Negative Binomial Regression to Model Dengue Cases Using Weather Factors

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Dengue fever is a widespread mosquito-borne disease, prevalent in the Americas, Africa, and Asia, that affects approximately 400 million people each year. The prevention of dengue fever is the only viable option to protect from infection, as proper medication is unavailable. Thus, the ability to predict dengue cases in advance would prove beneficial. In order to do so, a negative binomial model was developed to predict dengue cases using weather factors, including rainfall, temperature, humidity, and wind speed. Data from the District of Colombo, Sri Lanka were taken to construct the model using the statistical software R. As a comparison, a Poisson regression model was also constructed. Based on the probability density plots, it was concluded that the negative binomial regression model yielded the best performance. It was concluded that the monthly rainfall, average wind speed, and month of the year are key factors in the prediction of dengue cases. The findings of this study will help health officials prepare for potential outbreaks in vulnerable regions, minimizing the severity and fatalities of future dengue epidemics.

Awards Won:
American Meteorological Society: Certificate of Honorable Mention