



## ASEF Correlation Filters for Signal Processing and Object Detection and Recognition

Correlation filters are signal processing techniques which have been studied in many contexts, including object detection and recognition. Correlation filters show promise in a diverse array of applications, including biometrics (e.g., face, iris, fingerprint and voice verification), homeland security and counter-terrorism, automatic target detection and tracking for weapon guidance, phoneme detection/recognition for speech to text conversion, synthetic aperture radar and medical imaging applications.

Although many types of correlation filters exist, including Minimum Average Correlation Energy (MACE), Synthetic Discriminant Functions (SDF), Optimal Tradeoff Filters (OTF), and Unconstrained MACE (UMACE), these filters are generally better at object recognition than object detection. Furthermore, these filters are difficult to train and will over-fit training data.

Researchers in the Department of Computer Science at Colorado State University have devised a novel correlation filter, named ASEF, that already outperforms MACE, SDF and OTF filters at the task of object detection and may also prove adept at object recognition (testing is forthcoming). In one recent test, ASEF was used to recognize and locate the left eye of subjects' faces photographed from the front. ASEF performed with near perfect detection rates, in contrast to other common correlation filters which frequently got confused by the right eye or the nostrils. Unlike conventional correlation filters, ASEF is easily trained, improves with extended training and does not over-fit training data. Furthermore, ASEF is robust, easy to use and tolerant of structured noise.

Contact us for more information on this exciting new technology.

### Features and Benefits

- Superior correlation filter for object detection
- Easily trained and does not over-fit the training data
- Robust, easy to use and tolerant of structured noise
- Faster than many sliding window object detection methods

**ID: CSURF 09-017**

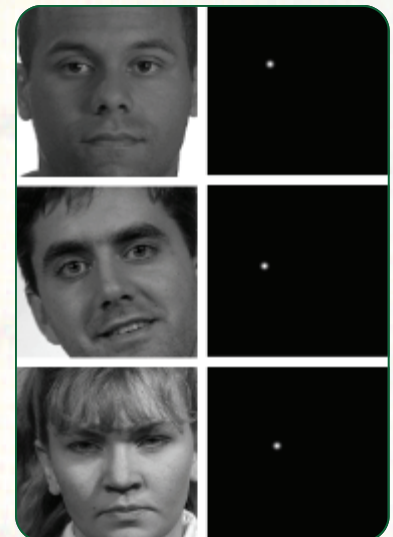
#### Patent Information

Patent protection anticipated.

#### Inventor Information

Mr. David Bolme

Dr. Bruce Draper



### Contact Information:

Dian Kammeyer

Phone: 970.482.2916

Email: [dian.kammeyer@colostate.edu](mailto:dian.kammeyer@colostate.edu)

[www.csurf.org/tto](http://www.csurf.org/tto)