

Slope Failure Monitoring by using Remote Sensing

Project Leader

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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 have developed 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

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