Abstract

Spectrum sensing is the core component in cognitive radio for ensuring effective dynamic spectrum access. Accurate signal classification in fading channels and low signal to noise ratio environment is a major challenge. Due to lack of information about the modulation scheme used it cannot distinguish whether signal present is that of the primary or any other secondary user communication. In this paper a multiclass modulation classification hierarchical framework is proposed which exploits the cyclostationary features extracted for identifying modulation form without any priori knowledge of signal properties like frequency, phase and symbol rate. The cyclostationary features extracted using spectral correlation analysis at each secondary user are treated as features and fed into the framework. The classification done is based on one-against-all approach to get the modulation scheme of the signal under observation. The performance of proposed framework for each classifiers used is quantified in terms of detection
accuracy, average training time and classification delay. It is demonstrated through simulation that an optimal feature set can be obtained to classify a range of modulation schemes with the proposed hierarchical framework. The proposed framework is found to be effective for modulation detection of signals when compared with two existing methods.

References

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Index Terms

Computer Science \hspace{1cm} Signal Processing

Keywords

Modulation recognition, Cyclostationary Features, Multi Class Classification