

## Outdoor Anomaly Detection with a Spectroscopic Line Detector

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**Abstract :** One of the tasks of optical surveillance is to detect anomalies in large amounts of image data. However, if the size of the anomaly is very small, limited information is available to distinguish it from the surrounding environment. Spectral detection provides a useful source of additional information and may help to detect anomalies with a size of a few pixels or less. Unfortunately, spectral cameras are expensive because of the difficulty of separating two spatial in addition to one spectral dimension. We investigate the possibility of modifying a simpler spectral line detector for outdoor detection. This may be especially useful if the area of interest forms a line, such as the horizon. We use a monochrome CCD that also enables detection into the near infrared. A simple camera is attached to the setup to determine which part of the environment is spectrally imaged. Our preliminary results indicate that sensitive detection of very small targets is indeed possible. Spectra could be taken from the various targets by averaging columns in the line image. By imaging a set of lines of various width we found narrow lines that could not be seen in the color image but remained visible in the spectral line image. A simultaneous analysis of the entire spectra can produce better results than visual inspection of the line spectral image. We are presently developing calibration targets for spatial and spectral focusing and alignment with the spatial camera. This will present improved results and more use in outdoor application

**Keywords :** anomaly detection, spectroscopic line imaging, image analysis, outdoor detection

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