

# Internship - Job Recommendation From A Heterogeneous Graph

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**Description** Job recommendation is the task of associating candidates with jobs. This can be useful for candidates who would like to find the best possible jobs, for companies that want to find the rarest talents in the vast pool of candidates, but also for independent recruiters who need to be as precise as possible when they send a resume to a company.

In this internship, you will work on a new dataset for job recommendations. Its particularity is that it contains much additional information about candidates and jobs we can represent as a graph. Besides, it is very sensitive to the cold start problem: We have many new candidates and new jobs, and it restricts a lot of the algorithms we can use.

If we consider video recommendations on Youtube, an average viewer watches many videos, and each video is viewed many times. Therefore, when recommending new videos to a specific user, we can look at what other similar viewers watched and recommend the most relevant video. This is the principle of collaborative filtering. In our case, our users are likely to get a job and never come back. Likewise, jobs are associated with one person, and then, we are done with it. Therefore, we need to exploit extra information to make the recommendation.

For our dataset, we can represent our pool of candidates and jobs with a heterogeneous graph, connecting candidates and jobs, but also additional node types like skills, cities, or employment types. Because we have this expressive representation, we must adapt the existing algorithms. During the internship, we will see how graph neural networks can be used to make recommendations, and we will propose a new architecture to solve our specific problem.

The goal of this internship will be to publish a paper at an international conference. The intern will work together with a Ph.D. student.

**Planning** The intern will start with a study of the state-of-the-art methods for recommendation centered on graphs. First, they will get familiar with the traditional datasets and the primary baselines. Then, they will implement our new models and compare them with the previous works.

**Prerequisites** The intern should be involved in a master's program and have a good knowledge of machine learning, deep learning, natural language process-

ing, and graphs. A good understanding of Python and the standard libraries used in data science (scikit-learn, PyTorch, pandas, transformers) is also expected. In addition, a previous experience with graph neural networks would be appreciated.

**Work Environment** The internship will take place at Telecom SudParis at Palaiseau. The intern will join the computer science department. The internship is paid and will last six months.

If you are interested, please send us your **resume**, a **transcript of your grades**, and a **cover letter** (in French or English).