

## Mean Shift-Based Preprocessing Methodology for Improved 3D Buildings Reconstruction

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**Abstract :** In this work we explore the capability of the mean shift algorithm as a powerful preprocessing tool for improving the quality of spatial data, acquired from airborne scanners, from densely built urban areas. On one hand, high resolution image data corrupted by noise caused by lossy compression techniques are appropriately smoothed while at the same time preserving the optical edges and, on the other, low resolution LiDAR data in the form of normalized Digital Surface Map (nDSM) is upsampled through the joint mean shift algorithm. Experiments on both the edge-preserving smoothing and upsampling capabilities using synthetic RGB-z data show that the mean shift algorithm is superior to bilateral filtering as well as to other classical smoothing and upsampling algorithms. Application of the proposed methodology for 3D reconstruction of buildings of a pilot region of Athens, Greece results in a significant visual improvement of the 3D building block model.

**Keywords :** 3D buildings reconstruction, data fusion, data upsampling, mean shift

**Conference Title :** ICCVISIP 2015 : International Conference on Computer Vision, Image and Signal Processing

**Conference Location :** Berlin, Germany

**Conference Dates :** May 21-22, 2015