Cover Letter

I love to learn new things, and I am proud of my ability to learn quickly. To switch from my Bachelor's degree in robotics to computer science, I had to do a lot of self-learning, and I read more than 150 publications in deep learning and NLP. When I started learning about NLP, my supervisor advised me to take on a more manageable project as a first step, to have a sense of reward as I work on it. However, building dialog agents was an important goal for me, so I was not phased by the unapproachability of it. Based on the many papers that I have read, I wrote a literature review paper that I presented at a national competition, winning first place. The GitHub repo associated with this project, where I also keep my notes on publications that I read, has almost 400 stars (url-to-repo). Since this paper, I have worked on a simple idea to make open-domain neural conversation models better. We hypothesized that it is hard for neural models to learn responses to open-ended utterances like "What did you do today?" since dialog datasets contain many adequate replies to such inputs. Thus, we proposed a data filtering method where such utterances are excluded from the training set. I presented our results at ACL 2019 (url-to-paper), the leading international conference in NLP, and at other conferences and workshops, detailed in my CV.

During the spring of this year, I gathered a small team consisting of three other students, I advise. Joining my dialog modeling endeavors, they worked on various ideas like adapting BERT and GPT-2 models to dialog modeling (url-to-repo) and using reinforcement learning to train chatbots (url-to-repo). With this team, I applied to the Amazon Alexa prize, for which I had to write a detailed research proposal highlighting the achievements of my team and my ideas and vision for the project. Recently, I worked on a new, large, high-quality dialog dataset based on books from Project Gutenberg. I compared it to other large datasets in a transfer learning context. I found that pre-training on my dataset results in better performance, consolidating that it is of higher quality. I presented my results at an annual university conference, and plan to improve the dataset further and submit a paper to a major conference.

In the summer of 2019, I was selected for the one-week-long Eastern European Machine Learning Summer School that included a range of intensive lectures and practical sessions. The environment was very diverse and enthusiastic, as the school had participants from over 50 countries. I had the pleasure to attend lectures from top researchers in the field, such as Anca Dragan, Andrew Zisserman, Antoine Bordes, Doina Precup, Shimon Whiteson, and Rahul Sukthankar. I had in-depth courses about a remarkable breadth of topics in machine learning, such as reinforcement learning, computer vision, natural language processing, and Bayesian learning.

I also explored other areas of deep learning, most notably during my internship and a later full-time position at Robert Bosch GmbH, one of Europe's leading research centers. I worked on semantic segmentation models applying them to the task of segmenting free parking space. The dataset, however, was of poor quality, so I built a user interface, and with the help of a test driver, I gathered ten thousand labeled images. With my program, parking spots projected to the ground could be added and moved around on the live video of a car camera. Finally, I modified the YOLO (url-to-yolo) architecture to be suitable for my task. I trained it on our new dataset achieving impressive results that convinced the department to give further funding to the project. Since I have

been involved in this project from its conception to the demo phase, and I had to solve challenges across several domains (economic, social, engineering), I gained a lot of valuable experience. I had to leave Bosch to focus on my Master's, but one year later, this project that I started is flourishing and has a team of 5 people working on it. I got along very well with everyone in my group and worked together with several people from different groups, whom I frequently consulted for their advice or asked for help with some part of the project. My work environment was in English, and I worked together with people from France, Germany, and the USA. I loved the multicultural environment, which allowed me to master English (achieving 117/120 on the TOEFL iBT test recently).

Building biological models always attracted me. During my Bachelor's, I took part in a small (2-man) research project where I designed a program for simulating and experimenting with protein-based logic circuits. I created a user interface in OpenGL for the simulation program, where users could build 3D molecular structures, and I implemented several algorithms (e.g., genetic algorithms) to search for molecular structures based on user-defined constraints.