1.1 Overview

Cultural and Historical Architectures are structures that were created in the past throughout the nation's history which are a part of Cultural Heritage. These architectures serve as the legacy of those who lived in ancient times, showing the cultures they had during those times. Due to its location, these structures are exposed to the elements and due to this, these structures degrade over time. According to (Bertolin, 2019), climate change is a threat to cultural and historical architectures as it worsens the decay rates of the architectures. (Sesana et al., 2021) also mentions that climate change increases hazardous events such as landslides, floods, and droughts, which can impact the cultural architectures.

Due to these natural elements, safeguarding these Cultural Heritage Sites become difficult as the speed in which the climate changes has increased. (Klingelhöfer et al., 2020) states that although the global climate is always changing, the rate that is changes has drastically increased due to human intervention reaching levels that mankind has never experienced before. It is due to this that the protection of these cultural sites more important. According to (Guzman et al., 2020), current methods in preserving historical and cultural architectures rely on reactive measures. This means that measures taken to preserve these sites, such as maintenance and repair, only happen after the impact from climate change has occurred. Due to this, the historical and cultural architectures are damaged or lost, making it too late to repair.

1.2 Problem Background

The are several problems with the current applications, mainly both applications are not very user friendly. Both applications are used in conjunction with one another but they both have different layouts and design. This causes users to learn two different applications just to do their work, making the learning curve higher. Lowering the learning curve is important as although smartphones are commonly used by people in this era, not all of them have the same level of competence when using it. Some are able to use all of the smartphones' features to the best of its ability, while others take a longer time to understand the basic operations of the smartphone.

1.3 Research Aim

The aim of the research is to figure out the feasibility of using Decision Tree or Support Vector Machines algorithms in aiding the protection of cultural and historical architectures by analysing microclimate data.

1.4 Research Question

1.5 Research Objectives

The objectives of the research are:

a) To compare and analyze Decision Tree and Support Vector Machines algorithms and choosing the most suitable algorithm to analyze microclimate data.

b) To design a preventive maintenance strategy that will suggest the most suitable actions in maintaining the historical and cultural architectures based on the insights gained from analyzing microclimate data.
c) To design a user-friendly dashboard prototype displaying real-time microclimate data as well as giving recommendations in maintenance to aid government officials in safeguarding cultural and historical architectures.

1.6 Research Scope

The scopes of the research are:

a) Analyzing microclimate data collected from the Malaysian Meteorological Department for the cultural and historical architecture that was identified by Johor Bahru's local authorities.
b) A preventive maintenance strategy will be designed based on insights gleaned from the data analysis.
c) Designing a user-friendly prototype of a dashboard that shows real-time microclimate data which also recommends appropriate maintenance measures to the local authorities.
d) Collaborating with local authorities in Johor Bahru and experts in cultural heritage site protection to ensure the sustainability of the project.

1.7 Research Contribution

The research will help in further developing the methods to safeguard cultural and historical architectures by taking a more active role in its maintenance and repair to allow it to survive for future generations to come.

1.8 Report Organization

This research paper will be divided into 5 different chapters. Chapter 2 will be an analysis of the current method in protecting the cultural and historical architectures as well as defining the machine learning algorithms. Chapter 3 will discuss the research methodologies used in this project. Chapter 4 will be an analysis of the information gleamed from previous chapters as well as the proposed solution. Finally, Chapter 5 will discuss whether or not the proposed solution will work as well as summarize the research paper.