Letter of Motivation

Application to MSc Software, Web & Cloud

Tampere University

The software used in urban safety systems is becoming more and more based on aggregating considerable amounts of sensitive, location-related data and providing the end-user with real-time decisions. However, most of such systems put an emphasis on analytical capability rather than privacy, scalability, and ethical accountability. In my undergraduate studies, this conflict between utility and trust dominated my academic passion and it was the primary factor that prompted me to seek the application to the MSc Software, Web and Cloud at the Tampere University.

This dilemma was solidified in my final project in my Bachelor, Geocrime, which is a web application that uses crime-aware navigation to help people in the city travel safely. When creating Geocrime, I was presented with a systems-level dilemma, namely, how to create a web-based, data-driven service, which would combine geospatial crime data, algorithmic, risk-aware routing, and be scalable and privacy-aware. The algorithmic aspect was solved by applying a crime-weighted A* routing algorithm with NetworkX and OSMnx, however, the project also exposed underlying architectural challenges in the scalability of the back-end, the implementation of the data architecture based on clouds and real-time pipelines, and the ethical aspects of using sensitive spatial data. These questions still left unanswered have become the main aspect of my inspiration to pursue further education in software engineering.

I have been guided by my desire and real-life limitations in determining my academic path. I planned to take a UK Bachelor of Degree on campus after finishing a Higher national diploma in computing (Cyber Security). But by that point the financial demands of the fully-time study abroad such as tuition fees, cost of living and availability of limited scholarships to do bachelors top-up degrees, the move to the UK was not practical. Instead of sacrificing quality of academics, I opted to have a UK Bachelor's Top-Up degree provided through an offshore, distance-supported program, which enabled me to receive a UK qualification of the same academic faculty that provides the on-campus program. The distance-based model comprised instructor-delivered, real-time classes, uninterrupted evaluation, and direct academic interaction, which offered relevant exposure to the UK teaching standards and stayed within feasible economic limits. This experience helped me strengthen my ideas that the availability of quality education, combined with academic dedication, helps students to reach their maximum potential. This coupled with achieving First Class Honours further gave me confidence in working within a tight space without compromising academic quality and made me even more determined to now seek an entirely on-campus, research-based master degree.

Geo Crime MSc Software, Web & Cloud at Tampere University are the direct answer to the gap in architecture and research that I discovered with Geocrime. The comprehensive coverage of the programme in terms of the advanced web development, cloud technology, data-intensive programming, and DevOps perfectly coincides with the necessity to transform the prototype

systems into the production-grade infrastructures. Research on cloud-native infrastructure and continuous deployment gives the needed technical infrastructure to grow safety-critical applications, whereas research on secure programming and software architecture offers a leading to the creation of trustworthy software in the back part. Notably, the focus on ethical and sustainable software engineering at Tampere University can be of great interest to me since I am interested in privacy-conscious system design, especially in systems related to crime and geospatial data.

In addition to the curriculum, the research environment in Tampere University is a strong success factor in my application. The studies of smart city platforms, data-driven software engineering, and human-centered AI indicate where I am planning to take Geocrime. The work on ethical AI and urban systems is an indication of efforts to make software work responsibly towards society and not just technical. I would especially like to understand how it would be possible to combine the cloud-based architectures and real-time data analytics with the principles of privacy preservation to help urban safety and decision-making. I believe that there is a great opportunity to continue with Geocrime as a master thesis concentrating on scaling, privacy-aware geospatial decision-support systems in a smart city environment.

This motivation was also supported by this experience as a Python backend intern. The creation of a web-based application introduced me to the real-time processing workflow, the optimization of backend performance, and the problem of integrating complex services into the web system, which proved the significance of cloud-ready backend design and systemized software engineering, two of the key themes of the Software, Web & Cloud programme.

I hope to help to develop safe, data-driven software systems that can be used both in urban or national levels in the future and especially in areas where trust, safety, and ethics are of utmost concern. I am not only inspired to develop software but also why and how such systems need to be developed in a responsible manner. Tampere University presents a scholarly community comprising of an academic rigorous software engineering, cloud technologies, and ethical research area that converges into a single place, which makes it the most suitable place where I can enhance my academic and professional growth.

I believe that my experience, focused mindset of research, and well-focused motivation will contribute to the MSc Software, Web and Cloud programme a lot. I hope I will become an active member of the academic community of Tampere University, as well as develop my research interests in scalable, ethical, and secure software systems.

Merit-Based Scholarship Statement

My Pearson BTEC Level 5 Higher National Diploma in Computing (Cyber Security) with Merit course, was in which I gained a strong interest in Python through self-directed learning alongside my official curriculum. This was applied and built up throughout my UK-accredited Bachelor of Science (Honours) in Computer Science with First Class Honours (GPA 4.09/4.50) in an assessment directive that was equal to on-campus delivery. Python has been a key part of my coursework and my final project, Geocrime, which was done as part of a University of

Hertfordshire course with academic supervision, frequent research meetings, and frequent feedback. My first idea of Geocrime was developed at a problem-solving seminar at the National Aerospace Science and Technology Park (NASTP) where I proposed an early prototype of the system aimed at safety conscious city navigation. Such experiences indicate that I possess a research mindset, and a merit-based scholarship will enable me to spend all my academic time in high-level research, course work, and thesis preparation in my masters education.