Statement of Purpose for PhD in Computer and System Engineering

Luca Cotti, June 2024

1. **Why do you want to complete further research in this field?**

   I want to research ways to apply ML techniques in innovative ways, to solve real-world problems that could provide a benefit to society as a whole, such as improving quality of life, increasing energy sustenability, and address complex societal challenges. I first discovered this passion while working on my master's thesis, with the title "Study and Development of a Digital Twin for the Simulation of User-Created Automations in a Green Smart Home". In this thesis, I developed a digital twin that tracks and provides suggestions on how to reduce the energy consumption of appliances in a home, based on user-defined automations acting on appliances. The system can be used to increase user's comfort and improve sustainability. The work of my thesis also contributed to a conference paper and a journal article.

2. **Why have you chosen to apply to this particular university?**

   I believe that the Politecnico di Torino represents the ideal convergence of my academic pursuits, professional experiences, and personal ambitions. The renowned faculty, cutting-edge research facilities, and collaborative environment at the Politecnico di Torino provide the perfect backdrop for my aspirations. I am particularly excited about the opportunity to work with Prof. Marco Mellia, whose work in Artificial Intelligence aligns closely with my interests and goals. Also, I believe that the mission on technological innovation of the city of Turin itself will provide a stimulating environment for my research and personal growth.

3. **What are your strengths?**

   I completed my Master's degree in Computer Science and Engineering with a thesis on the development of a digital twin for a smart home, which

   explored innovative techniques in [specific area of AI]. This research earned recognition for its originality and impact, showcasing my ability to contribute meaningfully to the field.

   My skill set is comprehensive and well-suited for advanced research in AI, with a deep understanding of machine learning algorithms, proficiency in programming languages such as Python and R, and experience with frameworks like TensorFlow and PyTorch.

4. **What are your transferable skills?**

   During my university studies, I also had the privilege of residing in the Collegio Universitario Luigi Lucchini, a college of merit that has provided me with a unique opportunity to develop my time management, leadership and interpersonal skills. Through cultural and social events, both locally and abroad, I had the chance to engage with a diverse group of brilliant minds, honing my ability to communicate effectively, work in diverse teams, and manage my time efficiently. I believe these skills will be invaluable

in my doctoral studies, enabling me to engage with peers, collaborate with researchers, and contribute meaningfully to the academic community.

5. **How does this program align with your career goals?**

I believe that the doctoral program in Computer and Control Engineering at the Politecnico di Torino aligns perfectly with my career goals. My long-term objective is to become a leading researcher in the field of Artificial Intelligence, contributing to the development of innovative technologies that have a positive impact on society. The program's focus on cutting-edge research, interdisciplinary collaboration, and practical applications will provide me with the necessary tools and knowledge to achieve this goal. I am confident that the skills, expertise, and network I will gain through this program will be instrumental in advancing my career and making meaningful contributions to the field of AI.