TanPibut HEALTH: EWS for Effective Weather Stations

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Abstract

Weather observations have played an essential role in several domains such as agricultural and environmental sciences. In modern weather stations, observations are automatically sensed and transmitted via a wireless link to a centralized database in a timely-fashion. Each individual station, in particular, sits on its own surrounding area and consists of (i) meteorological sensors to measure environmental observations (i.e. temperature, rain and humidity); (ii) mainboard to control the work process; (iii) energy source (i.e. solar cell and battery) to drive the work process; and (iv) communication network to transmit observations from field to server. Here, it is likely that sensors can malfunction, battery degrades, communication is poor, rain gauge is blocked and etc. Consequently, observations could be anomalous, delayed or missing. It should be noted that the more accurate, complete and in-time observations, the more effective and reliable are their applications. It is thus vital to always maintain weather stations such that the accurate, complete and in-time observations are promising. Here, we term this promising as weather station health. We believe that the health of weather stations should be real-time evaluated and then reported to the corresponding officials for timely maintenance plan and action. In this work, we thus propose TanPibut HEALTH which is a software system that holistically evaluates the health of weather stations. Specifically, it evaluates a set of observations starting from the current moment back to a specified period of time based on the qualified, missing and delayed observations. The evaluation result is given with the numerical value ranging from 0.0 to 1.0 for the worst to the best station health.

Biography:

Naiyana Sahavechaphan is a senior researcher and has worked at National Electronics and Computer Technology Center (NECTEC) for 20+ years. She is a motivational leadership in several high impact projects. Her current research focuses on the data stream management and analytics, mainly but not limited to epidemiological and environmental domains. She is also working on the development of data and identity platforms that efficiently drives the production of real-world software systems. TanPibut is one of her proudly presented software products.

Speaker Publications:

1. "Youcun Qi and Steven Martinaitis. A real-time automated quality control of hourly rain gauge data based on multiple sensors in mrms system. Journal of Hydrometeorology, pages 1675–1691, March 2016".
2. "Mark Anthony F. Mateo and Carson Leung. Design and development of a prototype system for detecting abnormal weather observa- tions. The Canadian Conference on Computer Science & Software Engineering, 2008".
3. "Carson Kai-Sang Leung, Ruppa K. Thulasiram, and Dmitri A. Bondarenko. An effi- cient system for detecting outliers from financial time series. In David A. Bell and Jun Hong, editors, Flexible and Efficient Information Handling, pages 190–198, Berlin, Heidelberg, 2006. Springer Berlin Heidelberg".
4. "Hesam Izakian and Witold Pedrycz. Anomaly detection in time series data using a fuzzy c-means clustering. Joint IFSA World Congress and NAFIPS Annual Meeting (IFSA/NAFIPS), IEEE, June 2013".

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