

## INTELLIGENT WIRELESS COMMUNICATION SYSTEM USING COGNITIVE RADIO

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### ABSTRACT

*The increasing demand for wireless communication introduces efficient spectrum utilization challenge. To address this challenge, cognitive radio (CR) is emerged as the key technology; which enables opportunistic access to the spectrum. CR is a form of wireless communication in which a transceiver can intelligently detect which communication channels are in use and which are not, and instantly move into vacant channels while avoiding occupied ones. This optimizes the use of available radio-frequency (RF) spectrum while minimizing interference to other users. In this paper, we present a state of the art on the use of Multi Agent Systems (MAS) for spectrum access using cooperation and competition to solve the problem of spectrum allocation and ensure better management. Then we propose a new approach which uses the CR for improving wireless communication for a single cognitive radio mobile terminal (CRMT).*

### KEYWORDS

*Cognitive Radio, wireless communications, mobility, Artificial Intelligence, Multi Agent Systems.*

### 1. INTRODUCTION

The Cognitive Radio (CR) was presented officially by Joseph Mitola in 1999, and since, this concept has been very popular with researchers in several fields such as telecommunications, artificial intelligence, and even philosophy. Joseph Mitola has defined the CR as “a radio that employs model-based reasoning to achieve a specified level of competence in radio-related domains” [1].

Most researches on CR networks have focused on the exploitation of unused spectrum. However, the CR nodes possess the necessary qualities to make a considerable progress in the reliability of wireless networks [2], which has been less explored, so that is why we were interested by improving the wireless link reliability of a video conferencing application.

The aim of our paper is to propose a technique to improve wireless communication to a video conferencing application for a mobile terminal using the CR for only one CRMT. For this, it seemed appropriate to choose a scenario on which we will apply our approach. Our technique is based on machine learning. In our future work, we will seek to improve real-time application performance related to many CRMT based on MAS.

In this paper, we first present how Artificial Intelligence techniques can be used in the Cognitive Radio networks. Then, we present a state of the art concerning the use of MAS in the