# Interference Mitigation Using Particle Swarm Optimization Algorithm in Television White Space

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**Abstract:**
Television white space is a promising technology that addresses the issue of spectrum scarcity in wireless communication. Recent years have seen a rise in the number of studies focusing on the propagation characteristics of the Television White Space (TVWS), which is the frequency range between 54MHz and 790MHz. However, interference is one of the significant issues that limit the utilization of available spectrum in TV bands, lower the quality of services among cognitive(secondary) users, and cause harmful destruction to licensed users. In literature, a lot of work has been done to address the challenge of interference in TVWS networks but many of them focused on interference between primary and secondary users in order to protect the licensed (primary) users while few did among secondary users. As a result, in this work, we employ a particle swarm optimization algorithm to optimize the spectrum and reduce interference among secondary users. Furthermore, we compare the performance of particle swarm optimization with the artificial

bee colony algorithm. Simulation results obtained show that particle swarm optimization outperforms the artificial bee algorithm thus indicting its strength in reducing interference among secondary users.

## I. Introduction

The need for efficient bandwidth utilization in wireless communication has surged in recent years. A report from Cisco, most recently updated in March 2020, predicts that in this year 2023, the approximate number of internet users will reach to 5.3 billion[1]. In addition, there will be 8.7 billion mobile-ready personal devices and 4.4 billion Machine-to-Machine (M2M) connections in use by 2023 [1]. This has led to an extreme scarcity of available radio frequencies.

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