[포ID-15] DETECTING VARIABILITY IN ASTRONOMICAL TIME SERIES DATA: APPLICATIONS OF CLUSTERING METHODS IN CLOUD COMPUTING ENVIRONMENTS

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We present applications of clustering methods to detect variability in massive astronomical time series data. Focusing on variability of bright stars, we use clustering methods to separate possible variable sources from other time series data, which include intrinsically non-variable sources and data with common systematic patterns.

We already finished the analysis of the Northern Sky Variability Survey data, which include about 16 million light curves, and present candidate variable sources with their association to other data at different wavelengths. We also apply our clustering method to the light curves of bright objects in the SuperWASP Data Release 1.

For the analysis of the SuperWASP data, we exploit a elastically configurable Cloud computing environments that the KISTI Supercomputing Center is deploying. Two quite different configurations are incorporated in our Cloud computing test bed. One system uses the Hadoop distributed processing with its distributed file system, using distributed processing with data locality condition. Another one adopts the Condor and the Lustre network file system. We present test results, considering performance of processing a large number of light curves, and finding clusters of variable and non-variable objects.

[포ID-16] Multivariate Auxiliary Channel Classification using Artificial Neural Networks for LIGO Gravitational-Wave Detector

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We present performance of artificial neural network multivariate classifier in identifying non-astrophysical origin noise transients from the gravitational wave channel of Laser Interferometer Gravitational-wave Observatory (LIGO). LIGO has successfully conducted six science runs, achieving the sensitivity as planned and producing many fruitful scientific results. It has been well observed that the detector noise is non-Gaussian and non-stationary, which results in large excess of noise transients called glitches arising from instrumental and environmental artifacts. Great efforts have been committed to reduce the glitches by tuning the detector instruments and by vetoing them but further improvement is still needed. To this end, there have been efforts to incorporate data from hundreds of auxiliary, physical and environmental channels into identifying the glitches in the gravitational wave channel. We introduce a multivariate classification method using Artificial Neural Networks (ANNs) that efficiently handles large number of variables. In this poster, we present preliminary results of the application of our ANN algorithm to data from LIGO's Science Run 4 and compare its performance with conventional vetoing method.