



Module 3 Summary

SESSION	TITLE	TEACHER
1	ML Foundations	Juan
2	Regression Introduction and Practice	Juan
3	Classification Introduction and Practice	Carlos
4	Feature Engineering and Selection for ML	Carlos
5	Advanced Supervised Models 1	Carlos
6	Advanced Supervised Models 2	Carlos
7	Hands-on Practice	Carlos





Motivation

Automatic External Defibrillators (**AEDs**) are electronic devices which are used to treat certain type of cardiac arrhythmias. Some shockable cardiac arrhythmias as **ventricular tachycardia** (**VT**) and **ventricular fibrillation** (**VF**) can be treated by AEDs in scenarios outside of a hospital when an appropriate shock could increase the chances of survival for a patient.

- AEDs as user friendly as possible for the operator
- The accuracy of the heartbeat analysis is of the upmost importance both to correctly deliver a shock if the patient is suffering from VF or VT and to not deliver shock for nonshockable rhythms such as normal sinus rhythms.





Specifications

- The American Heart Accociation (AHA) has released recommendations for VF and VT detection algorithms and suggests that accepted algorithms should have a sensitivity higher than 90% for shockable rhythms and a specificity higher than 95% for nonshockable rhythms
- The accuracy of the heartbeat analysis is of the upmost importance both to correctly deliver a shock if the patient is suffering from VF or VT and to not deliver shock for nonshockable rhythms such as normal sinus rhythms.

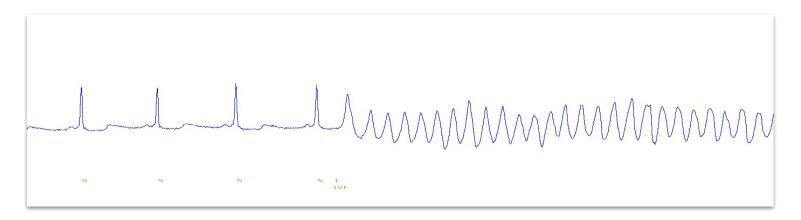


Objective

- Analyse labelled ECG data from public datasets
- Separate labels as shockable and nonshockable
- Segment and extract features from labelled ECG data
- Train a number of models using different machine learning algorithms
- Determine which algorithms are most effective for the classification of heart rhythms



Public Datasets



MIT-BIH Malignant Ventricular Arrythmia Database (VFDB)

- 22 ECGs 30 mins each
- Sample Rate 360 Hz
- 2 recording channels

Creighton University Ventricular Tachycardia Database (CUDB)

- 35 ECGs 8 mins each
- Sample Rate 250 Hz



Outline

- Business Understanding
- Data Analysis
- Data Modelling
 - Logistic Regression
 - Naïve Bayes
 - Decision Tree
 - Random Forest
 - Adaboost
 - XGBoost
- Final Conclusions

Photo by <u>Alexandru Acea</u> on <u>Unsplash</u>

