Hinode-3: 3rd Hinode Science Meeting
Hitotsubashi Memorial Hall, Tokyo
1–4 December, 2009

The event detection and the apparent velocity estimation based on computer vision

Masumi Shimojo

Nobeyama Solar Radio Observatory, NAOJ/NINS

Abstract. Due to the high spatial and time resolutions of the telescopes aboard Hinode, new active phenomena, waves and the complex motions of the fine structures in the known phenomena were discovered (ex. Chromospheric anemone jets (Shibata et al. 2007), Alfven wave in the prominence (Okamoto et al. 2007) and the complex dynamics in the prominence (Berger et al. 2008)). When we study such phenomena, we usually detect the events by eyes and estimate the apparent velocity of the phenomena based on the edges defined by eyes. The method is very easy way for analyzing a few events, but it is impossible to evaluate the uncertainty of the results and we need the huge time for the statistical study. In order to improve the accuracy evaluation and perform the statistical study based on the huge number samples, the automatic detection of the solar events is indispensable. However, it is difficult to automatically detect the eruptive events that are like the jet phenomena.
The progress of the computer system promoted the evolution of the science and technology of machines that see. Such a scientific field is called *computer vision*. Computer vision has already been applied to wide field in the industry (ex. the medical diagnostics and the robotics). The typical tasks of computer vision are the event detection and the motion tracking. Hence, we try to apply computer vision to solar physics. In order to program the apparent velocity estimation and the event detection based on computer vision, we used the OpenCV library[1] that is a computer vision library developed by Intel. In the paper, we show the results of the apparent velocity estimation and the event detection from the images taken by Nobeyama RadioHeliograph(NoRH) and X-Ray Telescope(XRT)/Hinode, and discuss the possibility of the application of computer vision to solar physics.

[1] http://opencv.willowgarage.com/wiki/