|  |  |
| --- | --- |
|  | **Land Cover and Bathymetric Survey** |
| Physical coverage of the Earth’s surface has different types or classes and each class and their sub classes have different optical properties. Theses optical properties can be measured remotely using satellites or air-borne vehicles to capture information of the constituents in a given area. Zone mapping and land cover retrieves spatial information on these different classes, e.g. forests, grasslands, croplands, lakes, wetlands. Zone and land cover maps primarily target detection and their changes, and to find optimal spatial boundaries for different land use classes. Feature extraction, clustering, and classification are important to identify boundaries for land cover using remote sensing. Moreover, in bathymetric surveys, the optical properties are primarily used to determine the depth of water bodies. In addition to that, satellite images of water bodies could be used to identify constituents subsumed in the water body. | |
| **Key results :**   * Clustering, feature extraction, and classification algorithms for land cover and zone mapping using hyperspectral satellite images. * Mapping of vegetation zones using hyperspectral data from the Hyperion sensor. * Development and analysis of zone mapping algorithms for hyperspectral data. | |
|  | |
| **Beneficiaries of the research :**   * Scholars/ researchers working on zone mapping using satellite images * Bathymetric surveyors performing field surveys for bathymetry mapping | |
| **Outcomes :**   * S.S.P. Vithana, E.M.M.B. Ekanayake, E.M.H.E.B. Ekanayake, A.R.M.A.N. Rathnayake, G.C. Jayatilaka, H.M.V.R. Herath, G.M.R.I. Godaliyadda and M.P.B. Ekanayake, “Adaptive hierarchical clustering for hyperspectral image classification: Umbrella Clustering”, Journal of Spectral Imaging, Vol. 8, Article ID aa1 (2019), July, 2019.DOI: 10.1255/jsi.2019.a11 * Sajani Pallegoda Vithana, Ruwanthi Abeysekara, Shane Oorloff, Vijitha Herath, Roshan Godaliyadda, Parakrama Ekanayake, Anuththara Rupasinghe. “Comparison of Two Algorithms for Land Cover Mapping Based on Hyperspectral Imagery,” in The International Journal on Advances in ICT for Emerging Regions (ICTer) – 2018 Special Issue, Vol. 11, No. 1, pp. 1-1, July, 2018. * E.M.M.B. Ekanayake, W.G.C. Bandara, G.W.K. Prabhath, H.M.V.R. Herath, G.M.R.I. Godaliyadda, M.P.B. Ekanayake, “Feature Extraction Using Minor Scatter Directions of Data to Distinguish Between Classes with Minute Differences of a Hyperspectral Image,” in proceedings of 14th IEEE International Conference on Industrial and Information Systems (ICIIS-2019), Peradeniya, Sri Lanka, December, 2019. * E. M. M. B. Ekanayake, A. R. M. A. N. Rathnayake, E. M. H. E. B. Ekanayake, G. M. R. I. Godaliyadda, H. M. V. R. Herath, M. P. B. Ekanayake, “Locally Linear Embedding for Dimensionality Reduction in Hyperspectral Image Classification”, Proceedings of the Peradeniya University International Research Sessions (iPURSE-2019), pp. 21, Vol. 22, Peradeniya, Sri Lanka, September, 2019. * Mevan Ekanayake, Hasantha Ekanayake, Anusha Rathnayake, Sajani Vithana, Vijitha Herath, Roshan Godaliyadda and Parakrama Ekanayake, “A Semi-Supervised Algorithm to Map Major Vegetation Zones using Satellite Hyperspectral Data,” in 9th Workshop on Hyperspectral Image and Signal Processing (WHISPERS 2018), Amsterdam, The Netherlands, Sep. 2018. * S.S.P. Vithana, A.M.R. Abeysekara, T.S.J. Oorloff, R.A.A. Rupasinghe, H.M.V.R. Herath, G.M.R.I. Godaliyadda and M.P.B. Ekanayake, “Hyperspectral Imaging Based Land Cover Mapping Using Data Obtained by the Hyperion Sensor”, 17th International Conference on Advances in ICT for Emerging Regions (ICTer2017), Colombo, Sri lanka, September, 2017. | |
| **Research team :**   * Prof. Vijitha Herath * Dr. Roshan Godaliyadda * Dr. Parakrama Ekanayake * Anuththara Rupasinghe * Sajani Vithana * Shane Oorloff * Ruwanthi Abeysekara * Mevan Ekanayake * Hasantha Ekanayake * Anusha Rathnayake * Gihan Jayatilaka * Yasiru Ranasinghe * Sanjaya Herath * Kavinga Weerasooriya | |
| **Acknowledgments :**   * USGS for providing hyperspectral images from the EO-1 satellite’s Hyperion sensor, and relevant documents for standard preprocessing of the images. * The Department of Geology, University of Peradeniya and Dr N.W.B. Balasuriya of the Department for making arrangements and providing equipment to perform lab testing. | |
| **Collaborators :**    Department of Electrical and Electronic, Faculty of Engineering, University of Peradeniya | |