

Development of AI/ML Methods for Advanced Device Localization in Beyond 5G Systems

Popular Science Summary

Everyone has found themselves lost in the city at some point, having had to use a map app from their smartphone to locate themselves. Now try to recall the same situation, but you are lost inside a building and tried to use the same app. It was telling you that you were outside the building when you were on the second floor of a mall.

You may ask yourself, how can we solve this? One possible solution for the indoor positioning problem is very popular in modern days, Artificial Intelligence (AI) and Machine Learning (ML). New communication technologies need to be followed by new methods that fix this problem. For 5G and beyond technologies, it is being studied the implementation of AI for enhancing different functionalities, one of them being device localization.

The AI methods are not referred to as a robot that can talk to us but more of an intelligent model installed in the smart devices you are using. This intelligent algorithm can be trained to predict the exact location of the device. The AI/ML models have the ability to learn from the environment, in this case from the network signals. Using this promising technology this project aims to help and improve the nowadays network positioning systems, to get better results in some scenarios.

This master thesis "Development of AI/ML Methods for Advanced Device Localization in Beyond 5G Systems" aims to explain the research done for solving the positioning problem, describing the steps taken to achieve the goals. By the end of this report, the goal is that the reader has more understanding of how device localization is currently done in 5G, acquire more knowledge about AI/ML, and how it can be implemented to improve the traditional location methods. Apart from illustrating these topics, the results of the developed AI/ML are shown, giving promising possibilities to further develop the explored AI/ML approach. Finally, some next steps are proposed for future researchers to have a starting point for improving the investigated solution.

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