REF: JR10002928

Training title:

Distributed image processing with Dask

Field: R&D
Speciality: Software development, scientific computing

Subject

Modern image processing algorithms shall use a broad range of software and hardware resources to be compliant with execution time requirements as they become more complex and are applied to an increasing number of images. The use of distributed processing frameworks compatible with cloud-based environments (GCE, OpenStack, Mesos) is now paramount in the satellite based Earth observation industry and several solutions exist. Apache Spark (https://spark.apache.org) has now matured as the standard distributive computing framework for industrial applications but other ones have emerged in the recent past, such as DASK (https://dask.org).

The aim of this study is to develop a processing pipeline based on DASK for operational satellite image processing and to assess this solution in comparison to the usage of Apache SPARK, already used in the department's image processing chains.

A processing pipeline for both local mode (multi-threading) and cluster mode (distributed processing) should be implemented, pipelining different kind of image algorithms. The study will benefit from the already deployed and operational cloud ecosystem and image processing chains of the department.

Relevance for image processing, performances, development costs, operability and maintainability constitute a non exhaustive list of criteria that might get answers with this study. This work will then enable the department to better formulate its mid-term strategy for the future evolutions of its ground system products.

Company background

The Space System business line of Airbus Defence & Space is the European leader in the field of optical Earth Observation systems. The company, through its history, is a pioneer of space industry, responsible for the development of the first Earth Observation space systems in Europe, starting with the SPOT family. Since this time, the company has led the major European developments in the fields, through programs such as METOP, ERS, ENVISAT, HELIOS, PLEIADES or SPOT6. This experience developed is now applied on export turn-key programs such as FORMOSAT, THEOS, ALSAT, CHILI, KazEOSat-1 or PeruSat, involving up to sub metric resolution systems, or such as COMS, a geostationary meteorological satellite for Korea.

This evolution conveyed Airbus Defence & Space to develop a strong expertise in Image Quality, Image Processing and Image Simulation through a group of about 80 engineers in 2017, constituting the Image Chain department (TESUI). The Image team carries out activities in fundamental image domains such as image simulation, ground processing, image quality, in-orbit testing, embedded processing, vision-based navigation and dedicated R&D activities.
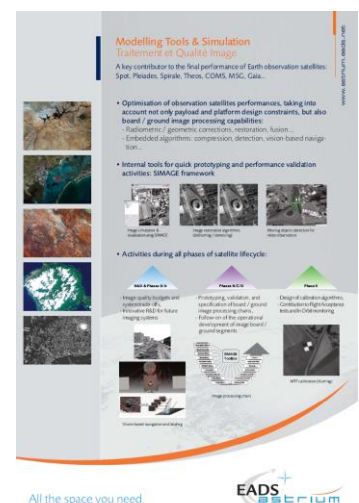
Required skills
- Linux operating systems (intermediate)
- Python 3.X (advanced)
- Independent with good research skills
- Meticulous with good communication skills
- Interested in scientific computing and image processing,
- Interested in Cloud, distributed and high performance computing

Desired education
- Engineering school or Master in software development

Training period length: **5 to 6 months in 2020**

Location	Airbus Defence & Space – Space Systems
	31 rue des cosmonautes 31402 **Toulouse** Cedex 4, **France**
Unit	TESUI – Sensor Processing Chain department
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