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A comparison of various geometrical feature for damage assessment in VHR urban imagery

P. Gamba, F. Dell'Acqua, G. Lisini

Remote Sensing Group, Department of Electronics, University of Pavia, Pavia, Italy
(name.surname@unipv.it)

Urban areas require scene interpretation tools with particular attention to geometric features. Indeed, spatial analysis must be coupled to spectral characterization of urban materials if reliable and suitable land use or change detection maps needs to be extracted. This is particularly true for Very High spatial resolution (VHR) imagery, increasingly available both in the optical and the microwave regions of the electromagnetic spectrum.

In past work on spaceborne characterization of urban areas the most common geometrical clues to scene interpretation in urban areas have always been segments, or edges. They were used for instance for land use discrimination [1] or improved change detection techniques [2]. More complex geometrical features have been traditionally used for aerial image interpretation, with a long experience due to the longer availability of finer spatial resolution data. In the near future the availability of VHR data from spaceborne platforms requires somehow a convergence of the two methodologies.

In this work, we try and analyze the possibility to exploit higher level geometrical features, easily available in urban areas from VHR spaceborne imagery, to extract information which not only improve change detection, but somehow allows a better damage characterization than currently available. The methodology tries and exploits the same clues to image interpretation that human interpreters usually look for in an image. Examples are regular geometrical patterns (like rectangular shapes), pairs of corresponding and parallel segments, corners with sufficient similarity. All of them will be extracted and considered in the examples proposed in the final paper to improve the possibility to detect or assess change due to destructive events in urban areas.

The algorithms developed in recent years by the group for geometrical scene anal-

ysis [3] segment extraction [4] and junction detection [5] will be therefore revised and jointly applied to improve the knowledge of pre-and post-event scenes in areas affected by earthquakes, with particular stress on Quickbird data for the 2003 Bam (Iran) event.

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