

Proposition of M2 internship

Exploration of joint deconvolution algorithms for omic data

Context:

With new standards of care emerging for cancer patients, omic data is now collected in a regular way. This data is needed for diagnostic purposes, as it serves to classify patients. However, the current classifications do not take into account intra-tumor heterogeneity, considering a bulk piece of tumor as homogeneous. We believe that intra-tumor heterogeneity quantification is of paramount importance.

Our proxy to quantify intra-tumor heterogeneity is the proportions of the different cell types present in a bulk sample. In order to quantify those proportions, one can perform deconvolution starting from an omic data. In particular, it can be transcriptomic or epigenomic data. As for now, deconvolution tools are still at their infancy, and usually use only measurement type (or block), either RNA or DNA methylation. We propose to improve deconvolution of bulk tumor samples by using a joint approach, analysing simultaneously the two blocks.

Subject:

The intern will focus on the development of joint deconvolution algorithms, tutored by a post-doc. The deconvolution problem can be considered either as a mere dimension reduction problem -that will be the focus of the beginning of the internship-, or as an embedding problem where the subspace should feature components interpretable as cell types -that will be the focus of the end of the internship. Joint deconvolution methods will be evaluated with a ranking pipeline that is currently being developed in the team.

Supervision:

The internship will take place in the TIMC laboratory with Magali Richard and Elise Amblard.

Location:

TIMC, Grenoble, FRANCE

Background:

We are looking for a student interested in working in an interdisciplinary environment. The candidate should be skilled in bioinformatics, data processing and matrix handling. They should have basic knowledge in biology (RNAseq et methylation data), as well as knowledge in R, python and bash. An interest in biological problems is necessary.

Contact:

Send a CV, a motivation letter, and two recommendation letters to magali.richard@univ-grenoble-alpes.fr and elise.amblard@univ-grenoble-alpes.fr