

Abstract

Singapore has been plagued by dengue fever for years. Due to the tropical rainforest climate which is warm and humid all the year round, the vector of this infectious disease which is *Aedes aegypti* is breeding fast and hence accelerates the transmission of dengue virus. Unfortunately, there is no licensed treatment or vaccine for this widely spreading and damaging infectious disease yet. Therefore, predicting the trend of dengue fever accurately in order to implement efficient surveillance strategies is the objective of this project.

In this work, the dengue cases data from 2000 until now was collected from the Ministry of Health Singapore (MOH), and the climatic history records were obtained from two sources which were the Weather Underground (WU) and the Meteorological Service Singapore (MSS).

I have applied statistical analysis for this topic and it was constructed by following four parts. Firstly, appropriate serial correlations in the dengue cases were obtained hence the properties of this time series were identified and suitable model framework could be selected based on them. Next, based on the nature of the dengue data, the dynamic regression model was considered feasible since both the serial correlations in the time series and the regression relationships of the climatic factors were demonstrated. After determining the model for fitting the data sets, certain criteria include the Akaike Information Criterion (AIC) were employed to examine the goodness of fit of candidate models and therefore finalise a most efficient model structure. Finally, the predictive ability of the model was tested according to the measures such as average absolute residuals. In addition, I developed the R function named `measure.predictive.ability` which conducts an iterated loop to examine the predictive ability of the model by the measures mentioned above.