Roof Reconstruction from Digital Images and 2D CAD Information

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ABSTRACT

Automatic building reconstruction by simple edge matching encounters many difficulties. The major one is that most of the edges extracted from an image by a low-level linear feature extraction method do not belong to any building edge at all. Moreover, an edge which appears to be straight in the image might actually not be straight in the object space at all, or it might even be from two totally different edges in the space. All these make simple edge matching ambiguous and very difficult to obtain a correct result.

In this paper we used large-scale aerial images of a suburban area of Tainan for experiment and developing the methods of reconstructing roof models by edge matching with the help of digital map data. We found out that digital map data can be helpful in two ways. One is that the maps can be used to narrow down the search area for finding building edges. The other is that they can be used to fill up gaps in a broken image edge or even to complete a missing edge. The results of this research also show that even with the help of map data, it is still not easy to reconstruct roof models completely. The main reasons are (1) the low-level edge extraction is often faulty, (2) the roof edges extracted are usually interfered by adjacent strong signals or are broken, (3) some roof edges could not be extracted at all. But in general, with the help of digital maps, the successful rate of reconstruction of roofs by simple edge matching can be indeed increased effectively.

Keywords: Digital stereo images, Digital map, Roof-reconstruction.

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