Spectrum Sensing to Detect N-Number of Primary Users Using N-Number Secondary Users by Applying Support Vector Machine.

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Abstract

In this paper, a cooperative spectrum sensing (CSS) model is proposed to sense n-number of primary users (PUs) using n-number secondary users (SUs) in a sequence by applying support vector machine (SVM) algorithm using three different kernels namely linear, polynomial and radial basis function (RBF) respectively. In this method, fusion centre (FC) instructs all the SUs through control channel, which PU is to be sensed by sending a pre-defined primary user identification code (PUid) and each SU sense the K^{th} PU spectrum information and stored in a database at FC. SU transmits a bit '0' or bit '1' along with PU sensing information to the FC to indicate whether it needs a spectrum band to transmit the data or not. SU add two identification codes along with sensing information to the FC which indicates that from which SU the sensing information received and which PU is sensed by the SU. For simulation 500 data samples are used and the simulation results show an accuracy of 96% and false alarm value of 1.3% in classifying the SU sensing information at FC using RBF kernel. Another method is proposed with multiclass classification by applying SVM algorithm using RBF kernel. The confusion region class is classified with zero false alarm percentage and achieves an accuracy of 99.3% in classifying the SU sensing information at FC.

Full Text

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SVM classification for 125 SUs as test samples using linear kernel

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SVM classification for 125 SUs as test samples using RBF kernel

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Percentage of False alarm for three different classes using RBF kernel

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