Simulate the Machine Learning Algorithm to Organize the CRAHN Network System

Publisher: IEEE

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Using available channels in a wireless spectrum, cognitive radio (CR) may automatically adjust transmission settings to optimize radio operational behaviour. To function properly, a CR ad hoc network (CRAHN) has to be dynamically capable construct autonomous and decentralized networks without negatively impacting licensed main user (PU) systems. For this reason, an effective spectrum necessitates a system structure based on artificial intelligence. This research provides a model for network planning, learning, and dynamic configuration that is based on a distributed autonomous CRAHN network system that uses reinforcement learning. The proposed optimization techniques for spectrum sensing, ad hoc network design, and context-aware signal categorization are all derived from the system model and are based on machine learning. The cognitive and detection engines may be used to examine the spectrum utilization and neighbour network status in the immediate area. To adapt to the ever-changing nature of the wireless environment, the suggested policy engine may generate network operating policies, identify policy conflicts, and infer the best course of action. Together with the erudition engine, whereby apply the recommended machine-learning methods, the decision engine arrives at the best possible settings for the CRAHN. In addition, guarantee peaceful cohabitation with surrounding systems to have excellent signal context recognition ability.

Published in: 2023 3rd International Conference on Advancement in Electronics & Communication Engineering

Metrics

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(AECE)

Date of Conference: 23-24 November 2023

DOI: 10.1109/AECE59614.2023.10428284

Date Added to IEEE *Xplore*: 15 February 2024

Publisher: IEEE

ISBN Information:

Conference Location: GHAZIABAD, India

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I. Introduction

The lack of frequency resources has become a major issue in recent years due to the increasing demand for wireless communication services[1]. Cognitive radio (CR) technology, which is a frequency-sharing mechanism accomplished via dynamic spectrum access, has garnered interest for its potential to make effective use of scarce frequency resources[2]. By monitoring the wireless environment, a CR network (CRN) may avoid interfering with accredited capital (Pus) using an unoccupied spectrum in space and time[3], [4]. The CRN has to cohabit peacefully with licensed users[5]. For the best performance in a wireless setting, the system must dynamically configure itself to make use of available resources[6], [7]. In this research, think about a distributed and self-configuring CR ad-hoc network (CRAHN) [8]. A CRAHN is more scalable and can adapt fast to changing wireless conditions[9], [10]. CRAHNs have found use in several different areas as of late due to their ability to quickly configure networks without relying on pre existing infrastructure and to make efficient use of the oftenest origin time [11], [12].

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