Master thesis project: Simulated testbed of urban mobility radio network traffic for testing of V2x applications

Ericsson Overview

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Position summary

Simulators facilitate the imitation of the operation of real-world processes or systems before deploying them in the real world. The tasks of this thesis will be to develop a radio network overlay for an urban mobility simulator. The integration between urban mobility and radio network simulation will be demonstrated on a public bus transportation scenario for the city of Stockholm. As such, the student will need to develop a model of mobile agents (i.e. UEs), as well as core and RAN elements.

This thesis is suitable for 1-2 students. The thesis would involve the following steps (can be adjusted to research interest of the candidate(s)):

• Study state of the art/practice traffic online simulators (e.g. SUMO), and select a proper level of urban traffic simulation (micro-, macro- or mesoscopic level)
• Study state of the art/practice radio network simulators (e.g. LENA), and select one for the integration.
• Provide a comparative analysis of the studied simulators
• Propose and implement an integration of the selected traffic and network simulator.
• Model and implement a realistic urban mobility scenario for a selected area in Stockholm (roads, mobile nodes, etc.).
• Potentially use the simulator for scalability testing of an already developed dynamic bus scheduling software

Related work:

• Veins – vehicular network simulation framework
• VSimRTI – Smart Mobility Simulation
• iTetris – open simulation platform for ITS services
• LTE-EPC network simulator (LENA)
• OMNeT++ – discrete event simulator
• SUMO – urban mobility simulator
• GAMA – agent-based modeling tool

Qualifications

We are looking for 1-2 open-minded students who seek a challenging research work with the freedom to propose and develop your own ideas. To be successful in this thesis work the candidate(s) would need the following:

• MSc studies in Computer Science or similar area.
• Excellent programming skills in C/C++
• Other preferable programming languages Python or Java
• Good knowledge of concepts in radio networks: LTE radio protocol stack, QCI bearers, RSSI, throughput, latency, etc.
• Knowledge of machine intelligence/AI planning algorithms is a bonus
• Like to build end to end prototypes and concepts
• Be fluent in English.

Available soon at ericsson.com/careers
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