Extraction of Buildings below the Height Threshold from Remotely Sense Data

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Applying a height threshold is standard procedure to extract buildings in complex sites. The height threshold is manually set (e.g. 1 meter) to group the LiDAR points with the height of 1 meter into non-ground LiDAR points. The non-ground LiDAR points are considered to be potential building candidates. By applying the height threshold, the LiDAR points lower than the height threshold are removed, and therefore, the smaller buildings cannot be extracted.

In our proposed method, the height difference and connectivity between the extracted building planes and their neighbouring ground planes are analysed. These building and ground planes are extracted using the MON3 algorithm. Working steps and experimental results of MON3 are available on ISPRS webpage. Analysing the aforementioned characteristics ensures the better extraction of low height portions of the buildings. The main steps of the proposed method are as follows:

1) Extract building planes from non-ground points using the baseline method.

2) Extract ground planes from ground co-planar points using region growing method (the same method used in the baseline method for plane extraction).

3) Extract building-connected-ground planes using the below steps:

a) Find the boundary points of buildings planes and their connected ground planes.

b) Measure height differences between boundary points of building planes and their connected ground planes. Later, the height differences are stored in variable X.

c) Calculate the standard deviation of variable X, and if it is less than pre-defined threshold, then ground planes which are connected to buildings are assumed as low building portions.

4) Analyse building-connected-ground planes using the below steps:

a) Measure height difference between the building connected-ground planes and their neighbouring ground planes. The derived height differences are stored in variable Y.

b) If all stored values of variable Y are greater than predefined threshold, then store building-connected-ground planes (i.e. low height building planes).