Machine Learning for Channel-based User Localization in Ad Hoc Systems

SenSIP Algorithms and Devices REU

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ABSTRACT

- In 5G, massive number of users being served by cellular networks.
- Currently, machine learning (ML) algorithms are used to schedule users in centralized systems.
- Investigate using ML to predict channels to reduce the channel estimation overhead.

MOTIVATION

Improve performance in applications:
- Device-to-device communication
- Machine-to-machine communication
- Vehicle-to-vehicle communication
- Healthcare systems

PROBLEM STATEMENT

- Rely on ML and channel-based user localization to predict channels to reduce channel estimation phase with ultimate goal of improving scheduling algorithm.
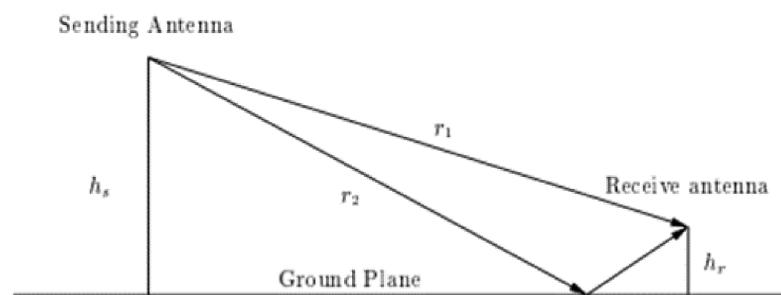
Illustration of multiple paths received at the receiver. [9]

EXPERIMENTAL METHODS

- Use GNU Radio Companion to operate USRP kits
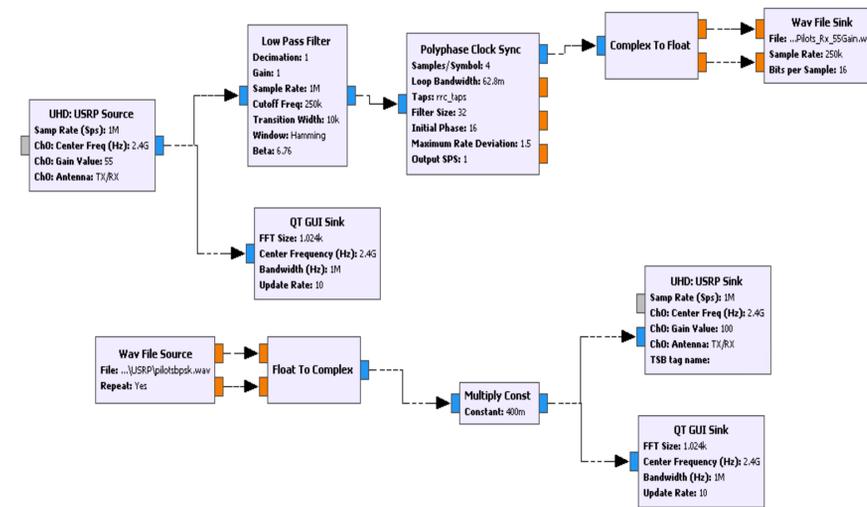
- Simulated-based datasets (MATLAB)
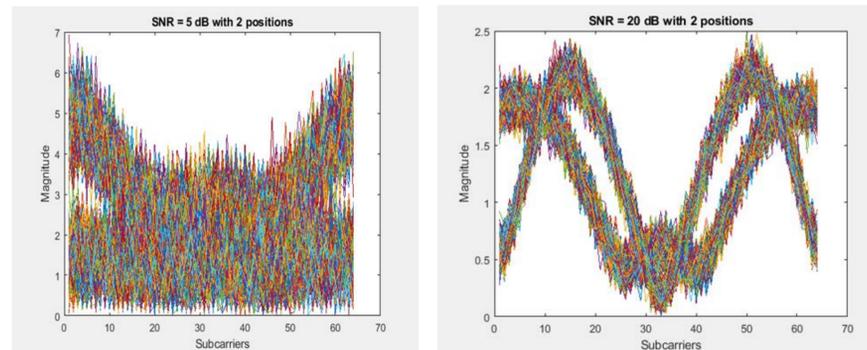
- Supervised learning classification algorithms; logistic regression (LR) and support vector machine (SVM)
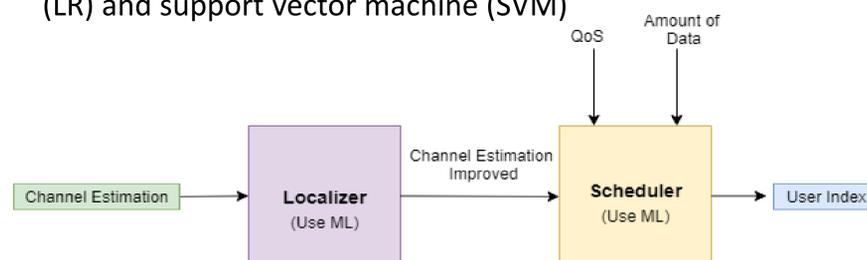
PRELIMINARY RESULTS
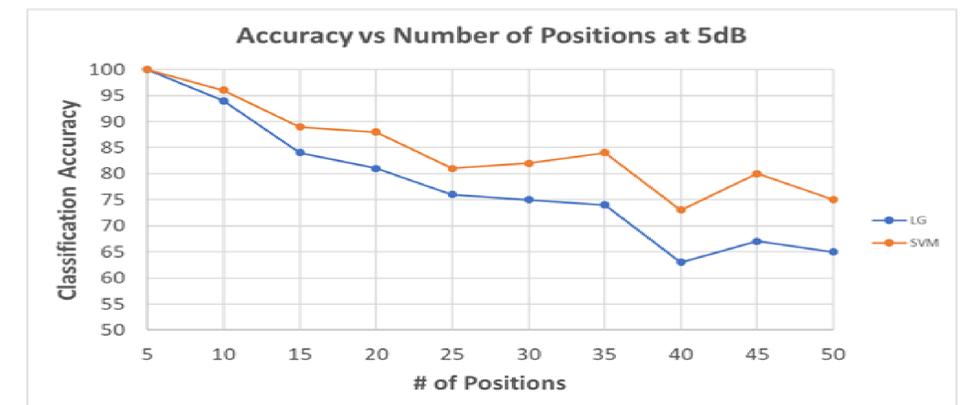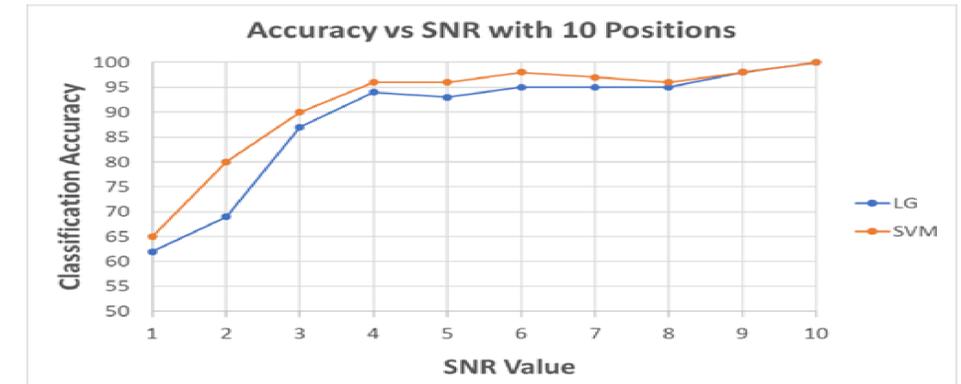
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