Automatic Classification of Collapsed Buildings using Stereo Aerial Images

Abstract

After an earthquake, the image-based interpretation methods are powerful tools for detection and classification of damaged buildings. A method based on two kinds of image-extracted features comparing stereo pairs of aerial images before and after an earthquake is presented. Comparing pre- and post event DSMs - generated from stereo images - could be a solution for detecting the extent of demolished areas of buildings. However such DSMs are not sufficiently accurate due to image matching problems. We propose "Regularity indices" to describe the appearance of the building as regular or irregular. Regularity indices were defined by taking account of lines composition with regards to building footprint. In addition, a normalized value of average differences between DSMs (within each building polygon) is added into the classification procedures. Three kinds of classification methods: k-NN, naive Bayes and support vector machine (SVM) are used and compared. Experiments are performed on two datasets of the Kobe and Bam earthquakes including vast varieties of real collapsed buildings. The numerical results achieved for our datasets are very promising to detect and classify collapsed buildings automatically.

References

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Index Terms

Computer Science

Pattern Recognition
Keywords
Supervised Classification  Collapse Detection  Earthquake