



Study of the outlier detection algorithms for automatic weather station time-series

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The outlier detection algorithms was studied using statistics, mathematical and heuristic methods. In our study we use real and simulated data with various measurement resolutions. The first was obtained from automatic weather station (AWS) at Russian State Hydrometeorological University. AWS offers the possibility to measure common meteorological parameters without directly human contribution. Meteorological parameters are measured continuously at fixed intervals. AWS collects the information of each sensors and save it on data house. AWS is applicable for different purposes such as making short-term forecasts, making quick decisions of various planning kinds, making climatological charts, data mining and so on. Generally, AWS have thermometer, anemometer, wind vane, hygrometer, barometer. AWS can also have ceilometer, visibility sensor, ultrasonic snow depth sensor, rain gauge and pyranometer. So we concerned with real data such as temperature, pressure and relative humidity time-series from AWS. The second time-series quantity is the same as the first one. It was modeled by applying typical statistical routines. For all studying algorithms we applied the several methods of outliers detection. In addition, there was simulated from one to several outliers along the whole length of initial dataset.

The conclusion was been made that algorithms efficiency depend heavily on various phenomena such as measurement resolution, meteorological parameter, outlier location in time-series, season and others. Our experimental findings point that studied algorithms can be applied for developing AWS methodological instructive regulations, in AWS automation software and in studying structure of meteorological time-series.