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Admissions Committee
Universidad Politécnica de Madrid (UPM)
Madrid, Spain

Motivation Letter - Application for PhD Position on Edge-Cloud Orchestration and ML-based Resource Management

Dear Admissions Committee,

I am writing to express my strong interest in the PhD position on Edge-Cloud Orchestration and ML-based Resource Management in the Cloud-edge Continuum at Universidad Politécnica de Madrid (UPM). After thoroughly reviewing the program description, I am confident that my academic background and research experience align well with the goals of this position. I am eager to contribute to the development of innovative solutions in the field of edge-cloud orchestration, while expanding my expertise in machine learning and resource management.

My academic journey began with a focus on FPGA design and hardware systems, which I studied extensively during my undergraduate program. Through courses such as Digital Logic Circuits, Principles of Computer Composition, and EDA Understanding and Practice, I gained a deep understanding of the principles of hardware design and the practical applications of FPGAs. I engaged in hands-on projects, such as the design and implementation of a pipelined CPU and an FPGA-based Snake game, which provided me with practical experience in utilizing various design tools and programming languages for hardware development.

Building on this foundation, I pursued a master's degree where I specialized in artificial intelligence (AI), particularly in the area of deep learning. During the course "Deep Learning and Its Applications," I conducted several experiments, including linear regression, logistic regression, and convolutional neural networks for image categorization. My final project, focused on Tumor Segmentation and Classification, achieved an F1 score of 0.89, demonstrating my proficiency in applying AI techniques to complex real-world problems. This project deepened my understanding of the potential of AI in transforming data into actionable insights.

My master's thesis, titled "Enhancing On-Chip Network Predictions With Advanced AI Techniques," further advanced my research in the integration of AI and hardware systems. The

objective of my research was to leverage advanced AI techniques to improve the accuracy and efficiency of key parameter predictions in Network-on-Chip (NoC) systems. Through this work, I gained experience in data generation, model training, and evaluation, while exploring the potential of AI in optimizing the design and performance of complex hardware systems.

As I look to the future, my research interests have evolved towards the intersection of embedded systems, AI, and cloud-edge orchestration. I am particularly interested in exploring how machine learning can be integrated into edge-cloud orchestration to enhance resource management across the cloud-edge continuum. The growing demands of AI-driven applications require more efficient and scalable systems, and I believe that edge-cloud orchestration, coupled with ML-based resource management, holds the key to meeting these demands. I am passionate about exploring how to design and implement distributed systems that can adapt to dynamic workloads and optimize performance while maintaining flexibility and scalability.

I am particularly drawn to UPM's PhD program due to its focus on bridging the performance gap in edge-cloud orchestration through innovative research and practical applications. I am excited about the opportunity to work on cutting-edge research that can lead to significant advancements in this field, and I am eager to contribute my skills and experience to your team.

Thank you for considering my application. I am enthusiastic about the possibility of discussing how my background and research interests align with the objectives of the PhD position at UPM. I look forward to the opportunity to further elaborate on my qualifications and to contribute to the innovative research being conducted at your institution.

Yours sincerely,
Lingyu Gong