Prepared by: Biochemical Engineering Intern Vargas Carreño Leonardo Augusto

The complete code of the "Receiver Operating characteristic" algorithm is described in the ROC_BIOMECHANICAL.ipynb file.

## Results.

**Table 1.1. ROC curve and AUC Generated Data**

| Test Size | Total Amount of Data | | Amount of Data Taken | | | | Tresholds Data | ROC AUC score | True Positive Rate | False Positive Rate |
|---|---|---|---|---|---|---|---|---|---|---|
| | X | And | X train | And train | X test | And test | | | | |
| 0.15 | 310 | 310 | 263 | 263 | 47 | 47 | First Three Facts<br>Inf 1.<br>0.8548569<br>0.85365055<br>0.83153443 | 0.925403 | First three facts:<br>0.,0.0322580,<br>0.70967742<br><br>Last three facts:<br>0.96774194,<br>0.96774194,<br>1., 1. | First three facts:<br>0., 0., 0.<br><br>Last three facts:<br>0.4375,<br>0.4375, 1. |
| 0.50 | | | 155 | 155 | 155 | 155 | First three facts:<br>Inf 1.<br>0.97844667<br>0.97825483<br>0.94085688 | 0.9269480 | First three facts:<br>0.,0.0101010,<br>0.58585859<br>Last three facts:<br>0.98989899,1,<br>1. | First three facts:<br>0., 0., 0.<br>Last three facts:<br>0.76785714,<br>0.76785714,<br>1. |
| 0.95 | | | 15 | 15 | 295 | 295 | First three facts:<br>INF<br>1.00000000E+00<br>9.50152933E-01<br>9.49025568E-01<br>9.31194777E-01 | 0.8455232 | First three facts:<br>0.,0.004950,<br>0.58910891<br>Last three facts:<br>0.9950495,<br>0.9950495,1. | First three facts:<br>0., 0., 0.<br>Last three facts:<br>0.97849462,<br>1., 1. |

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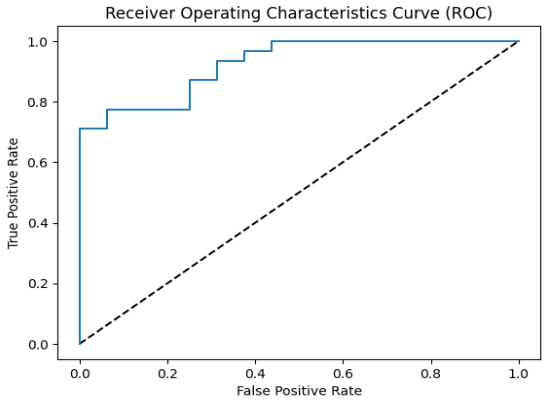
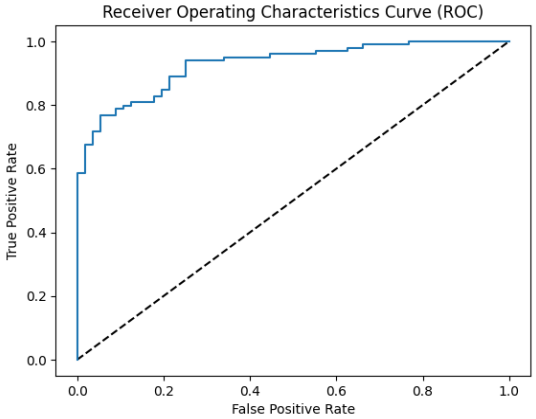
# Graphs True Positive Rate vs. False Positive Rate

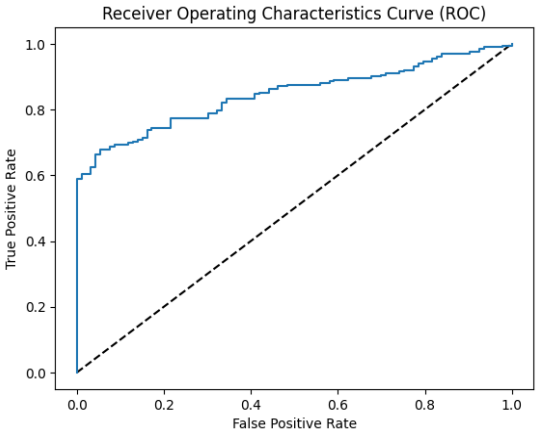
## Test Size= 0.15




## Test Size= 0.50




## Test Size= 0.95



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## Discussion.

The "ROC curve" algorithm is simple to implement, it is a simple curve that determines whether the prediction model recognizes classifications (it is mainly used for binary classifications

also it can be used in classifications with multiple labels). To make the "ROC curve" graph, the calculated values TPR (True Positive Rate) and FPR (False Positive Rate) are used. In the Biomechanical dataset it has two classes: Abnormal (1) and Normal (0).(Dipanja, Raghav, & Tushar, 2018)

The amount of data that will be used in the training and test data to generate the algorithm can be varied, so different sensitivity results can be obtained, as can be seen in Table 1.1. Data generated ROC curve and AUC with the different values of the Test Size variable. AUC Score varies from 0.9254 to 0.8455 being acceptable values for the algorithm, if the AUC values are less than 0.5 the model does not have the ability to discriminate between positive and negative class. With AUC= 0, the model predicts a negative class as a positive.

## Conclusion.

For the Dataset used, the algorithm used to generate the ROC curve graphs satisfies the prediction needs to know if the model can identify the classes (Normal and Abnormal).



## Bibliography

Dipanja, S., Raghav, B., & Tushar, S. (2018). Chapter 5 Building, Tunning and Deploying Models. "Receiver Operating Characteristic". In *Practical Machine Learning with Python. A Problem-Solver's Guide to Building.* (p. 276). Apress.