Slope Failure Monitoring by using Remote Sensing

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Objective

An accurate three dimensional terrain model can be periodically derived by remote sensing techniques, such as ground based laser scanner, digital photogrammetry and satellite remote sensing. Derived digital terrain models are represented by random three-dimensional coordinates. In this situation, accurate comparison of multi temporal terrain models are impossible. Therefore, a methodology of change detection using terrain model by remote sensing should be established. The established methodology will be applied to disaster monitoring.

Project Outline

Accurate three-dimensional measurement:

For wide coverage monitoring, satellite data are efficient. In Takagi laboratory, Japanese satellites ALOS and commercial satellite GeoEye-1 can be used. Both satellites have stereo sensors. We use three-dimensional coordinate computation programs that we havedeveloped ourselves.

For precise monitoring, ground based laser scanners are efficient. In Takagi laboratory, Leica Cyrax-2500, Riegle LMS-Z210 and Topcon GLS1500 can be used.

Methodology of change detection using digital terrain model:

For accurate change detection, point comparison is not enough, because digital terrain models are represented by random points. Thus an area comparison method must be developed. The least square matching method, which is used as a stereo matching method in photogrammetry, will be expanded to three-dimensional data for the comparison. Optimum window size for area comparison will be determined.

The change detection method developed here will be implemented to slope failure monitoring.

References

1.Shinpei AKIYAMA and Masataka TAKAGI, Applications of LiDAR Measurement for Road Management, Internet Journal of Society for Social Management Systems, SMS12-7130, 2012

2.Yuta IKEZAWA and Masataka TAKAGI, Preparation of Reference Dataset for Satellite Remote Sensing, Internet Journal of Society for Social Management Systems, SMS12-9361, 2012

3.Hiroshi NOMURA and Masataka TAKAGI, Landform Change Detection using Satellite Remote Sensing, Internet Journal of Society for Social Management Systems, SMS11-3638, 2011

4.Yuta IKEZAWA and Masataka TAKAGI, Land Cover Change Detection using Satellite Remote Sensing For Damaged Area Mapping, Internet Journal of Society for Social Management Systems, SMS11-2798, 2011

5.Ryo INADA and Masataka TAKAGI, Displacement Detection of Landslide by using Ground Based LiDAR, Proceedings of the 31th Asian Conference on Remote Sensing, Hanoi Vietnam, TS25-05, 2010

6. Keisuke ISHIDA and Masataka TAKAGI, Land Disaster Monitoring by using Multi Temporal ALOS/PRISM Stereo Imagery, Proceedings of the 31th Asian Conference on Remote Sensing, Hanoi Vietnam, TS25-02, 2010

7. Kouji UDA and Masataka TAKAGI, Suitable Type of GCP for Accurate Registration of High Resolution Satellite Data, Proceedings of the 31th Asian Conference on Remote Sensing, Hanoi Vietnam, TS16-03, 2010
8. Kyaw Sann OO and Masataka TAKAGI, Verification of Image Control Points, Proceedings of the 31th Asian Conference on Remote Sensing, Hanoi Vietnam, TS16-02, 2010

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