# Electronic Device Rating Prediction

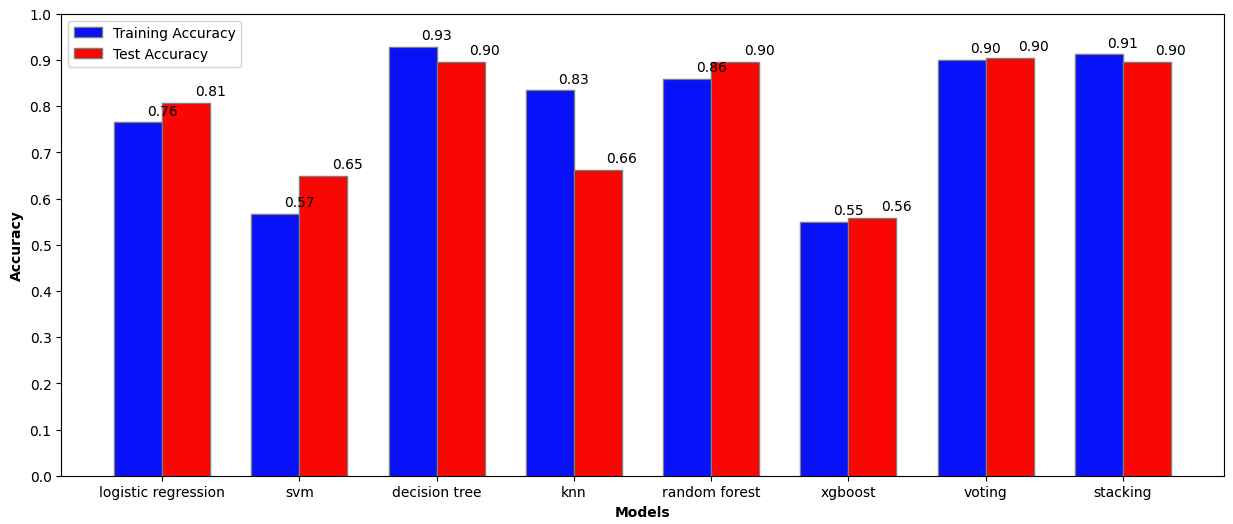
MS2 Report

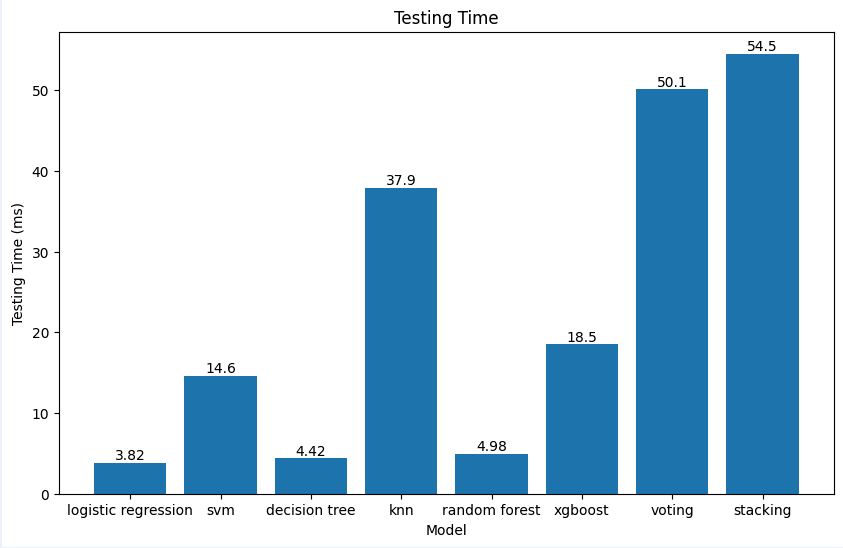
Team: CS\_27

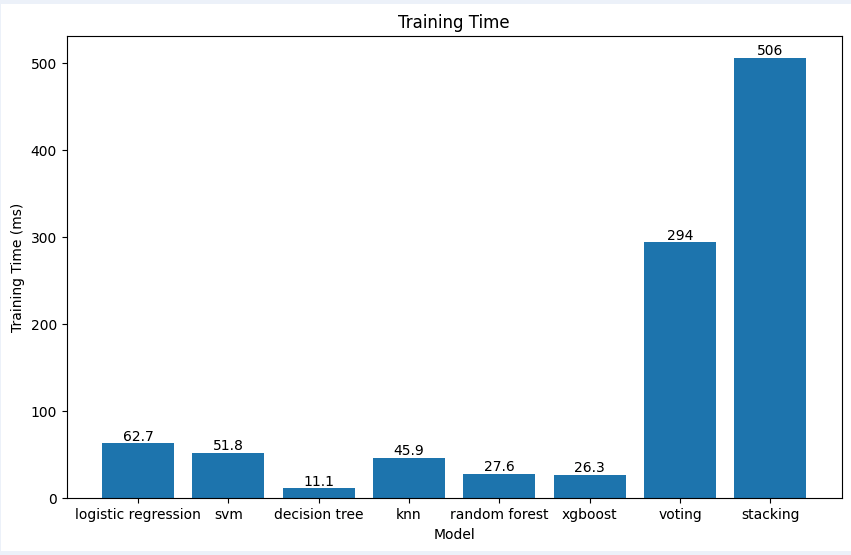
|  |  |  |
| --- | --- | --- |
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| 2021170480 | 6 | محمد عوض طلعت محمد |
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| 2021170483 | 6 | محمد مبروك فكري عبدالفتاح |
| 2021170641 | 8 | يوسف عمرو احمد زهران |

# Bar Graphs

Training & Testing Accuracy



Testing Models Time   


Training Models Time  


# Feature Selection

Chi-Squared  
since the input variables and output variables are categorical, Chi-Squared Feature Selection was the best choice and gave the highest accuracy when setting the K hyper parameter to 22

# Hyperparameter Tuning

Decision Tree

* when max\_depth = 5 – the best  
  + Training MSE: 0.0726643598615917
  + Testing MSE: 0.10344827586206896
  + Training Accuracy: 0.9273356401384083
  + Testing Accuracy: 0.896551724137931
* when max\_depth = 4   
  + Training MSE: 0.0847750865051903
  + Testing MSE: 0.1103448275862069
  + Training Accuracy: 0.9152249134948097
  + Testing Accuracy: 0.8896551724137931
* when max\_depth = 10   
  + Training MSE: 0.0034602076124567475
  + Testing MSE: 0.10344827586206896
  + Training Accuracy: 0.9965397923875432
  + Testing Accuracy: 0.896551724137931

## KNN:

* when n\_neighbors = 3 – the best  
  + Training MSE: 0.16608996539792387
  + Testing MSE: 0.33793103448275863
  + Training Accuracy: 0.8339100346020761
  + Testing Accuracy: 0.6620689655172414
* when n\_neighbors = 1  
  + Training MSE: 0.0
  + Testing MSE: 0.27586206896551724
  + Training Accuracy: 1.0
  + Testing Accuracy: 0.7241379310344828
* when n\_neighbors = 10  
  + Training MSE: 0.2975778546712803
  + Testing MSE: 0.46206896551724136
  + Training Accuracy: 0.7024221453287197
  + Testing Accuracy: 0.5379310344827586

Conclusion:

The project successfully classified electronic device ratings using machine learning models. Among the models tested, the Decision Tree achieved the highest accuracy with efficient training and testing times. The results were challenging because many of them were overfitting and cannot be considered. Overall, the project highlighted the importance of model selection and evaluation in classification tasks.