

KW – IEEE Joint Chapter on Computer Science/Signal Processing/Neural
Networks and the
Department of Systems Design Engineering Present:

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Automatic Registration of Spatial Datasets

Recent technical advances have produced a variety of sensors such as digital frame cameras, line cameras (linear array scanners), ranging sensors (e.g. LIDAR systems) and navigation units (e.g. GPS/INS). The integration of these datasets is essential since each data set provides unique information about the area of interest. However, successful integration is contingent on the alignment of these datasets relative to a common reference frame, which is known as the registration problem.

The presentation will start by outlining the essential four components of an effective registration paradigm. First, a decision has to be made regarding the choice of primitives for the registration procedure. Then, a similarity measure should be devised to ensure the correspondence of conjugate primitives. The third issue is concerned with establishing the registration transformation function that mathematically relates geometric attributes of corresponding primitives. Finally, a matching strategy has to be designed and implemented as a controlling framework that utilizes the primitives, the similarity measure, and the transformation function to solve the registration problem.

Following this discussion, the talk will proceed by showing some applications of this paradigm in various co-registration problems in mapping activities. First, automatic registration of multi-source imagery with varying geometric and radiometric properties will be presented. Then, the speaker will discuss the integration of terrestrial vector data and aerial imagery for orientation and change detection purposes. Finally, the co-registration of LIDAR and photogrammetric surfaces to a common reference frame will be outlined.

Refreshments to be served