

Application of SVM on satellite images to detect hot spots in Jharia coal field region of India

D. Singh (1) and Sajin. P (2)

(1) Department of Electronics and Computer Engineering

Indian Institute of Technology Roorkee-247667, India

Ph. No.: +91-1332-285695

Fax: +91-1332-285368

e-mail: dharmfec@iitr.ernet.in

Abstract-Present paper deals the application of support vector machine (SVM) with image analysis techniques on operational satellite images (i.e., NOAA/AVHRR and MODIS) to detect hot spots on Jharia coal field region of India. One of the major advantages is to use these satellite data that the data are free and very good temporal resolution while, one draw back is that it has low spatial resolution (i.e., approximately 1 km square). Therefore, it is important to do some research to apply some efficient optimization techniques with image analysis techniques to rectify these draw backs and use these satellite images for the required purposes. Therefore, in this paper, SVM and Multi-threshold techniques were explored for this application. The multi-threshold algorithm was developed to remove the cloud coverage from the land coverage. This algorithm also highlights the hotspots or fire spots in the suspected regions. While SVM was used for training to remove the false points which were also highlighted in threshold technique. Both the approaches can be used separately or in combination depending on the size of the image. The RBF (Radial Basis Function) kernel was used in training of three sets of inputs: surface temperature, normalized difference vegetation index (NDVI) and Global Environment Monitoring Index (GEMI) respectively. This makes a classified image in the output highlighting the burned and unburned surfaces. The results obtained were compared with the ground based observations of hot spots, and found to be in good agreement with our results. This type of work will be quite helpful in near future to develop some hot spots monitoring system using these operational satellites data.