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# Acknowledgments

I thank above all the god who gave me the courage and the will to complete this work.

I deeply thank my supervisor Mrs. Seridi for guiding me with patience, and for all her efforts, advice and corrections.

My heartfelt thanks to my friends who have helped me.

Finally, a big thanks to my family for supporting me during my university course.

# Dedication

To the whole family

To all my friends

# Abstract

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# Introduction

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# Chapter 1: State of the art

## Machine learning

Machine learning, also known as artificial learning, is a form of artificial intelligence (AI) that allows a system to learn from data and not through explicit programming. As algorithms ingest training data, it becomes possible to create more accurate models based on this data. A machine learning model is the result generated when you train your machine learning algorithm with data. After the training, when you provide input to a model, you receive an output result. For example, a predictive algorithm creates a predictive model. Then, when you provide data to the predictive model, you receive a forecast that is determined by the data that formed the model.

## Class decomposition

Class decomposition describes the process of segmenting each class into a number of homogeneous sub-classes. This can be naturally achieved through clustering. Utilising class decomposition can provide a number of benefits to supervised learning, especially ensembles. It can be a computationally efficient way to provide a linearly separable dataset without the need for feature engineering required by techniques like Support Ve]ctor Machines (SVM) and Deep Learning. For ensembles, the decomposition is a natural way to increase diversity; a key factor for the success of ensemble classifiers. In this paper, we propose to adopt class decomposition to the state-of-the-art ensemble learning Random Forests. Medical data for patient diagnosis may greatly benefit from this technique, as the same disease can have a diverse of symptoms. We have experimentally validated our proposed method on a number of datasets in that are mainly related to the medical domain.

# Chapter 2: Conception

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# Chapter 3: Experimentation and Results

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# Conclusion and Perspectives

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