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Area of Research: Image Processing

Title: Development of Learning based Multispectral Remote Sensing Image Super-resolution (*Tentative*)

Summary: Multispectral remote sensing image super-resolution (SR) is a new field of study in image processing and interpretation for remote sensing applications. It is extremely difficult to capture a high-resolution (HR) image for remote sensing applications due to the physical limitations of imaging instruments and dynamic atmospheric disturbances. Since multispectral (MS) images have a low spatial resolution, they are limited in their use in remote sensing applications such as environmental tracking, military target recognition, and so on. To address these limitations, SR provides a low-cost method for producing HR images from LR MS imagery. SR image reconstruction is an ill-posed problem. To stabilize the inversion of ill-posed problem, learning based approaches such as sparse representation and deep learning based methods can be used for multispectral remote sensing super-resolution. With the help of learning based approach, reconstructed image can achieve a good quality and speed. Since MS has a huge datasets, it can be effectively used in parallel processing platforms. For real time application, parallel processing based SR algorithm needs to be designed and implemented on the graphical unit processing (GPU) with CUDA acceleration.

Experimental Set-up: A research laboratory has been set up which consists of workstation with GPU-optimized environment (GPU Server). Dell PowerEdge R730 GPU Server consisting of processor of Intel Xeon and 1 Nvidia Tesla P100 GPU cards consisting a total of 3584 CUDA cores and 16GB GPU/Graphics RAM. The system runs on the Linux Operating System. OpenCV 3.3.1 with CUDA 8.06 toolkit has been integrated with the computing system.

