

Image-based Urban Modeling

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Current remote sensing technology is able to collect and provide abundant geospatial data at different resolutions. The value-added geospatial exploitation of remote sensing data is a challenging task for information extraction and knowledge discovery. Such a challenge demands advanced principles and techniques in data registration and enhancement, automated feature extraction, and spatial-temporal modeling. This presentation will address urban modeling from remotely sensed data at two different scales. At the large scale, urban development patterns and trend will be learned from satellite images. Cellular automata approach in artificial intelligence is used to fulfill this spatial-temporal modeling task. The learned rules are then used to predict future urban sprawl. Discussions will address issues in effective model calibration and assessment. The effort at the small scale intends to extract and model individual 3-D buildings. We will discuss techniques of machine learning for geospatial feature extraction from optical and ranging images. Methods and results for building extraction and reconstruction will be presented. Finally, the link of geospatial information science and technology to computer graphics and computer vision will be discussed.