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ASSESSMENT OF TEMPERATURE AND RAINFALL FACTORS IN SPATIAL PATTERN ANALYSIS OF DENGUE CASES BY USING GEOGRAPHICALLY WEIGHTED REGRESSION (GWR) METHOD IN KEDAH, MALAYSIA

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AUTHOR'S DECLARATION

I declare that the work on this project/dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA (UiTM). This project/dissertation is original, and it is the result of my work, unless otherwise indicated or acknowledged as referenced work.

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ABSTRACT

Dengue fever is a virus that spreads quickly between mosquitoes and is often found in tropical and subtropical regions. It is also one of the most common viral infections that infect individuals worldwide. In Malaysia, there have been reported 90,304 dengue cases overall in 2020, with 145 deaths. In 2021, there were 26,365 recorded cases of dengue fever (70.8% decrease from 2020), and 20 deaths were reported (86.2% decrease from 2020). However, the numbers for 2023 are increasing significantly. The aim of this research is to analyse the effect of temperature and rainfall on the spatial pattern analysis of dengue cases using Geographically Weighted Regression (GWR) method in Kedah, Malaysia. The objectives include to determine spatial interpolation of rainfall and temperature using kriging method, to examine spatial distribution of dengue cases using Moran's I and to analyse the relationship of temperature and rainfall on spatial pattern analysis of dengue cases by using Geographically Weighted Regression (GWR) method in Kedah, Malaysia. Three associated components which are intercept, rainfall and temperature were computed and retrieved from the spatial database. For year 2021, the R-squared increased from 0.118 to 0.921, while the Akaike Information Criterion (AIC) decreased from 9824.291 to 1634.783 while or year 2022, the R-squared increased from 0.123 to 0.869, while the Akaike Information Criterion (AIC) decreased from 9813.789 to 3441.735 when compared to the global logistic regression model. GWR analysis found the rainfall and temperature factors all significant relationship with dengue incidence. GWR also indicates a significant improvement in AIC values with the smallest and biggest adjusted R square. It is expected that the developed model can help local hygienic authorities that provides strategies for the prevention and control of this epidemic in Malaysia.

Keywords: Dengue cases, Temperature, Rainfall, Spatial Analysis, Moran's I, Geographically Weighted Regression (GWR)

TABLE OF CONTENTS