ID: Type: **Poster**

False Event Solutions Using Archived Data and Logistic Regression

The archive of automated and reviewed event solutions residing at the International Data Center (IDC) is a valuable resource for improving the performance of event formation algorithms. Here, logistic regression is used to identify a set of event-centric (explanatory) variables for determining the validity of automated event solutions. The resulting logistic model computes the conditional probability that an event is valid given the values of the explanatory variables. A collection of logistic models are assembled from different combinations of explanatory variables and an optimum model identified based on their receiver operating characteristics, Akaike information criterion, and goodness-of-fit metrics. If successful, logistic models for Global Association (GA) grid cells with a sufficient number of historic events can be developed and used to validate preliminary event solutions. Rejection of preliminary event solutions with low probability of occurrence may reduce the number of events formed by GA having mixed, merged, or false associations. This work was performed in part under the auspices of the U. S. Department of Energy by Los Alamos National Laboratory under contract number DE-AC52-06NA24569.

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Track Classification: Theme 3: Advances in Sensors, Networks and Processing