Technion—Israel Institute of Technology

Pixel Club

You are invited to attend a lecture by
<div dir="rtl">הנכם מוזמנים להרצאה של</div>

Eyal Madar
Electrical Engineering, Technion

<div dir="rtl">: בנושא</div>

Combined Local-Global Background Modeling for Anomaly Detection in Hyperspectral Images

In this research, we address the problem of anomaly detection using remotely sensed spectral information collected by hyperspectral sensors. Anomaly detection algorithms first model the abundant material spectra (background). Then, every pixel spectrally different in a meaningful way from the background is declared to be an anomaly pixel. Two major approaches to statistical background modeling can be distinguished: "the local approach" and "the global approach". Local algorithms can tightly fit the background process but are subject to an over-fitting problem, which may produce an excessive number of false-alarms. Global methods are more resistant to over-fitting, however, they have a limited ability to adapt to all nuances of the background process (an under-fitting problem), which may result in high false alarm rates, as well as low probability of detection.

In our work, we propose a combination of the local and global background modeling approaches by introducing the BEVA (Background Extreme Value Analysis) algorithm. In its local part, the background process is estimated using a greedy sequential method. It is composed of robust estimation of the Gaussian statistics and a background cluster hypothesis discriminator, based on Extreme Value Theory results. In its global part, the obtained local background models are inter-related to reduce the number of false alarms. In addition, we improve BEVA's local part via a preprocessing segmentation that is based on Spectral Clustering. We also introduce the NG-BEVA algorithm; a non-Gaussian version of BEVA that combines Extreme Value Theory results with Gamma distribution fitting. NG-BEVA is found to further improve the performance.

* M.Sc. Research under the supervision of Prof. David Malah and Dr. Meir Barzohar.

The lecture will take place on Tuesday, 7/12/2010
at 11:30 in room 1061
Meir Building
Technion City

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ההרצאה תתקיים ביום שלישי, 7/12/2010
בשעה 11:30 בחדר 1061
בבניין מאייר
קריית הטכניון
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Department of Electrical Engineering
- Electronics
- Computers
- Communications

Department of Computer Science

<div dir="rtl">כיבוד קל יוגש לפני תחילת ההרצאה</div>

<div dir="rtl">הזמנה זו מהווה אישור כניסה עם רכב לטכניון</div>