Predictive Analysis of Malaysian Dengue Hemorrrhagic Fever Data from 2010-2017 using BigML

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Mentoring Narrative

This project will give the undergraduate student, Foong Min Wong, experience with statistical analysis on dengue disease data. She will develop her research skill of writing about scientific results, improve statistical skills in BigML (an online machine learning tool), learn about gathering disease data through online government database, and explore advanced topics in predictive analytics.

The undergraduate researcher will meet with Dr. Otto one hour per week. At each meeting, we will discuss specific research techniques and the larger scientific context, as well as advice about graduate school and their career goals. Working together, we will develop a specific plan for what the student will investigate before our next meeting. The student will check in via email halfway through each week with a brief progress update and any questions they have encountered. Dr. Otto will also be available via email to help the student at other times throughout the week. This will enable the research mentor to help the student become un-stuck when needed, as well as provide the student with frequent low-stakes practice at scientific communication.

Project Steps

- Summer 2020

    1. Gather and collect dengue hemorrhagic fever (DHF) annual datasets from Malaysian Open Data Portal
    2. Clean and pre-process disease data using automation Python script
    3. Familiarize Foong Min with BigML
    4. Merge all seven DHF annual datasets into one master dataset in BigML
    5. Run regression analysis on master dataset based on age groups and states in BigML
    6. Run time-series analysis on the master dataset in BigML

Dissemination

Foong Min will present her results at the University of Wisconsin-Eau Claire Department of Mathematics Retreat and the Celebration of Excellence in Research and Creative Activity (CERCA).

Student Background

Foong Min is a senior majoring in applied mathematics and computer science. The student is well-prepared for this project and having necessary statistical background. She has experience with statistics and probability (MATH 246, 346, 445) and computer programming (CS 145, 245, 335). She is taking research methods (MATH 380) in the Fall 2019 semester. This project fosters required skills including experience with the statistical analysis and basics of predictive analytics using BigML.

Prior Activities

Dr. Otto has mentored 28 research projects since 2012, involving a total of 24 UWEC students and 4 students from Rice University. The UWEC students on 21 of the projects were funded by ORSP; one was funded by the University of Wisconsin System Office of Professional and Instructional Development; and two were conducted as independent studies. Sixteen students presented their work in posters or talks at state or national conferences. One publication has been accepted based on these projects, and one is in submission. She has also mentored three students on a National Science Foundation grant. Details about students and projects are in Dr. Otto's vita.