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## V-SIPAL - A VIRTUAL LABORATORY FOR SATELLITE IMAGE PROCESSING AND ANALYSIS

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**Abstract.** In this paper a virtual laboratory for the Satellite Image Processing and Analysis (v-SIPAL) being developed at the Indian Institute of Technology Bombay is described. v-SIPAL comprises a set of experiments that are normally carried out by students learning digital processing and analysis of satellite images using commercial software. Currently, the experiments that are available on the server include Image Viewer, Image Contrast Enhancement, Image Smoothing, Edge Enhancement, Principal Component Transform, Texture Analysis by Co-occurrence Matrix method, Image Indirect Color Coordinate Transforms, Fourier Analysis, Mathematical Morphology, Unsupervised Image Classification, Supervised Image Classification and Accuracy Assessment. The virtual laboratory includes a theory module for each option of every experiment, a description of the procedure to perform each experiment, the menu to choose and perform the experiment, a module on interpretation of results when performed with a given image and pre-specified options, bibliography, links to useful internet resources and user-feedback. The user can upload his/her own images for performing the experiments and can also reuse outputs of one experiment in another experiment where applicable. Some of the other experiments currently under development include georeferencing of images, data fusion, feature evaluation by divergence and J-M distance, image compression, wavelet image analysis and change detection. In addition to the theory module include self-assessment quizzes, audio-video clips on selected concepts, and a discussion on the elements of visual image interpretation. V-SIPAL is at the stage of internal evaluation within IIT Bombay and will soon be open to selected educational institutions in India for evaluation.

