Research Methodology II Report

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I have grown a lot in terms of academic research abilities in the past year at the Department of Computer Science in National Tsing Hua University. This report consists of two main sections: the progress I made, and my study plan to draft the Master's thesis in late February 2023.

As soon as I joined HSCC Lab, I participated in Delta Electronics's anomaly detection project, researching three papers on Bayesian optimization [1, 2, 6], implementing Gaussian Process Hedge algorithm, and presented four articles on Generative Adversarial Network (GAN) [3, 4, 5, 7]. Apart from this, I enrolled in five Computer Science courses with at least four top class A+, whilst monitoring and grading homeworks and the final exam as a teaching assistant for Design and Analysis of Algorithms lectured by Chair Professor Sheu. Moreover, I pushed hard in self-learning, progressing 50%, 75%, and 100% in Stanford's Convex Optimization, MIT's Artificial Intelligence and Linear Algebra, respectively. Regarding the thesis, I studied 16 publications in 5G scheduling, narrowing the research topic to resource allocation in ultra-reliable low latency communications (URLLC) puncturing systems, inventing an approximation algorithm by total unimodularity, and have been working on simulations[1].

I have three prime goals for the next semester: finishing course credits, reading 80 academic papers, and completing the thesis's simulations. First and foremost, I attend Natural Language Processing Lab. by Professor Jyun-Sheng Chang to experiment learning-based techniques on my research problem. Secondly, I take on five papers and discuss with my Professor once per week. Thirdly, I kickstart thesis writing, finalizing simulation environment to reproduce others' work and compare performance, aiming to publish on IEEE conferences like INFOCOM and ICC.

[1] https://github.com/phogbinh/5g

References

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[4] Yuxuan Li et al. "Augmented Time Regularized Generative Adversarial Network (ATR-GAN) for Data Augmentation in Online Process Anomaly Detection". In: *IEEE Transactions on Automation Science and Engineering* (2021), pp. 1–18. DOI: 10.1109/TASE.2021.3118635.

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