Contribution ID: **147**   Type: **Oral**

Non-parametric parallel GRID Harris-affine detector

Wednesday, February 13, 2008 5:00 PM (30 minutes)

Because most-wanted of image analysis applications as three-dimensional reconstruction, mosaicing, object recognition and classification can rely on feature detection methodology as a primary stage, it can be used to satisfy many requests of these items and more in general in the field of computer vision. Feature descriptors can be applied to identify similar regions on different images; it is clear that some characteristics have to be owned of good descriptors.

One of the most appropriate question in match methodology regards which detector has to be used to characterize the region of interest. They can be classified as global or local, some of them are characterized by global information and other are modelled on local values. In this contribution a detector, based on local information, will be used. It rejects the same model

of the parametric Harris Affine detector with the peculiarity to have no parameters, and to be focussed on the each sections of the image.

3. Impact

The proposed algorithm consists of the following steps: image enhancement and feature mask computation by using z-scored local windows, simple Harris-corner extraction and selection, and refinement of the final result by an iterative procedure computed on every feature without computational approximation. The algorithm uses statistical filters with a variety of kernel, which cause a bottleneck on a serial implementation. Right now, our application has been developed under MPI paradigm and a corresponding porting for PI2S2-GRID is under construction and we foresee that the final Grid version will be tested by a couple of weeks. The system will use the support of Genius for a dissemination on a naïve scientific community and also to display the results of large data. Given the latency of standard network we assume a improving of the performance with the use of Infiniband network. The efficiency of our MPI methodology has been test on a set of images and it has been evaluated about 80%.

4. Conclusions / Future plans

Good results have been obtained considering that for some sections the parallelism degree is bounded by the numbers of used scales and also the bottleneck of very heterogeneous data. From a technical point of view, our application needs an useful installation of FFT library; such installation has been inquired to the PI2S2-Grid technical team, and it will be running by the next few days. We will discuss the resource required for it, the performance and its scalability on GRID paradigm.

Provide a set of generic keywords that define your contribution (e.g. Data Management, Workflows, High Energy Physics)

parallel image analysis, MPI feature detector, scale-space theory, no-parameters algorithms, Genius

1. Short overview

A new nonparametric Harris-affine detector is introduced here. This is an image processing algorithm for extracting a particular kind of image features. The new proposed implementation automatically tries to select best features with respect to local-to-global image properties in a scale-space domain. An unusual parallel GRID implementation has been developed to avoid unbalanced computational workload distribution among different processors.

Primary author: BELLAVIA, fabio (Univ. Palermo)

Co-authors: VALENTI, cesare (Univ. Palermo); TEGOLO, domenico (Univ. Palermo)

Presenter: BELLAVIA, fabio (Univ. Palermo)

Session Classification: Workflow and Parallelism

Track Classification: Scientific Results Obtained Using Grid Technology