ReproVIP Grid5000 internship

Context

In the last few years, there has been a growing awareness of reproducibility concerns in many areas of science. The ReproVIP project aims at evaluating and improving the reproducibility of scientific results obtained with the Virtual Imaging Platform (VIP) in the field of medical imaging. We focus on a reproducibility level ensuring that the code produces the same result when executed with the same set of inputs and that an investigator is able to reobtain the published results.

There are multiple sources/causes leading to numerical reproducibility issues. Among them, we can cite the computational environment [Gla2015], as well as the numerical instability of the applications [Kiar2019]. In a recent study, we used Fuzzy libmath to evaluate the numerical stability of the Brats preprocessing pipeline against the elementary mathematical functions (libm). Hardware is also a source of possible differences in results and platforms such as Grid5000 allow to experiment on a large variety of computing resources.

Objectives and methods

In this context, the main objective of the internship is to evaluate the influence of the hardware (processor microarchitecture) on the reproducibility of the segmentation results obtained with the Brats preprocessing pipeline.

To achieve this objective, the student will have to:

- Acquire a good understanding of the context and more specifically of the Brats pipeline and the Grid5000 infrastructure
- Define an experiment plan allowing to evaluate the influence of the hardware and compare it to previous results obtained with Fuzzy
- Implement, run the experiments and analyze the results

Depending on the timeline, competences and interest of the recruited student, we can also work on:

- Reproducibility metrics in the ReproVIP Dashboard
- Exploring the source of code instabilities and ways of fixing them

Practical information

Location: At the Creatis Laboratory (Villeurbanne, INSA Campus)

Site Université Lyon 1 – ESCPE :
Campus LyonTech la Doua – Université Lyon1, ESCPE
3, rue Victor Grignard
69616 Villeurbanne Cedex, France
Tél. : +33 (0)4 72 44 80 84 / +33 (0)4 72 44 80 15
Fax : +33 (0)4 72 44 81 99
e-mail : prénom.nom@creatis.univ-lyon1.fr

Site INSA : CREATIS - Direction
Campus LyonTech la Doua – INSA de Lyon
Bât. Blaise Pascal - 7 avenue Jean Capelle
69621 Villeurbanne Cedex, France
Tél. : +33 (0)4 72 43 82 27
Fax : +33 (0)4 72 43 85 96
e-mail : prénom.nom@creatis.insa-lyon.fr

Site Hospitalier :
Hôpital Louis Pradel,
28 avenue du Doyen Lépine,
69677 Bron Cedex, France
Tél. : +33 (0)4 72 68 49 09
Fax : +33 (0)4 72 68 49 16
e-mail : prénom.nom@creatis.univ-lyon1.fr

Tutors: Sorina Pop and Gaël Vila. The student will also closely interact with the other members of the ReproVIP project

Contacts:
Sorina Pop, email : sorina.pop@creatis.insa-lyon.fr
Gaël Vila, email : gael.vila@creatis.insa-lyon.fr