

# **Abstract**

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## **Design and Implementation of a Real-time Sleep Stage Monitoring System for Narcolepsy Diagnosis**

A number of illnesses that affect people's daily life are caused by numerous sleep disorders which usually have common symptoms. In order for a physician to determine the correct diagnosis and its proper treatment, an overnight sleep analysis is usually performed. The scope of this paper is to design and implement a portable system that will assist Narcoleptic patients, in real-time, to aid them into leading a more productive life. The Feature Extraction Unit of the system is implemented on a Xilinx FPGA chip with a maximum error rate of 0.1618%. The classification method used is based on Support Vector Machine (SVM) algorithm. The kernel function used in this design is the Radial Basis Function (RBF) Kernel as it provides the highest classification rates, achieving an accuracy rate greater than 90%.