814601S Work Experience in ICT responsibilities

Prabhash Rathnayake: 2305010
University of Oulu: Autonomous Driving Project
Summer Internship 2024

Attachment 1.

Personal internship plan

Name and student number: Ekanayaka Widanage Prabhash Kumara Rathnayake 2305010

Practical training course name and code: 814601S Work Experience in ICT responsibilities

Employer: University of Oulu – Autonomous Driving Project

Employer's contact person: Vishaka Basnayake Mudiyanselage

Contact information: vishaka.basnayake@oulu.fi

Estimated time/times for internship: 2 months (till July 21st)

Planned duties and assignments for the internship period:

During the internship period, my primary duties and assignments will include a thorough orientation to the University of Oulu's 6GVisible project, focusing on 5G/6G-enabled autonomous driving. I will review and analyze datasets on network traffic from various levels of autonomous vehicles, followed by developing a network demand prediction model using machine learning algorithms. This model will be validated and refined using the collected data. Additionally, I will conduct a comprehensive review of standards and parameters for Cellular V2X communications. My tasks will also entail investigating network simulations and software available for such use cases, analyzing any discrepancies, and refining the model accordingly. The findings from these activities will be documented and summarized in a detailed paper, covering methods, results, and implications for future research in autonomous driving technology.

Knowledge and skills acquired during studies that can help in the duties:

During my studies, I have acquired advanced skills in machine learning and data analysis, essential for developing and refining the network demand prediction model. I also have the programming experience needed for model development and network simulations. My expertise in statistical analysis will be useful for validating the model, and my ability to conduct literature reviews and document research results is crucial for producing a comprehensive research paper.

Personal learning goals:

I aim to deepen my understanding of 5G/6G-enabled autonomous driving systems and enhance my machine learning and data analysis skills. I will conduct literature reviews to inform model development, improve my technical writing by documenting research processes, and enhance my collaboration and communication skills. By the end, I aim to advance my expertise in autonomous driving and machine learning, contributing effectively to the project.

Student's signature: 

Employer's signature: _____

Study program signature: _____

Attachment 2.

Weekly report: Week 1

Name and student number: Ekanayaka Widanage Prabhash Kumara Rathnayake 2305010

Practical training course name and code: 814601S Work Experience in ICT responsibilities

Employer: University of Oulu – Autonomous Driving Project

Working period (start-end, number of hours): Mon-Fri from 9 to 4.30 (35+ hours)

Main tasks and duties during the period:

Orientation and familiarization with the University of Oulu's 6GVisible project, including defining specific aims, objectives, and deliverables for the training as part of 6GVisible. Understanding the project aspects, and technical aspects, and meeting various researchers involved in different areas of the project. Also, understanding the Autonomous Driving architecture and standards to begin work on the final deliverables.

Challenges faced during the period:

The main challenge was to get to know the 5G and 6G standards, as they are somewhat different from my expertise areas. However, I was able to manage it with my RAN experience. The actual challenge was building a more holistic version of the project.

Solutions and successes:

As I participated in project meetings and engaged in conversations and discussions, I was able to gather more details, clear my doubts, and get a better understanding of the project and its progress.

I had expertise in 2G, 3G, and 4G technologies, so transitioning to 5G and 6G was a matter of refreshing my memory and putting in some effort to learn. Research papers and study materials helped me, and within the first week, I gained enough knowledge to effectively carry out my tasks.

Personal development:

The key point is that I successfully adapted to a different domain by creatively applying my existing knowledge and skills to suit the job requirements. I firmly believe that this experience has been essential for my personal development. Furthermore, working on this project has exposed me to a valuable network of talented professionals, enhancing my confidence and skills.

Knowledge and skills from university studies that I was able to utilize in my work:

The researching methodologies enabled me to kickstart the assigned tasks, and my expertise in data engineering, especially project management and group work instilled in me the confidence to autonomously and effectively tackle the task assigned to me.

Weekly report: Week 2

Name and student number: Ekanayaka Widanage Prabhash Kumara Rathnayake 2305010

Practical training course name and code: 814601S Work Experience in ICT responsibilities

Employer: University of Oulu – Autonomous Driving Project

Working period (start-end, number of hours): Mon-Fri from 9 to 4.30 (35+ hours)

Main tasks and duties during the period:

I was primarily tasked with reviewing existing datasets on network traffic from non, semi, and fully autonomous vehicles. Additionally, I delved into the European standards and 3GPP standards to understand the accepted network parameters and available protocols. This review was mainly technical and also aimed at finding similar research and datasets for making predictions.

Challenges faced during the period:

The topic is relatively new, and the available datasets have been used in a case-focused manner rather than meeting our expectations and requirements. The knowledge database on this RAN application is scattered across several areas. Most of the RAN KPI data I was looking for was not available within the project yet. It was not possible to gain a correct understanding without delving deeply into other related concepts and requirements for autonomous driving.

Solutions and successes:

Despite not having access to exact data sets, I managed to retrieve some raw data based on existing car sensor data. I used this information to adapt to other requirements and predict traffic patterns, while also furthering my understanding of autonomous driving.

Since I couldn't access the Oulu-specific Radio Network KPI, I proactively sought out additional information from other sources. I plan to integrate available data sets from 5G and 6G testing into autonomous driving traffic systems, aligning with industry standards and meeting specific requirements backed by various research efforts.

Personal development:

I successfully overcame the limitations and efficiently managed the tasks within the given time frame. In a research project, I expect uncertainties and surprises, but I am confident in my ability to be resourceful and goal-oriented, working with what we have and seeking alternative approaches to achieve our objectives.

Knowledge and skills from university studies that I was able to utilize in my work:

I want to emphasize the importance of being adaptable and using different strategies which I learned while working on the Capstone project and other tasks. The programming and AI concepts I've learned have been very useful for this week's work, as well as the BI skills I've acquired. The confidence I've gained during my studies has helped me stay positive and be more creative and resourceful when facing challenges.