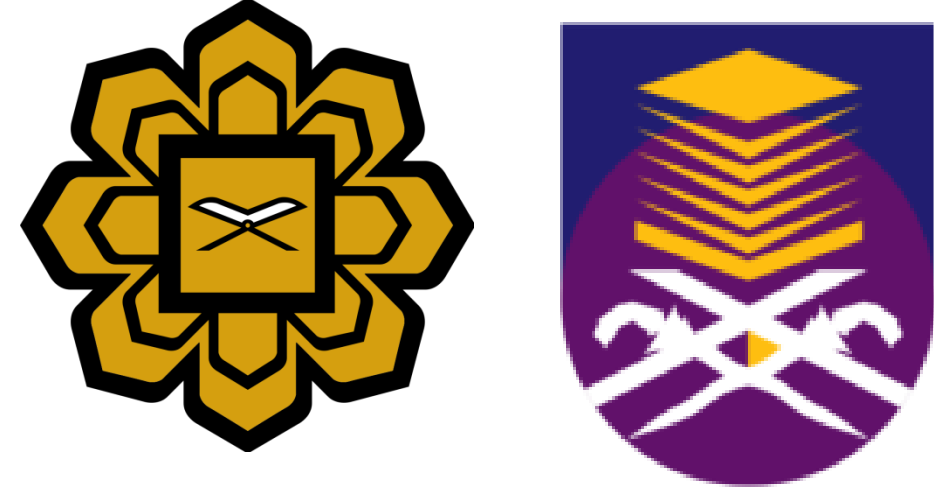




Title of the Product/ Project

MACHINE LEARNING IN CULTURAL HERITAGE PRICE PREDICTION : ALGORITHMS AND FACTORS OF HERITAGE



ISCIID 2021
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Idea, Invention, Innovation & Design Expo 2021

Group Member

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ABSTRACT

The aim of this study is to identify the best model of machine learning algorithms in predict the price of heritage property data.

This study has proposed 114 unit of prewar shophouses in George Town Penang Island from 2004 until 2019 and applied five machine learning algorithms for training heritage dataset by evaluate using R-Square and Root Mean Square Error.

The finding show the consistency of random forest model as the best model as price prediction from previous studies including in this study which have been selected as the best machine learning model for heritage price prediction with the highest R-Square and lowest Root Mean Square Error.

The use of machine learning technique as price prediction using heritage dataset are not actively been discovered by others researcher, thus this study has extending previous studies by restructure the price prediction training configuration and update factors of heritage.

Authors has summarised the particular machine learning algorithms and current factors of heritage by analyse from previous literatures and publication from George Town World Heritage Incorporated.

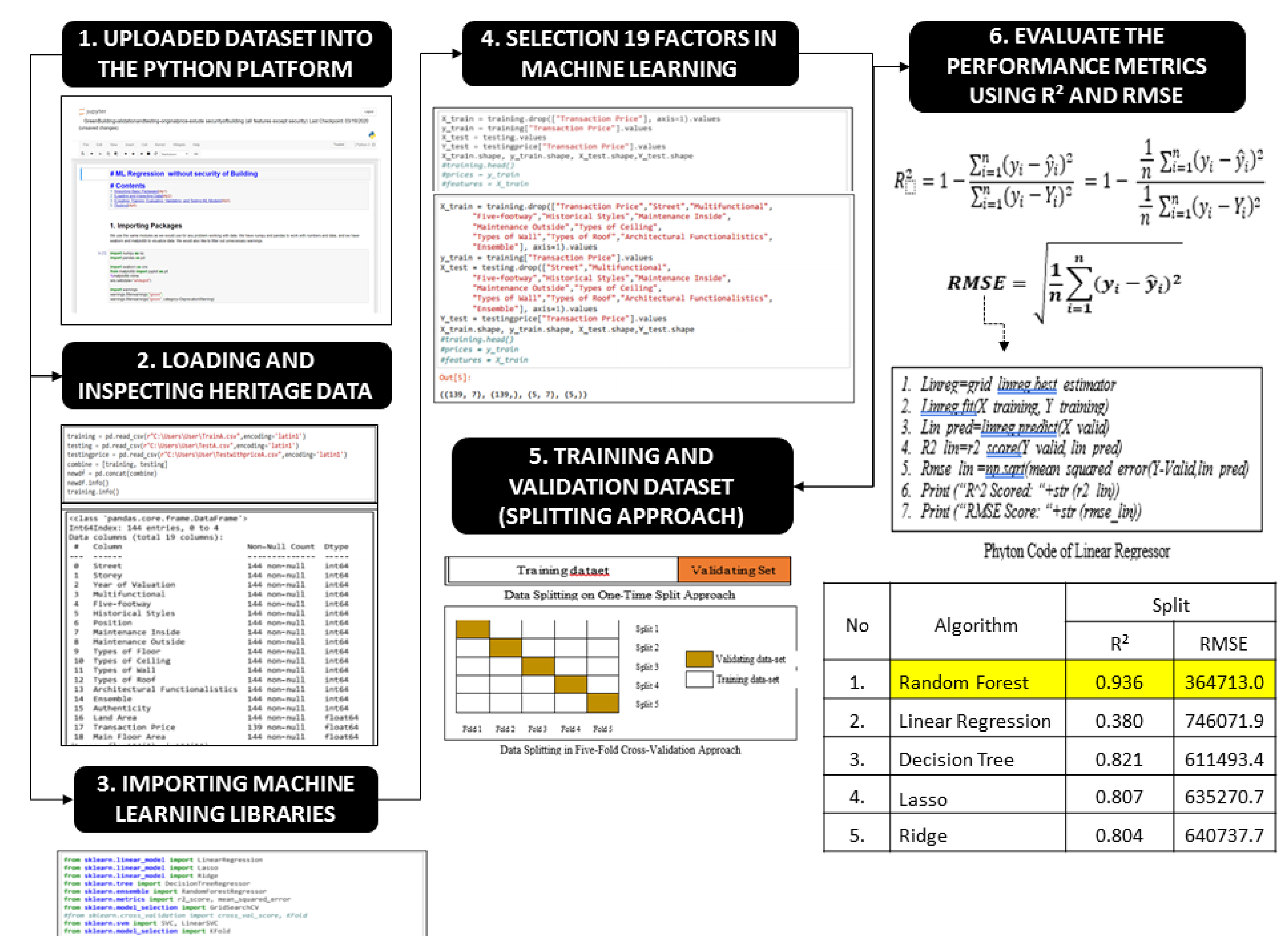
This finding broadly supports the work of other studies in this area which linking the price and factor of contribution.

This study has brings to light the potential implications of misuse or misunderstanding of heritage to be interpreted in correct context and suggest for future research works.

INTRODUCTION

- Last century 15 years back, heritage properties studies was considered has received much attention in focusing its price prediction due to it is a historical property which has different interest and it also a heterogeneous property in real estate field.
- It is important to assess the heritage property area to establish the market value through the proper price prediction. The most approach been used are sale comparison method, cost method, hedonic pricing, travel cost and contingent valuation method.
- However, there is no strong evidence that can convincingly show the validity method been used in predict heritage properties and the existing method been used in predict the heritage price is questioned its accuracy because it being doubtful of its effectiveness, reliability and suitability using the previous factors of heritage.
- The gaps here, the absence of a specific standard in valuing the heritage property factors and the absence of a clear method in the Malaysian provision in conducting heritage property price prediction if the market evidence is not available.
- real estate predicting price has discover the new computational predicting technique which is machine learning, but this technique are still limited and rarely considered in cultural heritage.
- authors has bridge this gap by review the cultural heritage area and computational machine learning techniques to provided appropriate approach study in predict heritage price.
- ML learns from previous experience to predict current performance and improve for future data.
- In ML there are four main categories of learning such Supervised, Unsupervised, Semi-supervised and Reinforcement.
- ML models used in real estate analysis such as Decision Trees, Linear Regression, Gradient Boosting, Neural Networks, Support Vector Machine and Random Forest.

METHODOLOGY



PRODUCT DESCRIPTIONS/ INNOVATION IN BRIEF

- This study offers current understanding and latest information in price prediction of heritage property using machine learning algorithms, thus this is a new alternative in real estate in predict heritage property price using machine learning.

PUBLICATIONS

- Ja'afar, N. S., & Mohamad, J. (2020). An Assessment of Heritage Property Values using Multiple Regression Analysis : George Town, Penang Island. Malaysian Journal of Sustainable Environment, 7(2), 37–60. **MyCITE**
- Mohamad, J., Ja'afar, S., & Ismail, S. (2020). Heritage Property Valuation using Machine Learning Algorithms. 26TH Annual Pacific Rim Real Estate Society Conference, 1–12. **Refereed**
- Ja'afar, N. S., & Mohamad, J. (2021). Application of Machine Learning in Analysing Historical and Non-Historical Characteristics of Heritage Pre-War Shophouses. Journal of the Malaysian Institute of Planners, XIII, 1–14. **SCOPUS Index**
- Ja'afar, N. S., Mohamad, J., & Ismail, S. (2021). Machine Learning for Property Price Prediction and Price Valuation : A Systematic Literature Review. Journal of the Malaysian Institute of Planners, XIII, 1-16. **SCOPUS Index**
- Ja'afar, N. S., Mohamad, J., & Ismail, S. (2021). Machine Learning Algorithms for Heritage Property Valuation. Journal of the Malaysian Institute of Planners, XIII, 1-9. **SCOPUS Index**

NOVELTY/ ORIGINALITY

- This paper **sheds new light on heritage property price prediction** which we believe it is not common in the literature.
- It may also lessen its importance and challenge its novelty.
- Researchers started from **conduct site inspection and reviewing** information from heritage organisation then researcher has realised **the absence of a specific standard in valuing the heritage property factors and the absence of a clear method in Malaysia provision.**
- Thus researcher **applied the collected heritage factors for price prediction** by using the new alternative price predicting which **machine learning algorithms.**
- The configuration of machine learning been used in **predict heritage property price by applied five algorithms.**

SIGNIFICANCES

