

STATEMENT OF PURPOSE

Applicant: Hamza Abdul Jabbar

Program: MS in Computer Science

Target University: [University Name]

My journey in Computer Science began with a fascination for building things. At UET Taxila, I started by mastering Full Stack Web Development and later expanded into Mobile App Development. I was drawn to the tangible process of creating functional applications that people could use on their smartphones and browsers. However, as I progressed, a defining experience occurred during a freelance project for a tech startup, where I encountered challenges that required me to go beyond traditional development boundaries. This experience exposed the limitations of conventional application development and sparked my interest in addressing more complex problems. I realized that I wanted to work on challenges beyond building user interfaces. I was driven to design systems that were not only functional, but also intelligent and scalable. This realization led me to transition from pure application development toward advanced research in Computer Science, particularly at the intersection of Artificial Intelligence and System Design.

Despite this shift, I never lost my engineering roots. Currently in my seventh semester, I maintain a CGPA of 3.75 and have earned the National Academic Excellence Award under the Laptop Scheme. I continue to approach research with the mindset of a developer, believing that theoretical models must ultimately be translated into clean, efficient, and deployable code.

My interest in advanced computing was further ignited when I first encountered Artificial Neural Networks. I was fascinated by the idea that a simple matrix of numbers could solve non-deterministic problems. However, I soon realized that deploying such models in real-world environments requires more than achieving high accuracy. It demands robust system architecture. In practical applications, architectural design often outweighs marginal accuracy gains when scalability and efficiency are considered. This understanding highlighted the trade-off between latency and performance, and the importance of balancing user experience with system reliability. Addressing these challenges represents the true bridge between theoretical Artificial Intelligence and scalable systems, and this realization strongly motivates my decision to pursue a Master's degree in Computer Science.

For my ongoing final year thesis, I am applying this engineering mindset to the domain of digital media integrity. I observed that many deepfake detection systems rely on out-dated datasets such as FaceForensics++, which contain visible facial artifacts that are unrepresentative of modern threats. To overcome this limitation, I am validating my system using the **MAVOS-DD** (Multilingual Audio-Video Open-Set Deepfake Detection) benchmark. Unlike earlier datasets, MAVOS-DD employs state-of-the-art generative models to produce high-fidelity deepfakes with minimal visual artifacts and includes diverse linguistic patterns. The core Computer Science challenge in this work lies not only in model training, but also in the efficient fusion of high-dimensional multimodal data. I am developing a custom fusion layer to align Vision Transformers for visual analysis with wav2vec for audio representation, with the goal of building a system robust to open-set and previously unseen attacks.

To further expand my technical scope beyond computer vision, I recently engineered **No-Haram DNS**, an AI-powered network filtering system. The primary challenge was blocking harmful content in real time without introducing network latency. I implemented a Hybrid Lambda Architecture that combines constant-time static lookups with an asynchronous AI-based analysis layer powered by a fine-tuned DistilBERT model. By

leveraging Redis for message queueing and optimizing the inference pipeline, I reduced end-to-end system latency to under 15 milliseconds. This project demonstrated how Natural Language Processing, System Design, and Network Engineering can converge to address real societal challenges.

Beyond research, my professional experience has strengthened my ability to manage complex software infrastructure. As a Full Stack Developer at Fireprenair, I designed scalable platforms on AWS and optimized backend query performance, reducing transaction processing times by 60 percent. My early experience in building mobile and web applications has given me a strong understanding of scalability, database optimization, and CI/CD pipelines, which are essential skills for modern Computer Science research.

I am applying to [University Name] because of its strong emphasis on both the theoretical foundations of Computer Science and their practical applications. I am particularly interested in the work of [Professor Name or Lab Name], whose research on [Topic] closely aligns with my academic background. I am eager to explore how AI architectures can be designed to remain accurate while also being efficient and scalable across distributed systems.

My long-term goal is to become a computer scientist who combines strong software engineering principles with advanced research capabilities. I aspire to build systems that address real-world problems through intelligent perception and robust infrastructure. With my coding proficiency, solid mathematical foundation, and strong motivation for innovation, I am confident in my ability to contribute meaningfully to the research community at [University Name].