

Rapid Monitoring of Earthquake Damages Using Optical and SAR Data

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Abstract : Earthquake is an inevitable catastrophic natural disaster. The damages of buildings and man-made structures, where most of the human activities occur are the major cause of casualties from earthquakes. A comparison of optical and SAR data is presented in the case of Kathmandu valley which was hardly shaken by 2015-Nepal Earthquake. Though many existing researchers have conducted optical data based estimated or suggested combined use of optical and SAR data for improved accuracy, however finding cloud-free optical images when urgently needed are not assured. Therefore, this research is specialized in developing SAR based technique with the target of rapid and accurate geospatial reporting. Should considers that limited time available in post-disaster situation offering quick computation exclusively based on two pairs of pre-seismic and co-seismic single look complex (SLC) images. The InSAR coherence pre-seismic, co-seismic and post-seismic was used to detect the change in damaged area. In addition, the ground truth data from field applied to optical data by random forest classification for detection of damaged area. The ground truth data collected in the field were used to assess the accuracy of supervised classification approach. Though a higher accuracy obtained from the optical data then integration by optical-SAR data. Limitation of cloud-free images when urgently needed for earthquake event are and is not assured, thus further research on improving the SAR based damage detection is suggested. Availability of very accurate damage information is expected for channelling the rescue and emergency operations. It is expected that the quick reporting of the post-disaster damage situation quantified by the rapid earthquake assessment should assist in channeling the rescue and emergency operations, and in informing the public about the scale of damage.

Keywords : Sentinel-1A data, Landsat-8, earthquake damage, InSAR, rapid damage monitoring, 2015-Nepal earthquake

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