July 2023 · 132(2):1-14

DOI: 10.1007/s11277-023-10662-3

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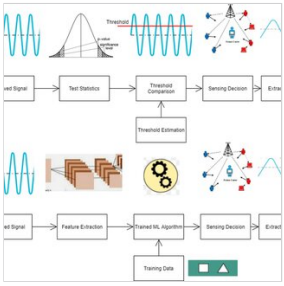
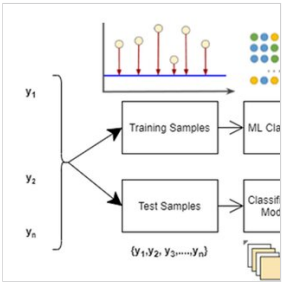
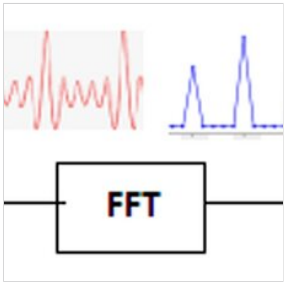
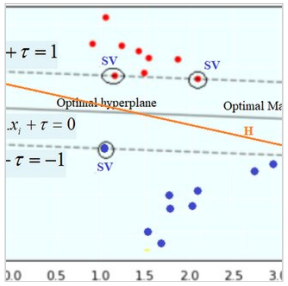
Abstract and figures

Due to the increasing interest in wireless networks, the availability of spectrum has become a challenge. With the help of cognitive radio, a promising technology, can be overcome this issue. One of the most challenging tasks in this technique is finding the available spectrum holes. The increasing interest in machine learning techniques for spectrum sensing (SS) has led to the development of several novel methods. In this paper, we use the support vector machine with the kernel transformation that are designed to improve the performance of SS, such as such as Linear kernel, Radial Basis Function or Gaussian kernel, Polynomial kernel and Sigmoid kernel. One of the main reasons why the kernel functions are used is due to the possibility of having a non-linear dataset. The performance of kernel functions is compared in terms of accuracy, precision, recall, f1_score and confusion matrix for different number of users such as 100, 500 and 1000. Among all these, Polynomial kernel SVM has shown better performance of 96%, 97% and 100% accuracy for 100, 500 and 1000 number of users. In addition, this paper presents a comparison of the proposed and existing methods, where the proposed method has shown a better performance.





Page 1

Performance Validation of Spectrum Sensing Using Kernelized Support Vector Machine Transformation

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Accepted: 13 July 2023 / Published online: 24 July 2023

Abstract
Due to the increasing interest in wireless networks, the availability of spectrum has become a challenge. With the help of cognitive radio, a promising technology, can be overcome this issue. One of the most challenging tasks in this technique is finding the available spectrum holes. The increasing interest in machine learning techniques for spectrum sensing (SS) has led to the development of several novel methods. In this paper, we use the support vector machine with the kernel transformation that are designed to improve the performance of SS, such as such as Linear kernel, Radial Basis Function or Gaussian kernel, Polynomial kernel and Sigmoid kernel. One of the main reasons why the kernel functions are used is due to the possibility of having a non-linear dataset. The performance of kernel functions is compared in terms of accuracy, precision, recall, f1_score and confusion matrix for different number of users such as 100, 500 and 1000. Among all these, Polynomial kernel SVM has shown better performance of 96%, 97% and 100% accuracy for 100, 500 and 1000 number of users. In addition, this paper presents a comparison of the proposed and existing methods, where the proposed method has shown a better performance.

Keywords Classification · Machine learning · SVM · Cognitive radio · Spectrum sensing

1 Introduction

Due to the increasing demand for cellular traffic and the need for more data transfer capacity, the radio environment is experiencing a severe shortage of spectrum. One solution is cognitive radio (CR), which can help address this issue [1]. One of the main advantages of cognitive radio is its ability to gain from the environmental elements of its environment. According to the literature [1, 2], sometimes, the spectrum can be free from the licensed users or primary users (PU) for the use of unlicensed users or secondary users (SU). This means that secondary users can easily access the empty band. The ability to detect the

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Lakshmikanth reddy · Monu Meena

The constant development of interest experienced by wireless networks makes a spectrum accessibility challenge. Cognitive radio (CR) is a promising solution to overcome the challenges in spectrum utilization. The process of finding the spectrum holes (availability of spectrum) is called spectrum sensing (SS) which is a major task in cognitive radio network (CRN). Various creative methodologies are proposed in the...

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In order to obtained efficient ways to use the spectrum frequency the cognitive radio (CR) uses spectrum sensing techniques to allocate secondary users (SU) dynamically. Exist two classes of spectrum sensing techniques, narrowband and wideband sensing. But, with the increase of demand of spectrum and new technologies like 5G, techniques based on narrowband sensing begin to became inefficient. For...

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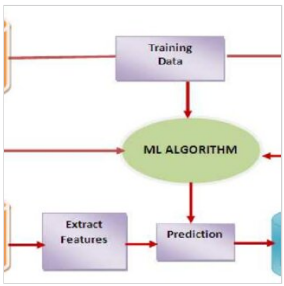

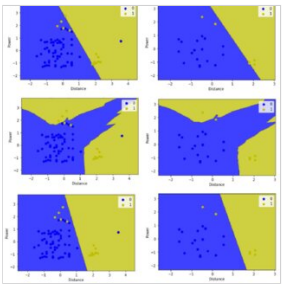

recision	recision
.0	.758
.0	.812
.0	.75

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