Verifying R Code and Visualizing Power Grid Data

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SIGNATURE QUALITY METRICS

INTRODUCTION:

There are many bioforensic signatures which are produced by analytical instruments that cost a lot of money to make. Upon first deployment, it is unknown how many samples are needed to test, resulting in an accurate measurement.

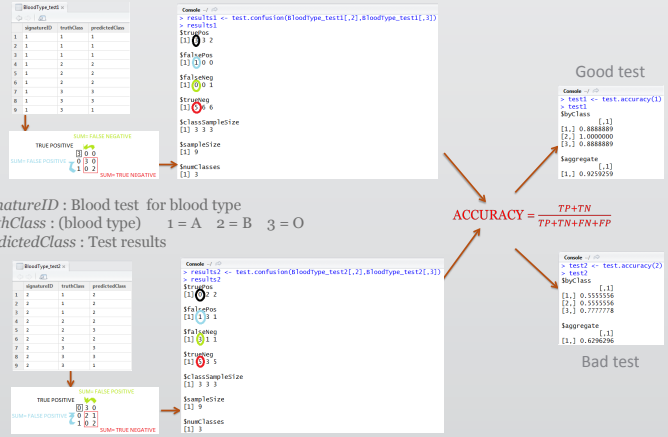
METHODS:

R package SQM will provide subject matter experts with some tools that will help them assess the specific quality of signatures and determine their :

- ACCURACY
- UTILITY
- COST

HOW IT WORKS:

READS IN DATA



- *signatureID* : Blood test for blood type
- *truthClass* : (blood type) 1 = A 2 = B 3 = O
- *predictedClass* : Test results

FUTURE:

Although the function calls are easy to use, creating the list of signatures in an easier fashion will be helpful for users. Furthermore, making a method to calculate the most cost beneficial *and* accurate signature would also be helpful for users.

GUI DEVELOPOMENT

INTRODUCTION:

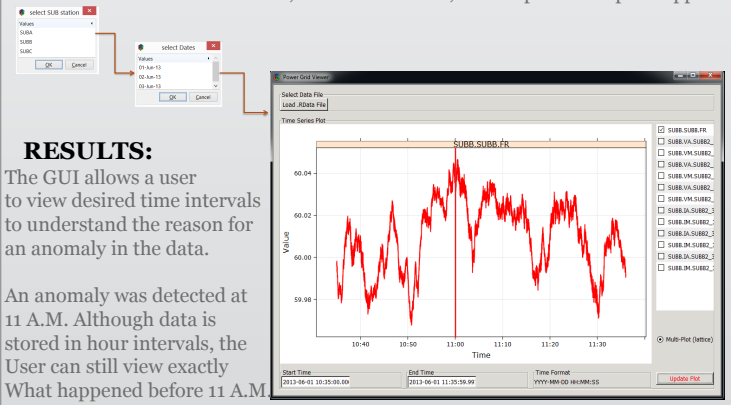
Phasor Measurement Units collect data on electrical waves on power grids. The data collected for this project was thirty times a second, for thirteen variables, per sub station. Graphical user interfaces are needed to easily see the data for quick visual analysis.

METHODS:

With use of the RGtk2 package of R, a GUI is created to easily view data depending on desired sub station, date and variables. Once anomalies are discovered using PNNL's situational awareness tools, users can view what occurred to the power grid through viewing any desired measurement of electrical waves before, during or after the occurrence of the anomaly.

HOW IT WORKS:

User chooses desired sub station, date and variable, clicks upload and plots appear:



RESULTS:

The GUI allows a user to view desired time intervals to understand the reason for an anomaly in the data.

An anomaly was detected at 11 A.M. Although data is stored in hour intervals, the User can still view exactly What happened before 11 A.M.

FUTURE:

As PMU's become cheaper to build, the amount of data that will be collected will be overwhelming. Algorithms will be needed to sift through this large amount of data to identify anomalies in real time. This will assist domain experts in identifying important abnormal events in the grid and to help prevent these events from escalating into more devastating results.

STAR

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ABOUT

Pacific Northwest National Laboratory

The Pacific Northwest National Laboratory, located in southeastern Washington State, is a U.S. Department of Energy Office of Science laboratory that solves complex problems in energy, national security, and the environment, and advances scientific frontiers in the chemical, biological, materials, environmental, and computational sciences. The Laboratory employs nearly 5,000 staff members, has an annual budget in excess of $1 billion, and has been managed by Ohio-based Battelle since 1965.

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This material is based upon work supported by the S.D. Bechtel, Jr. Foundation, National Marine Sanctuary Foundation, Carnegie Corporation of New York, and/or National Science Foundation under Grant Nos. 0952013 and 0833353. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the funders.

The STAR program is administered by the Cal Poly Center for Excellence in Science and Mathematics Education (CESaME) on behalf of the California State University.