

## **Cognitive wireless sensor actor network: An agricultural perspective**

### **Abstract**

Intelligent environments are exposing the next revolutionary steps of development technologies in automation of building, industrial, home, and transportation systems. The new generation of Wireless Sensor Actor Networks (WSANs) technologies of sensing the environment, computing and communicating advances at faster rates. It can be conceived that the world will eventually be covered by networks of autonomous smart sensor-actor nodes which yields revolutionary applications. Nowadays WSAN can be considered as passive networks of sensing the phenomena, while fusion of Artificial Intelligence (AI) concepts and algorithms into the network's nodes provides those nodes with the ability to mimics the human behavior in sensing and reacting which give the network the ability to be autonomous for specific application. This paper presents the fusion of artificial intelligence represented by Fuzzy Inference System (FIS) with WSAN for greenhouse climate control. Smartness of current WSAN (SWSAN) is proposed based on FIS while the conventional control methods are not efficient in terms of energy, labor interference, productivity and flexibility. In this paper, Fuzzy Inference System (FIS) has been designed and fused within the coordinator node of WSAN, and hardware and software of networks nodes and sensors have been presented. Indeed, this paper describes the new era of cognitive WSAN based on AI paradigm and shows a reprehensive set of new applications and identifies several possibilities of creating the smartness concepts of currently Wireless Sensor-Actor Network (WSAN). The primary concept of automation, wireless technologies and cognitive approach of WSAN within diverse application and particularly for agriculture application are presented and discussed.

**Keywords;** Smart wireless sensor actor network, Artificial intelligence, Cognitive green-house climate control, Fuzzy logic control.