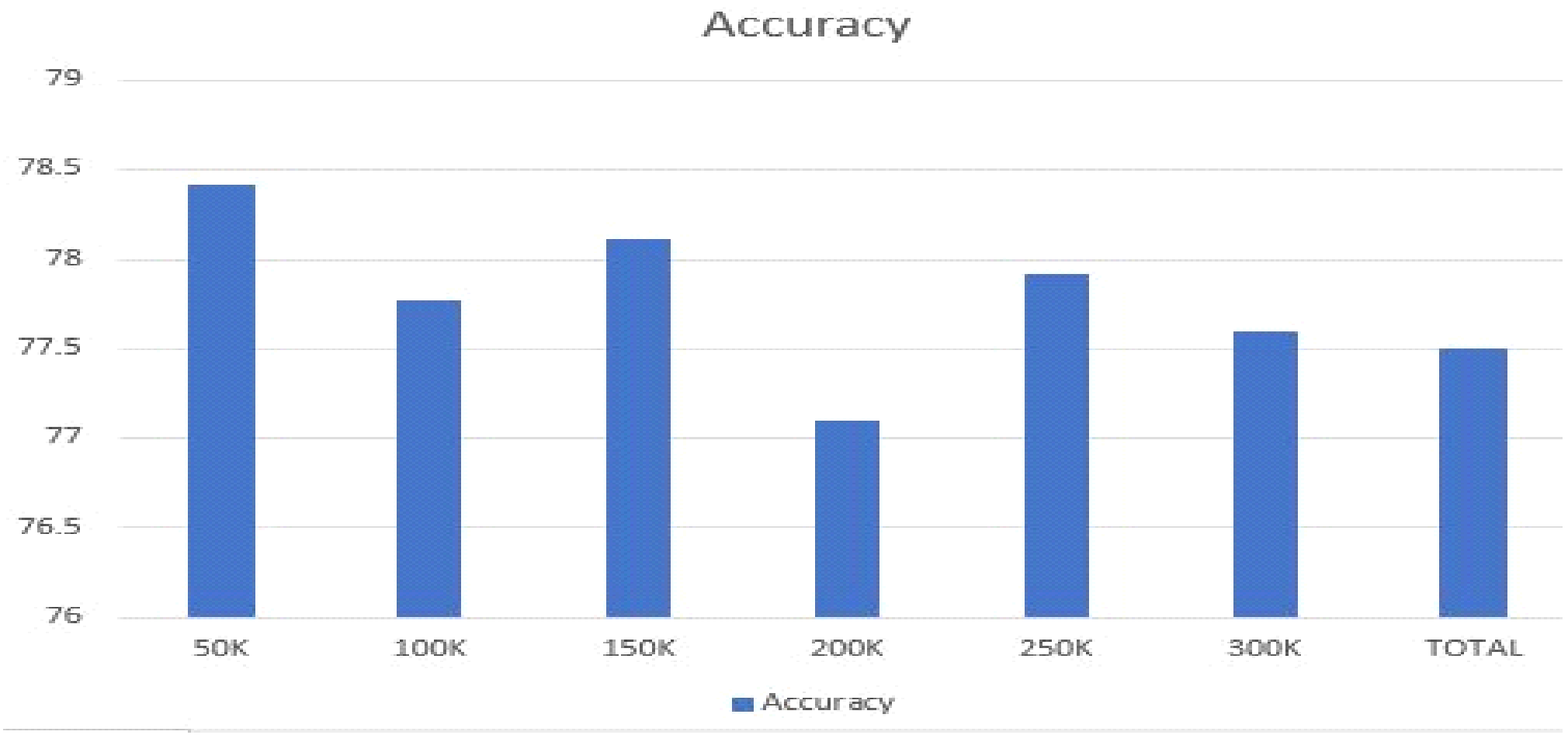
Comparison of Algorithms



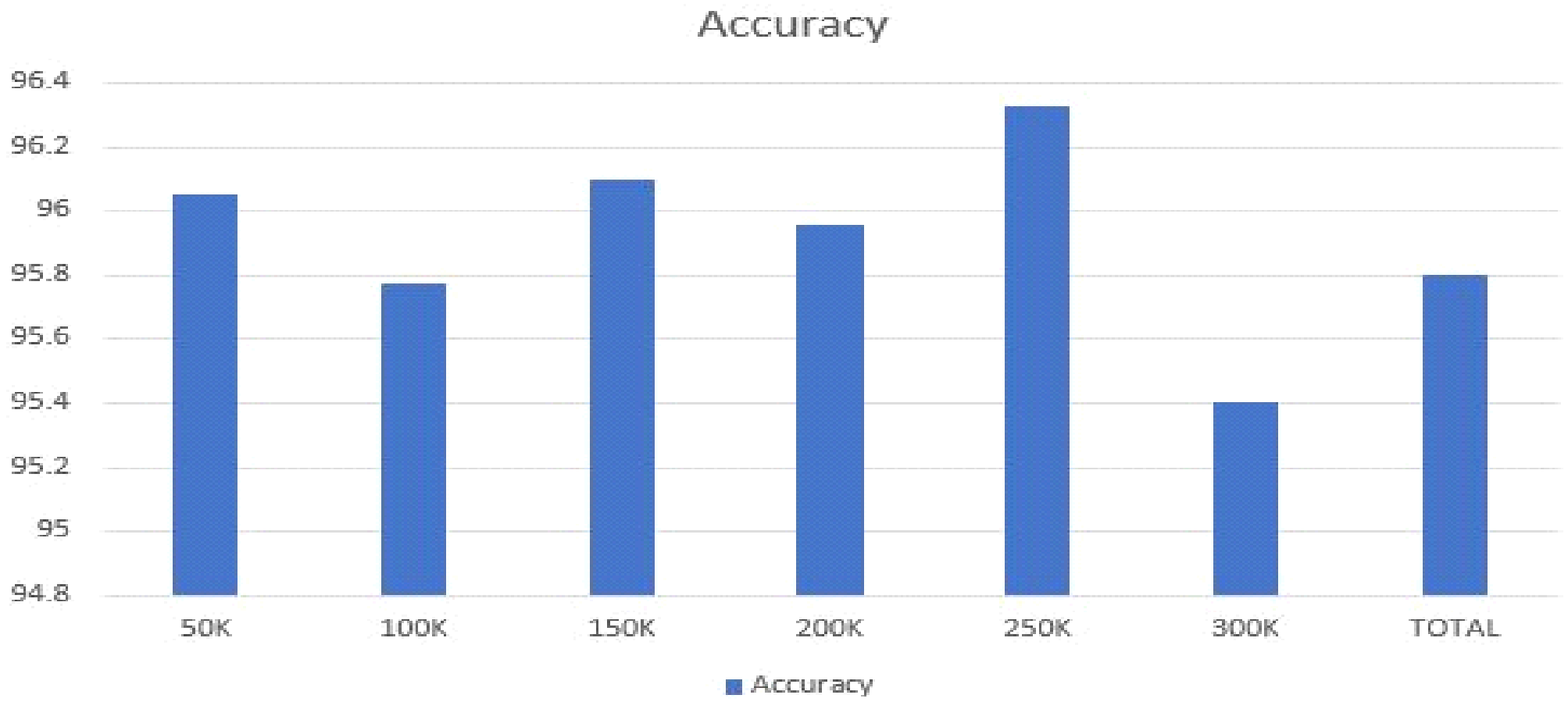
Splitting Data (KNN)



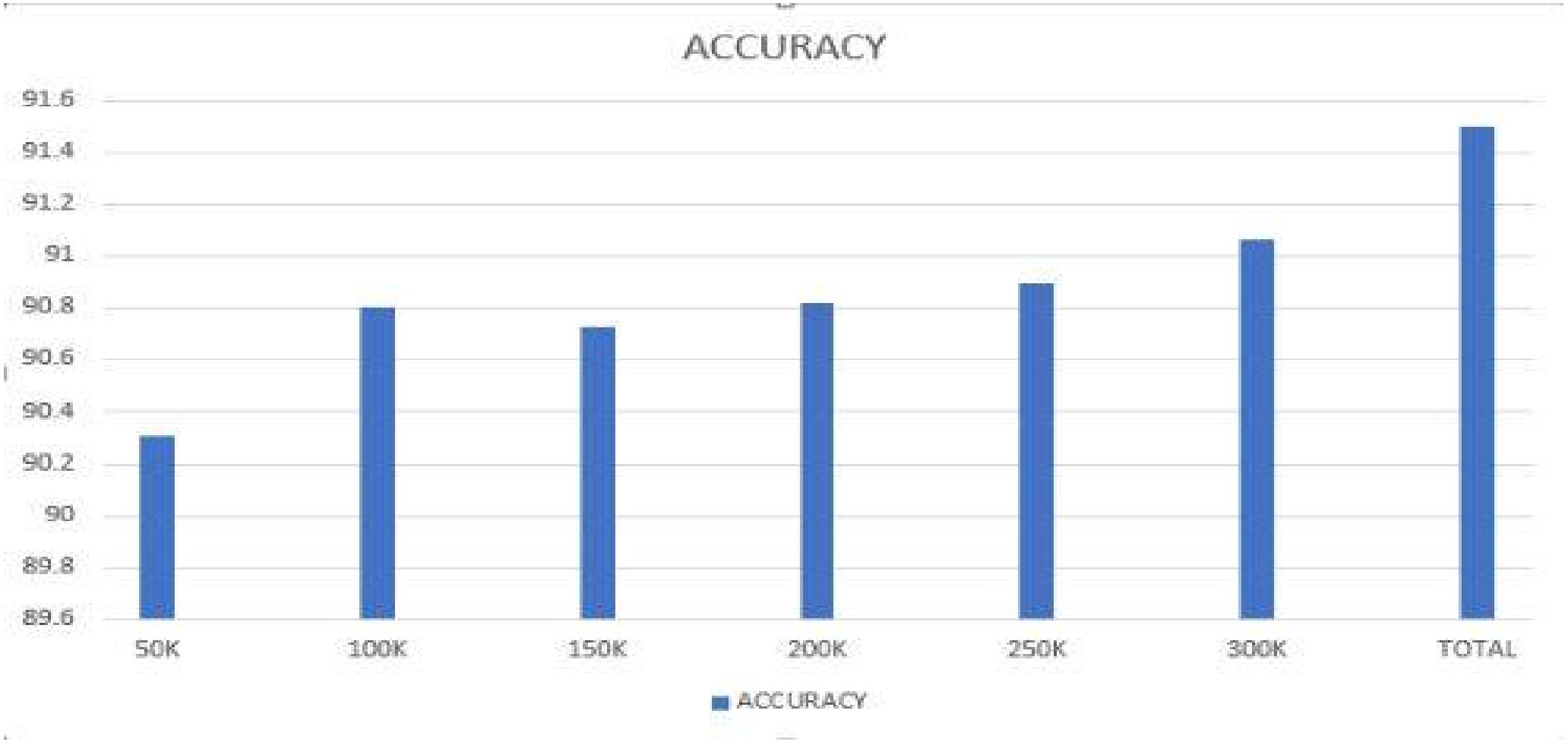
(Naïve Bayes)


Accuracy
79
78.5
78
77.5
77
76.5
76
50K
100K
150K
200K
250K
300K
TOTAL
Accuracy

(Logistic Regression)

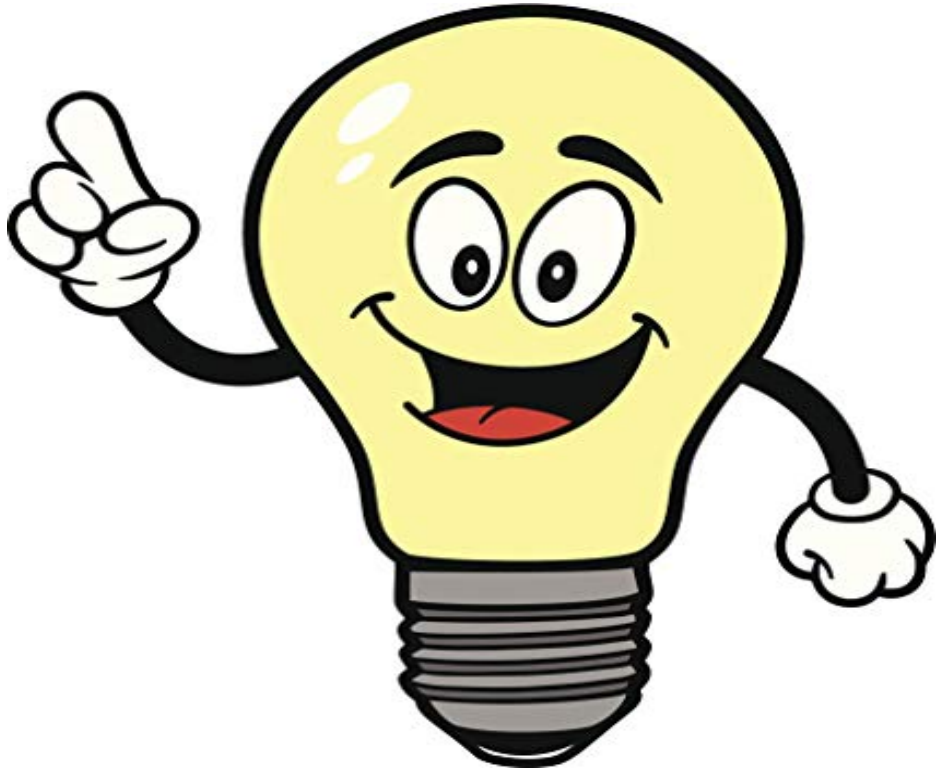


(SVM)


ACCURACY
91.6
91.4
91.2
91
90.8
90.6
90.4
90.2
90
89.8
89.6
50K
100K
150K
200K
250K
300K
TOTAL
ACCURACY

Summery

KNN (98.4 %)
and
ANN (98.56%)
is best



FUTURE WORK

1. Find out batter algorithm except ANN and KNN

2. Find out better solution for WSN

Reference

[1] Q. Liao and H. Zhu, “An Energy Balanced Clustering Algorithm Based on LEACH Protocol,” *Appl. Mech. Mater.*, vol. 341–342, pp. 1138–1143, 2013.

[2] “(PDF) Hello Flood Attack and its Countermeasures in Wireless Sensor Networks.” [Online]. Available: https://www.researchgate.net/publication/46093611_Hello_Flood_Attack_and_its_Countermeasures_in_Wireless_Sensor_Networks. [Accessed: 03-Apr-2019].

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[6] S. Kaplantzis, “Security Models for Wireless Sensor Networks,” 2006.

[7] F. Josephin and N. Ramaraj, “PREVENTION AND DETECTION OF SELECTIVE FORWARDING ATTACK IN WIRELESS SENSOR NETWORKS,” *Int. J. Sci. Res. Innov.*, vol. 1, pp. 12–17, 2016.

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