

Sensor Integration for Urban Analysis

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Integration of hyperspectral AVIRIS (airborne visible/infrared imaging spectrometer) and high resolution IFSAR (interferometric synthetic aperture radar) provides a unique data set for urban analysis. Surface material properties can be extracted from AVIRIS data, while IFSAR provides the geometrical information. The urban landscape is extraordinary complex. It is composed of structural geometry of roads, buildings, and land-cover mixtures in relatively unpredictable spatial patterns. Current theories on urban processes, which generate these geometrical and land use patterns observable in the urban landscape are inadequate to explain or predict these patterns. In this talk we present recent advances in fusion of AVIRIS and C-band 40 MHz interferometric data of urban environment. AVIRIS data is used to segment the urban environment into natural and human-made components. The terrain elevation model derived from the interferometric measurements is used to obtain a digital terrain elevation of the background topography, and structure heights. The results of this approach for study areas in San Francisco and Los Angeles, California are presented. The performance of this methodology for urban segmentation and feature extraction is discussed in terms of the sensor resolution and data artifacts due to the complex nature of the urban environment. The detection of urban structures using IFSAR sensor is also discussed.