Chair of Communications Engineering
TUM Department of Electrical and Computer Engineering
Technical University of Munich

Master's Thesis

Application of Machine Learning in Wireless Communications

This thesis is done in collaboration with Prof. David Gesbert and Dr. Paul de Kerret at Eurecom.

Machine Learning allows devices to learn from data to improve their strategy for future actions, in either continuous (regression) or discrete (classification) mode. Recently, Machine Learning has evolved into one of the most active research fields due to its impressive success in a wide range of domains where it has often revolutionized the state of the art. Yet, its impact on communication networks has so far been very limited despite a wide array of anticipated application scenarios.

This thesis is part of a project investigating the use of mobile flying base stations, specifically an access point (AP) mounted on Unmanned Aerial Vehicles (UAVs), for wireless communication. Mounting access points on UAVs provides an additional degree of freedom in terms of mobility and system design and offers advantages in terms dynamic network deployment and fast response to varying demand. The goal of this thesis will be to investigate if Machine Learning can be used to solve challenges related to the autonomous positioning of the drone, as the position of the base station is the deciding factor in the system performance. This includes considerations about the Quality of Service, coverage, overall capacity and energy efficiency/flying time, as well as the optimality of static positioning compared to dynamic flight paths. The key features related to the use of Machine Learning to solve this challenge will be studied and the improvement will be quantified whenever possible.

Advisors

Rana Amjad
Prof. David Gesbert, Paul de Kerret (Eurecom)