

# **Bachelor's Thesis**

# Automated multi-channel FTM data collection for ML

#### Abstract

Indoor localization is a key factor in environments where traditional localization techniques like GPS are not available. An important factor is FTM, a ranging technique for WiFi. With triangulation, its ranging data can be used for localization. FTM, however, works good in free field conditions but can be affected by multi-path propagation, for which indoor scenarios are prone to. Multi-path propagation is location dependent and can not be solved by repeated measurements under the same conditions. That is why we used measurements on different channels in a previous work. Nevertheless, post-processing and merging strategies have to be developed.

## Content

The aim of this project is to use machine learning (ML) to merge FTM measurements on different frequencies. Therefore, a big dataset of training data has to be collected, for which a platform is needed. This is why this project is about programming a robot, such that it collects FTM data at different positions and on different WiFi channels. Additionally, the ground truth has to be recorded. For this task we provide ultra-wide band (UWB) hardware. After creating the platform, that collects all of the data, the robot can run in different rooms and collect ranging data, such that a ML model can be trained afterwards.

### **Requirements**

\* Good practical skills in programming. \* Interests in experimental work and robot programming (Python) \* as well as interests in supervised learning.