CYBER SECURITY

PBL- 2

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Classification Algorithm Used:

- Stacking Ensemble
- Major Voting Ensemble
- Weighted Ensemble Classifier

STACKING ENSEMBLE:-

Stacking is a ensemble model, where a new model is trained from the combined predictions of two (or more) previous model. The predictions from the models are used as inputs for each sequential layer, and combined to form a new set of predictions. These can be used on additional layers, or the process can stop here with a final result

Ensemble stacking can be referred to as blending, because all the numbers are blended to produce a prediction or classification.

Here we have used Decision tree ,Gradient Boosting and random forest as basic classifiers.

MAJOR VOTING ENSEMBLE:-

This model makes a prediction (votes) for each test instance and the final output prediction is the one that receives more than half of the votes. If none of the predictions get more than half of the votes, we may say that the ensemble method could not make a stable prediction for this instance.

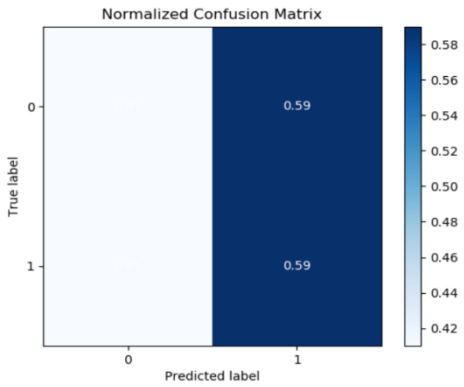
WEIGHTED ENSEMBLER CLASSIFIER:-

Unlike majority voting, where each model has the same rights, we can increase the importance of one or more models. In weighted voting you count the prediction of the better models multiple times. Finding a reasonable set of weights is up to you.

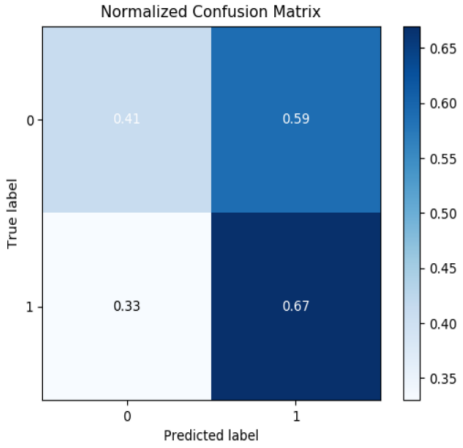
VISUALIZATION OF DATASET (Using Normalized Confusion Matrix)

1.) UDP

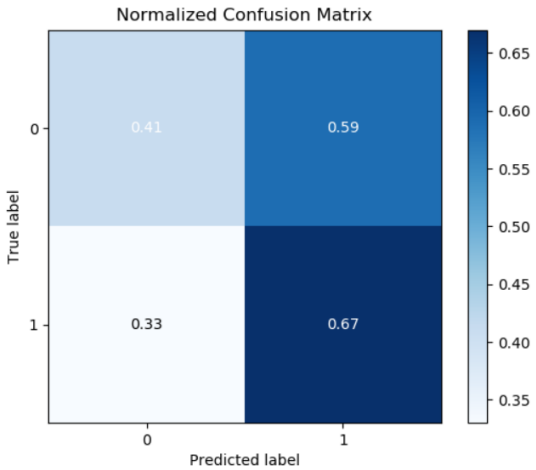
Stacking Ensemble: **TP: 0.41, FN: 0.59,FP :0.41,TN: 0.59**



Major Voting Ensemble **TP: 0.41, FN: 0.59,FP :0.33,TN: 0.67**

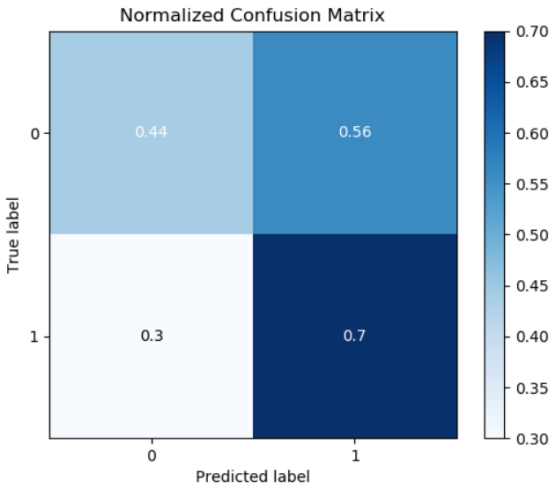


Weighted Ensembler Classifier **TP: 0.41, FN: 0.59,FP :0.33,TN: 0.67**

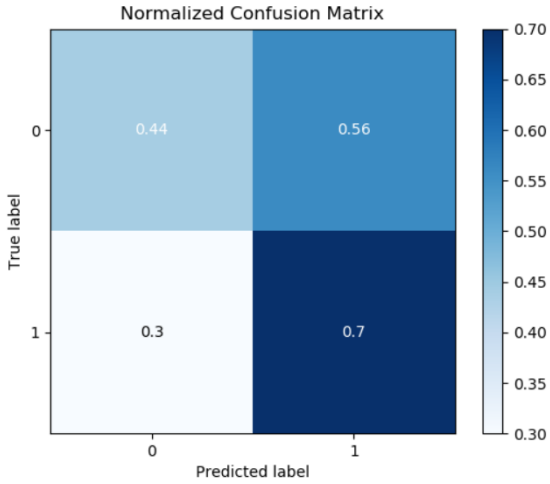


2.) TCPSYN

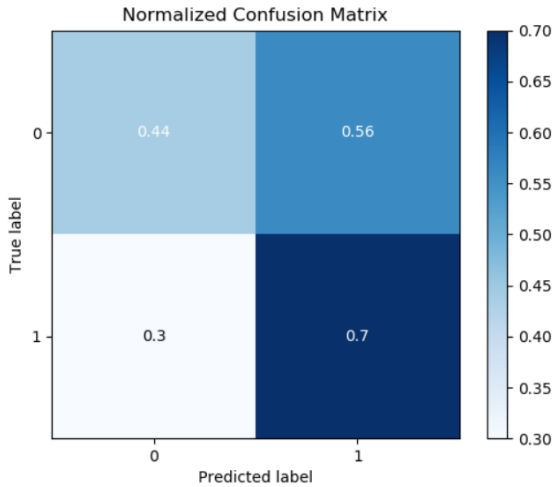
Stacking Ensemble **TP: 0.44, FN: 0.56,FP :0.3,TN: 0.7**



Major Voting Ensemble **TP: 0.44, FN: 0.56,FP :0.3,TN: 0.7**

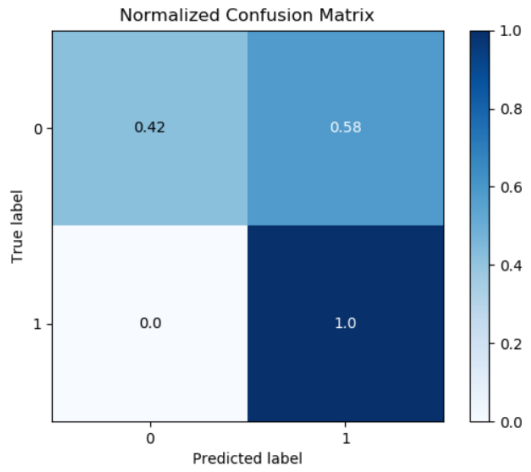


Weighted Ensemble Classifier **TP: 0.44, FN: 0.56,FP :0.3,TN: 0.7**

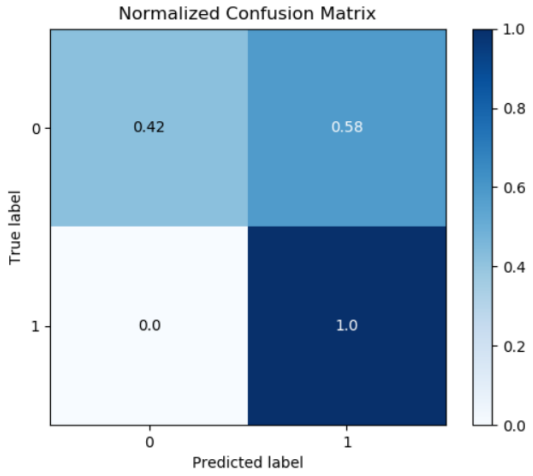


3.) ICMP

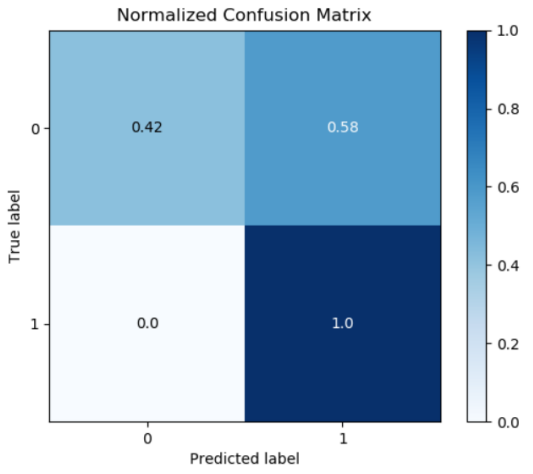
Stacking Ensemble **TP: 0.42, FN: 0.58,FP :0.0,TN:**



Major Voting Ensemble **TP: 0.42, FN: 0.58,FP :0.0,TN: 1.0**

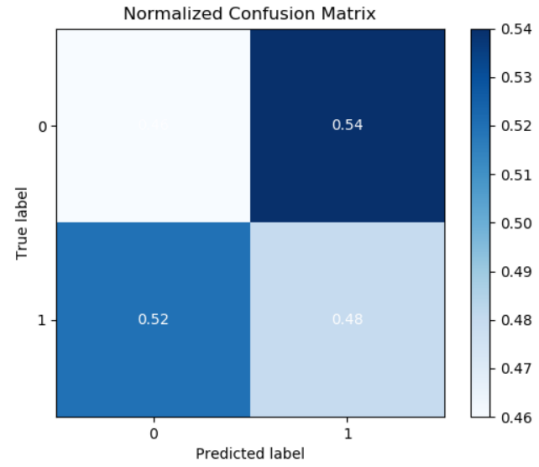


Weighted Ensemble Classifier **TP: 0.42, FN: 0.58,FP :0.0,TN: 1.0**

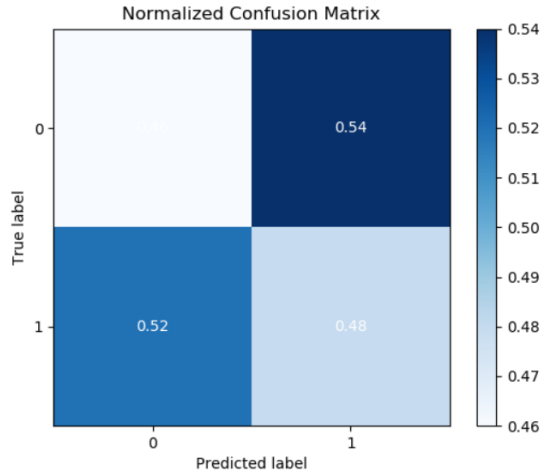


4.) LAND

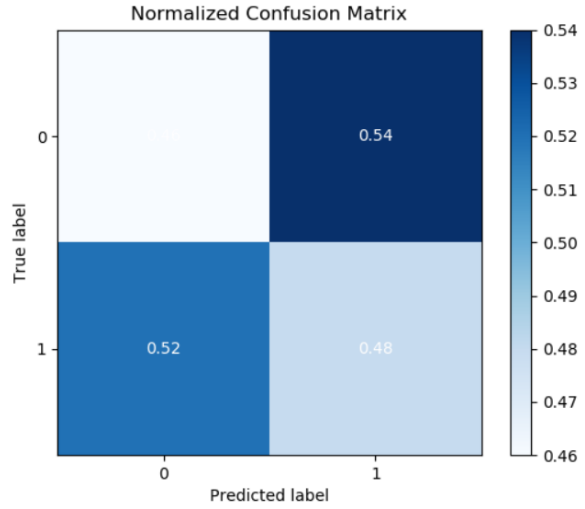
Stacking Ensemble **TP: 0.46, FN: 0.54,FP :0.52,TN: 0.48**



Major Voting Ensemble **TP: 0.46, FN: 0.54,FP :0.52,TN: 0.48**

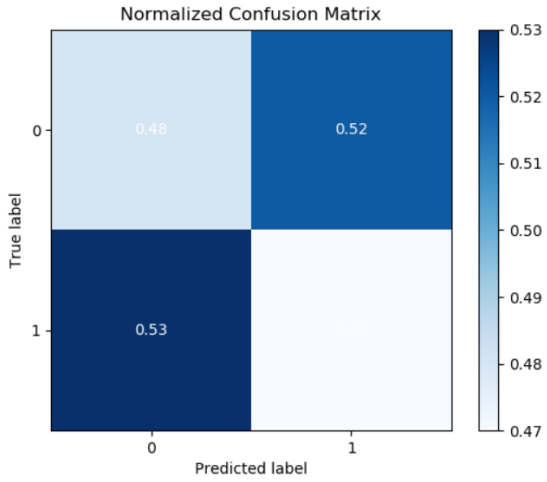


Weighted Ensemble Classifier **TP: 0.46, FN: 0.54,FP :0.52,TN: 0.48**

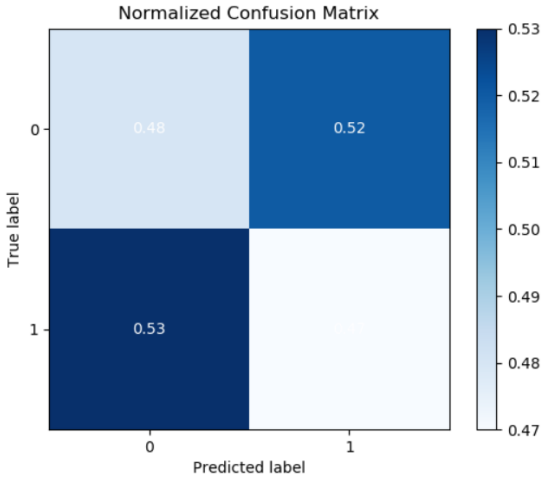


5.) TCPSYNACK

Stacking Ensemble **TP: 0.48, FN: 0.52,FP :0.53,TN: 0.47**



Major Voting Ensemble **TP: 0.48, FN: 0.52,FP :0.53,TN: 0.47**



Weighted Ensemble Classifier **TP: 0.48, FN: 0.52,FP :0.53,TN: 0.47**