March 16, 2014

PAROLE Project
Nancy
France

Motivation Letter

I hold a Computer Engineering degree and a Distributed Systems degree from the Engineering Faculty and the Mathematics Faculty respectively, both at the National University of Córdoba, Argentina. I would like to apply for a position in Deep neural networks for source separation and noise-robust speech recognition. My long term career goal is to hold a position as a research scientist in academia or in a research and development company.
The academic background I obtained from Computer Engineering is mainly on Communication Systems, Computer Architecture and Software Development. My first work experience was at the Computer Architecture Laboratory of my faculty. I worked for two years there, and I focused on performance optimization of large scale finite element simulations of hydraulic systems. During this time, I also conducted work for my graduate thesis about the design of an embedded multi-core Java processor. As a result I acquired relevant skills for working with numeric problems and for performing performance optimization of code through parallel programming techniques.
After completing my Masters thesis I left the Computer Architecture Laboratory and pursued a career in software development in industry. The first position I held was in Motorola Argentina, as an embedded software developer. I focused on software for communication systems such as Soft Switches and Cable Modem products. I acquired valuable experience in Software Development in general, working with big amounts of code, collaborating with a team of people and planing work to meet deadlines. During this same period of time, I started to pursue a degree in Distributed Systems at the Faculty of Mathematics at National University of Córdoba.
Completing the above mentioned program helped me to broaden my view of Informatics as a discipline as I took contact with many ideas from Computer Science that were new to me as coming from a classical Computer Engineering education. This helped me to advance my career; shortly after completing the program I obtained a position at Intel Corporation as a Senior Software Engineer. Intel is well known for attracting the best individuals, and is also a very demanding employer.
Projects at Intel are really ambitious; my work at Intel has been mainly on Context Awareness and Recommender Systems. The Context Awareness initiative within Intel involved a project that consisted in a client engine for mobile devices. This engine would allow applications to access a collection of high level states that were inferred from raw sensor data, captured from a user mobile device such as a phone or laptop. As a result of my participation in this project I had the opportunity to apply several Machine Learning techniques to perform mining of raw sensor data such as accelerometers, gps, cameras and microphones.

Particularly, I used deep neural networks to perform Spoken Language Classification[1] of user recorded voice samples. In relation to this project, I contributed to an open source Deep Learning Toolbox, and created a prototype[2] for solving the problem of classifying between German, Italian and English speakers.
My work in Recommender Systems focused on the development of a large scale graph processing database which was used as a Knowledge Representation engine that allows the real time processing of user recommendations in the form of graph queries. In this context, nodes in the graph would represent consumer items such as books or songs and arcs in the graph would represent relationships among these items. I worked both developing the infrastructure for this database and computing the relationships between nodes. As a result I acquired experience applying topic modelling and music similarity algorithms to big amounts of data.
I find the topic of this Phd particularly interesting. I'm fascinated about unsupervised Machine Learning in general, and specially in the form of unsupervised learning that takes place in deep architectures. I believe that the capability of deep neural networks to capture long term dependencies could push forward the state of the art in speech source separation.
Should you require further information or clarification on the above information please do not hesitate to contact me. Thank you for taking the time to consider my application, and I look forward to your reply.

Sincerely,

Jose P. Alberto Andreotti.

[1] Spoken Language Classification is the task of determining the language a speaker is using.
[2] You can find it here.