Interval Type-2 Fuzzy Logic System for Dynamic Spectrum Access in Cognitive Radio

Abstract

The current scenario has shown that, with the conventional spectrum access approach, the radio spectrum allocated to primary (licensed) users is hugely underutilized. While many spectrum methods have been proposed to utilize spectrum efficient manner, the spectrum access opportunistic way is happen to the most practical approach to attain near-optimal spectrum utilization by permitting secondary (unlicensed) users to sense and access available spectrum opportunistically. In this paper, we present decision making scheme in cognitive radio based on Interval type-2 fuzzy logic system. Here, classical type-1 and Interval type-2 fuzzy logic system has been compared in terms of possibility of spectrum access by the secondary user with effective and seamless communication between cognitive radio and primary user. The proposed fuzzy inference system has three input parameters such as spectrum utilization efficiency, degree of mobility and distance to primary user of cognitive radio, along with output parameter as the possibility of accessing the spectrum for secondary user based on linguistic knowledge of 27 rules. This paper mainly deals with design of decision making scheme using Interval type-2 fuzzy logic for minimizing the effect of uncertainty produced by the measurement
and environmental noise. Simulation result shows significant enhancement in dynamic spectrum allocation for secondary user with higher probability conditions.

References


Index Terms

Computer Science Fuzzy Systems

Keywords
Cognitive Radio, Type-1 fuzzy logic, Interval Type-2 Fuzzy logic System, Spectrum Access.