Master Thesis

Spectrum sensing algorithm design and evaluation

Research field

Cognitive radio

Keywords

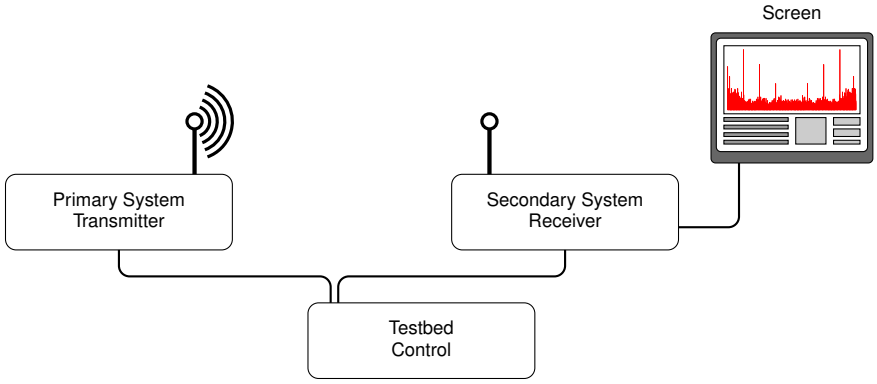
Spectrum sensing, signal processing, detection

Description

In the past decades, most parts of the radio spectrum have been licensed off to companies and public institutions by governments worldwide, leaving little to no space for new and upcoming wireless services. In stark contrast to this spectral scarcity, measurement campaigns have shown that license holders are drastically underutilizing their shares of the spectrum. The so called primary users (PUs) might only make use of their spectral bands at certain times and/or locations.

To tackle this problem, dynamic spectrum access (DSA) has been proposed. Secondary users (SUs) are to be allowed access to unused spectral bands as long as they can guarantee not to interfere with the primary usage.

One of the main enablers of dynamic spectrum access is fast and reliable spectrum sensing. Acquiring the occupation status of a spectral band can be accomplished in different ways, based on, e.g., cyclostationarity, the amount of energy in a band and properties of the eigenvalues of the received samples' covariance matrix. A number of spectrum sensing algorithms based on the aforementioned statistical signal properties have been proposed in the literature.



Goal

This thesis aims at designing a new spectrum sensing algorithm based on established ones. The new algorithm is to be evaluated and compared against other known algorithms in simulation as well as on a software-defined radio platform.

Requirements

- A good understanding of signal processing and stochastics.
- A solid foundation in MATLAB programming.

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