Weiran Wang

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Research Interests

After earning an M.Sc. from KTH Royal Institute of Technology in 2023, I transitioned into the role of a 5G Baseband Software Developer at Ericsson. My research interests straddle the complex domain of internetworking systems and its interdisciplinary interfaces. On one hand, I am interested in Network Function Virtualization, Network Calculus, and Wireless Communication that underpin the essence of internetworking. On the other hand, I delve into the interconnected areas of Distributed Systems, Machine Learning, and Game Theory, highlighting the convergence of these disciplines. Currently, I am channeling my problem-solving skills into refining Uplink Carrier Aggregation through the creation of a robust software quality indications framework.

Education

KTH Royal Institute of Technology *Stockholm, Sweden*

M.Sc., in the School of Electrical Engineering and Computer Science *Aug. 2020 - Mar. 2023*

- Program: ICT Innovation - track Cloud and Network Infrastructures, GPA: 4.56/5
- Thesis: "Analysis of Flow Prolongation Using GNN in FIFO Multiplexing System"
- Advisors: Prof. Jean-Yves Le Boudec (EPFL), Prof. Viktoria Fodor (KTH) and Dr. Hossein Tabatabaee (EPFL)

École polytechnique fédérale de Lausanne (EPFL) *Lausanne, Switzerland*

Exchange in the School of Computer and Communication Sciences *Sep. 2021 - Aug. 2022*

- GPA: 5.26/6
- Semester and Degree Project done in Laboratory for Communications and Applications 2
- Advisors: Prof. Jean-Yves Le Boudec and Dr. Hossein Tabatabaee

Dalian University of Technology *Dalian, China*

B.Sc., in the School of Software Engineering *Sep. 2016 - Jun. 2020*

- Program: Software Engineering (Japanese Intensive), GPA: 85.7/100
- Thesis: "The Research on Virtual Function Scheduling of Edge Network Based on Game Theory"
- Advisors: Prof. Zichuan Xu and Dr. Qiufen Xia

Industrial Experience

Ericsson *Stockholm, Sweden*

5G Baseband Software Developer *Sep. 2022 - Present*

- Served on the Module Product Care for Uplink, aiming to enhance the robustness and predictability of baseband source code.
- Developing a Software Quality Indications Framework dashboard to systematically track quality improvement initiatives.
- Improved code quality and identified potential bugs using CodeChecker.
- Developed a tool to extract checkers from both global and local control elements' configuration files, read the merge mode from the profile file, and deliver the final checker settings.

Ericsson *Stockholm, Sweden*

Summer Intern R&D *Jun. 2021 - Aug. 2021*

- Developed a tool to automatically check Ericsson code disclaimers of the created and last-modified dates form the git log.
- Extracted and compared real-time Baseband Uplink Products data with test use cases, and visualized data on Ericsson developer website.
- Built 'Include What You Use (IWYU)' with the Ericsson compiler to enable support for Ericsson's proprietary code. Later, leveraged IWYU to replace compiler innovations for code header inclusion checks.

Research Projects

Analysis of Flow Prolongation Using GNN in FIFO Multiplexing System *Lausanne, Switzerland*

École polytechnique fédérale de Lausanne (EPFL) *Mar. 2022 - Dec. 2022*

- Reproduced the GNN model based on PMOO and achieved an accuray of 65% compared to 69.6% in the reference paper.
- Integrated the NetCal/DNC into the network topology so that the delay bound can be calculated automatically once a new network is provided.
- Generated a novel dataset comprising over 160,000 topologies, each with the average of 25 servers and 115 flows, which was used for the adversarial attack purpose.
- Implemented FGSM attack to the network topologies with flow prolongations predicted by GNN.

Flow Analysis on GNN-Oriented Flow Prolongation *Lausanne, Switzerland*

École polytechnique fédérale de Lausanne (EPFL) *Oct. 2021 - Feb. 2022*

- Investigated the usage of NetCal/DNC with network topologies settings to compute the delay bound of the flow of interest.
- Investigated the usage of GNN to predict flow prolongations in new network topologies (trained GNN based on LUDB and PMOO).
- Analyzed the tightness of delay bounds and benchmarked the execution time computed by LUDB-FF, PMOO, TFA and SFA with PLP in source-sink tandem networks.

The Research on Virtual Function Scheduling of Edge Network on Game Theory *Dalian, China*

Dalian University of Technology *Dec. 2019 - Jun. 2020*

- Realized a decentralized coalition algorithm based on *Gale-Shapley algorithm*, and proved the existence of Nash Equilibrium in the problem of minimizing total latency for VNF scheduling.
- Simulated the experiment, and the results showed a better scheduling completion time compared with the existing *Genetic Algorithm* and *Round-robin Scheduling Algorithm*.

Selected Awards

2022 KTH Erasmus+ Scholarship
2021 EPFL Swiss-European Mobility Program (SEMP) Scholarship
2021 KTH Covid-19 Financial Aid Scholarship Based on Academic Excellence
2020 Distinguished Graduate of Dalian City
2020 Outstanding Undergraduate Thesis of Dalian University of Technology
2019 Outstanding Position Paper in UNIDO of National Model United Nations New York Conference
2019 Honorable Mention Delegation Award of National Model United Nations New York Conference
2018 Outstanding Youth League Member of Dalian University of Technology

Skills

Programmings Python, Java, Scala, C/C++, TLA+, JavaScript, HTML/CSS.

Tools Kubernetes, PyTorch, Scikit-learn, Hadoop, Spark, jQuery, Ajax, Elasticsearch, Kibana, DPDK, Jenkins.

Miscellaneous Linux, Shell (Bash/Zsh), LaTeX, Bazel, Git, CI/CD.

Languages English (Proficient), Chinese (Native), Japanese (Intermediate), French (Elementary), Swedish (Elementary).

Extracurricular Living and studying in Europe, I've embraced diverse skills. I annually ski in the Swiss Alps and dive in the Mediterranean, with an open water diving certificate expected by mid-August. Moreover, motivated by my Italian and French roommates, I've started exploring various cuisines and honing my culinary skills (photos available here). During my undergraduate years, I actively participated in United Nations events. Notably, in 2018, I was a student delegate at the 9th University Scholars Leadership Symposium in the United Nations Economic and Social Commission for Asia and the Pacific, in Bangkok, Thailand. The following year, I represented my university at the National Model United Nations Conference in New York, USA.