Educational Experience:

Driven by curiosity on how technology and programs were built, in 2013, I enrolled in the BSc degree in Information Systems and Computer Engineering from Instituto Superior Técnico (IST) in Lisbon, Portugal. After completing the coursework on Symbolic AI, I was invited to do research on text generation (using Recurrent Neural Networks), a subdomain of Natural Language Processing (NLP), in the Spoken Language Systems Lab (L2F) at INESC-ID. I felt excited with the idea of creating a poetry generation system of my own and I delved into the neural networks' inner details in an attempt to better grasp the, at the time, so unfamiliar yet interesting topic. This was my first introduction to both research, to both Machine Learning (ML) and NLP fields.

Unfortunately, my family was struggling financially and because the research position was unfunded I had to drop the research two months afterward to help support my family financially. Indeed, earlier that year, my mother was fired without notice and could not get a steady job, which made it difficult to support our family and my education. Consequently, I decided to balance studying and a full-time job as a junior programmer at a consulting company during the first year of my MSc degree (at the same university). Besides prioritization and management skills, this experience made me more resilient to stress, further improved my teamwork aptitude and my self-confidence, for I was able to complete every coursework with distinction as well as to achieve high performance at the company.

Despite being a great experience, working as a full-time consultant made me realize I wanted to pursue a more challenging and exciting path in research (similar to the one I had had at the L2F group). Thus, at the beginning of my master's second year, I decided to quit my job at the consulting company and to join an academic research group at INESC-ID as a Research Assistant. There, I have published 6 papers at international conferences about efficient ways to tackle architectural design optimization problems, involving time-consuming objective functions. I combined multi-objective optimization with ML surrogates to speed up the optimization process. Using the skills acquired in the ML and AI coursework, as well as my software development expertise, I put forth an easy-to-use optimization framework for architects, which is now being used by the elements in the same research group. Being a part of a large interdisciplinary group made me realize the importance of the collaboration between different disciplines to the success of a research project, especially, for projects with a potential for large societal impact (we need to collaborate with the people affected by the systems we are building for they are the ones we are going to help). My degree culminated with the discussion of my master dissertation on these topics in which I achieved the maximum score of 20.

Later that year, I was also invited to be a lecturing assistant of the courses Advanced Programming and Programming Languages where I was responsible for the elaboration and evaluation of the practical assignments. As a lecturer assistant, I have grown a passion for teaching and helping others to improve themselves. The exercise of decomposing the complicated concepts into smaller, easier to grasp concepts is a challenging task and a great opportunity to validate the knowledge that I have acquired as well.

In March 2020, I was the recipient of the Maria de Lourdes Pintassilgo 2019 award, which aims to recognize and reward annually two women who graduated at Técnico, one of whose Master's thesis has been distinguished for its scientific quality and remarkable academic performance at IST.

Social Experience:
Throughout my academic career (from 2014 to 2019), I have also been a part of multiple student organizations within the Computer Engineering department. As a mentor of freshmen students, I have guided them through the first undergraduate year and taught them time management and prioritization. As an active member of the students' organization (dubbed NEIIST), I have organized workshops, contacted different companies regarding their sponsorship and enrollment in the annual SET student career fair. Through this experience, I have learned how to communicate, to negotiate, and to delegate different aspects of the sponsorship agreement more effectively. Moreover, I was elected as the director of the activities involving the dynamization of Computer Science for children aged from 6 to 18. With this experience, I have learned how to cooperate, devise engaging programming activities, and manage a team composed of 5 elements, as well as how to adapt my speech to the target audience (e.g. breaking the concepts into simpler ones).

More recently, I have mentored a 13-year-old girl in the development of a self-paced computer science project throughout one school year. During this time, I taught her different programming paradigms and delineated a bottom-up plan for project development. This was part of a volunteering project organized by TreeTree2, which held monthly meetings at IST. Similarly to teaching, this experience further reinforced my passion for teaching and helping others to reach their potential.

Working Experience:
Since July 2019, I have been a research data scientist at the Fairness, Accountability, Transparency, and Ethics in AI (FATE) group at Feedzai, a financial fraud-detection startup. As an industry researcher, I have had the chance to work on real-world datasets spanning millions of users worldwide, which rely on Feedzai to detect fraudulent transactions among other attack vectors. As wrongfully declining access to a bank account can severely damage a person's quality of life, it is of utmost importance that this process is fair, transparent, and free of discrimination. As part of the FATE research group, I am tasked with researching ways to improve racial and gender fairness on Feedzai's fraud detection systems, as well as to improve the transparency (and explainability) of these systems. Since then, I have been collaborating on multiple projects, which resulted in the development of numerous tools with a focus on robust and discrimination-free model selection, co-authorship of 2 patents on ML explainability, and 3 scientific articles. In addition, I have been responsible for developing resources to ease the integration of new elements within the team (e.g., through the creation of how to's and other tutorials or good developing practices guides). I am also responsible for moderating and organizing weekly project meetings where project advances are presented and discussed for a broader audience.

I believe this industry experience will be beneficial for my future Ph.D. studies, as I've been exposed to not only real-world datasets but also to fairness and explainability in practice.

Purpose:
Finally, I want to work on open problems related to fairer, more robust, and transparent ML systems that involve proximity with humans. In that regard, I am currently looking for research internships with a practical application abroad and for PhD opportunities in the ML field. I am confident that I have the necessary experience, qualifications, and the right motivation to undertake these challenges. I believe my background in both industry and academia are evidence of the determination, perseverance, and curiosity that I apply in my research.

Thank you for taking the time to read this letter,

Sincerely,

Catarina Belém