Master Thesis -
Handover Optimization using AI/ML

Background
Seamless wireless connectivity is one of the fundamental requirements of 5G and beyond wireless networks targeting interruption-free mobility in high speeds (up to 500 kmph). Hence, the quest to provide solutions fulfilling beyond 5G mobility requirements has been already commenced by leading network technology vendors. Performance of the radio network inevitably depends on the network mobility configuration and the radio condition that is abruptly fluctuating especially in high mobility scenarios (e.g., highway, or high-speed trains) [1].

Conditional handover is a solution to enable seamless mobility targeting to minimize the handover failure rate especially in high mobility scenarios. In conditional handover, the handover preparation phase toward multiple target cells is performed while before the time of handover execution. This early preparation of handover toward multiple target cells increases the chance of successful handover at the cost of additional resources at the network side.

In the framework of this master thesis, we aim at using machine learning techniques to develop AI based solutions predicting the conditional handover events in advance (e.g., predicting when the wireless device leaves the serving cell toward another cell upon mobility). The inferences provided by the AI models can be used by the network to optimize radio resources allocated to the conditional handover. The outcome of this study could provide significant impact on the configuration of mobility control parameters in 5G networks and will be incorporated in 3GPP as part of the Artificial Intelligence (AI) work item.

Thesis Description
The following steps are envisioned as part of the thesis work:

- Understanding real field data collected from LTE network
- Developing parser to analyze the data
- Developing and optimizing different AI-ML models to predict different events related to the HO

The thesis will be concluded with a result presentation for the Ericsson research team.

Qualifications
This project aims at students in Telecommunication and networking engineering, computer science, computer engineering or similar.

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**Keywords**
Python, Mobility Protocols, Machin Learning, Mobility and Self Optimizing Network (SON)