Modeling and forecasting dengue incidence in matara district using kernel smoothing with boxcar kernel function

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Dengue is one of the main health diseases that we have to face in day-to-day life, therefore this research aim is to model the monthly number of dengue cases in Matara district and forecast the dengue incidence. Of note, there has been a rapid increase in dengue cases in the Matara district in the year 2021. To model Dengue incidents, kernel smoothing is used in this study. Kernel smoothing is a nonparametric method. Besides the classical parametric methods, any predefined functions of a finite number of parameters are not required. Kernel smoothing methods have been developed on the monthly data collected from October 2014 to October 2022 from the Epidemiology Unit at the Ministry of Health in Sri Lanka. The kernel smoothing method with Boxcar kernel is used and gets the neighborhood length as 1.1 with the lowest cross-validation error. Finally, we can conclude that the kernel smoothing method gives a very accurate fitted model for this data set as the Mean Absolute Percentage Error (MAPE) of the model is 17%. However, climate changes, uncontrolled urbanization, and commercial trade are the main external factors that can affect dengue cases as well as the accuracy of our model. We can conclude that our model is suitable and will be useful for government and health staff to make decisions for the future. Predicted Dengue cases for November and December 2022 and January 2023 are 86.2323, 98.4320, and 138.5731 respectively.

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