1605 Sebring Hills Dr.
Henderson, Nevada 89052

email: information@brainlike.com
website: http://www.brainlike.com/
facsimile 619-393-0364

Use-Case Evaluation Imagery "Desirables"

Use-case imagery datasets for evaluating automatic detection process feasibility should reflect operational reality and enable meaningful evaluation. The following list of demonstration dataset "desirables" may not all be feasible when solutions are first being considered. Just the same, meeting as many of the desirables as possible, while understanding the need to meet them eventually, will enable that meaningful evaluation.

a) Sequential snippets. The dataset should include time series snippets. Each snippet should include a target image. Each snippet's target image should be preceded and succeeded by images containing no targets, reflecting operational reality where a) imagery contains targets rarely, and b) target as well as background clutter may change over time. Enough snippets should be available for separation into representative configuration and validation samples.

   For example, we were given 50 snippets containing overlapping airborne whale detection snapshots. Each snippet was 20 snapshots long. Each snippet included a few snapshots in the middle containing whales, preceded and succeeded by snapshots containing no whales. We separated the 50 snippets into a 25-snippet configuration sample and a 25-snippet test sample. We used the training sample to configure a whale detection process that detected all training sample whales with acceptably few false detections. We then used the test sample to show that the results would stand up under independent validation.

b) Representative background clutter. Snippet imagery should look like operational imagery, including background image regions that may look like target image regions. Snippets should not have been preselected or preprocessed to mitigate clutter.
c) Representative target resolution. When evaluating detectability within either full resolution or compressed images, dataset images should be either compressed or not compressed accordingly.
d) Realistic data processing/capture speed. When evaluating edge detectability from fused EO, IR, radar, and lidar ground measurements at rates of 1 FPS, for example, all four measurements should be available at 1 FPS on a low SWaP processor.
e) Multivariate pixel alignment. Pixels within time-aligned multivariate time series should be aligned closely enough to enable pixel matching. For example, each pixel in a thermal image to be used as a trigger for highlighting an event within a corresponding three-color image should should be close in time to its corresponding pixel in the three-color image.
f) Multivariate time series alignment. Either all component values at each series time point should be measured at the same time or the time point for each component measurement should be available as metadata. For example, thermal images to be used as triggers for highlighting targets within corresponding three-color images should either have been captured at the same time or capture times for both the thermal and three-color images should be available in a separate file.