**COSC2670 – Practical Data Science**

**Assignment 2**

Title: Can the survival of patients with heart failure be predicted?

Affiliations: RMIT University

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I certify that this is all my own original work. If I took any parts from elsewhere, then they were non-essential parts of the assignment, and they are clearly attributed in my submission. I will show I agree to this honor code by typing "Yes": Yes

INCLUDE A READ ME FILE FOR THE CODE.

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# Abstract

\*\* Make changes.

The aim of this report was to investigate if the survival of patients with heart failure could be predicted using different features. The data used in this study was obtained from a dataset of medical records of patients with heart failure. The K-Nearest Neighbours and Decision Tree classification techniques were used to create models to help predict the survival of patients with heart failure. The results of the models show that it is possible to be able to predict the survival rate using data from the medical records of patients. The Decision Tree models provides a higher accuracy to determine the chances of survival of patients. The report concludes that medical professionals are able to get a better understanding of their patients’ chances of survival using data from medical records. It is recommended that medical professionals utilise the Decision Tree model when reading through medical records of patients with heart failure to gain a greater understanding of their patient’s risk death.

If medical professionals are able to look at medical records are see potentially threatening data according to the model, they will be able to monitor and treat patients more carefully, hopefully leading to potential patient recovery.

Help to forecast heart-failure related events.

# Introduction

\*\* have in text referencing throughout this because there is no way I know this information off the top of my very intellectual mind. Also, plagiarism check – especially that long sentence where I list the causes.

Heart failure is a type of cardiovascular disease occurring when the heart does not pump enough blood around the body. The risk of heart failure can be increased due factors such as aging, family history, unhealthy lifestyle habits (such as a poor diet, smoking, use of illegal drugs, alcohol abuse and lack of exercise), having heart of blood vessel conditions, lung disease, infections such as HIV. (NIH, n.d.). Cardiovascular diseases were responsible for approximately 17.9 million deaths in 2019 and was the cause of 32% of all deaths around the world (WHO, 2021). The high death rate surrounded heart related diseases due to the heart being such a vital organ highlights why it is so important for medical professionals to find a way to predict heart failure is patients. This report will use classification techniques such as K-Nearest Neighbours and a Decision Tree to create a model to use data from medical records to predict the chances of survival of patients with heart failure.

# Methodology

The research outlined in this report used a dataset from 2015 which information collected for 299 patients with heart failure using their medical records. The data was collected from medical records of patients at the Faisalabad Institute of Cardiology and at the Allied Hospital in Faisalabad from the province of Punjab in Pakistan. This was between the months of April and December.

Before any models were created, the different clinical features were explored.

I applied classification machine learning techniques such as K-Nearest Neighbours and the Decision Tree to predict whether patients with heart failure would survive. During the K-Nearest Neighbours technique, feature selection was conduction in order to achieve the highest possible accuracy of predicting patient survival from the model. The clinical features collected from medical records can be seen in *Table 1*.

\*\* make a table – see where I put this table last year

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## Model 1: K-Nearest Neighbours

## Model 2: Decision Tree

# Results

## Model 1: K-Nearest Neighbours

## Model 2: Decision Tree

# Discussion

# Conclusion

Could we only use one or two features to predict heart failure instead of the 10.

# References

Add my own references, like to dataset and the actual research paper

Also to the slides

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