Motivation Letter

The COVID-19 pandemic induced a significant strain between the demand for and relatively fixed supply of available physician labor, thereby threatening its ability to function properly in the future. As such, and in memory of my grandfather, who died due to insufficient medical resources, I resolved to develop intelligent healthcare solutions to help more people avoid the misery of disease and premature death. Witnessing the development of artificial intelligence has reinforced my belief that machine learning can help medical professionals better use their expertise to make decisions and mitigate the labor shortage, especially for medical imaging for screenings, precision medicine, and risk assessment. However, the community has had difficulty building unified diagnosis models for several common diseases. Therefore, I am pursuing the Master of Science in Electrical Engineering and Information Technology at ETH Zürich where I will refine the skills needed to contribute to machine learning and medical imaging by developing a multi-modal multi-task unified model for diagnosing disease.

My academic trajectory is like a gradient descent algorithm $\theta_{n+1} = \theta_n - \eta \nabla F(\theta_n)$, where θ is my life goal, η is the step length, $\nabla F(\theta)$ is my research interest (descent direction), and the most important thing is my resolution to keep moving to the next point in the curve. In this regard, my undergraduate studies exposed me to several promising machine learning projects for medical diagnosis, including medical imaging and signal processing. I am drawn to the program at ETH Zürich due to its leading position in machine learning and medical imaging research. I dream of joining Professor Ender Konukoglu's group at Computer Vision Laboratory, whose research interests in Biomedical Image Computing align perfectly with my focus. I admire his recent work, "The OOD Blind Spot of Unsupervised Anomaly Detection," which pointed out a common problem that anomaly detection faced and proposed a reliable solution. As part of the group, I aspire to explore similar approaches to solve the possible flaws in existing anomaly detection algorithms. Beyond research, ETH Zürich's customizable curriculum of the Signal Processing and Machine Learning track will enable me to acquire the knowledge needed to build my ideal diagnosis model, including security and networking to prevent privacy law violations and protect patients' private data beyond basic machine learning fundamentals.