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Metrics to Evaluate New Data Mining and Machine Learning Algorithms Developed for Use at the IDC

A number of projects aim to introduce novel ideas from the computer science community into the IDC data processing pipeline. There is need to develop standard criteria for evaluating their success with respect to each other and to current IDC processing. It is proposed that such criteria be developed in a way that is appropriate to the mission of the IDC, namely to ensure that no nuclear explosions go undetected. Any technique or algorithm which is proposed for inclusion in the IDC pipeline should demonstrate that it either improves the quality of the IDC bulletins or is useful to analysts (or both). It should do one or more of the following: reduce spurious events, find more, lower magnitude events, improve event locations and/or depths, return better quality error ellipses, make better quality detections, and/or reduce the time that analysts must spend evaluating events on a per-event basis. It must not miss events which are currently being found by IDC, introduce a geographical bias or violate physics. Implementation of this system of metrics will ensure that all algorithms will be evaluated fairly regardless of where they are developed and by whom.

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