Abstract

This paper proposes a hardware model that provides new fire detection and control mechanism with the interface of artificial neural network and fuzzy logic. This work is based on the integration of hardware module and implementation of artificial neural fuzzy inference system (ANFIS). The hardware consists of temperature sensor, smoke sensor, flame detector and a microcontroller unit. The sensors sense the environment and send data to microcontroller for further processing. Here the microcontroller will work as a control unit. The hardware model of the system also consists of the GSM module for sending the warning message if severe fire exists, and a GPS module in order to indicate the fire location. This technique expresses the idea of implementing Fuzzy logic on the real time data which is collected by the sensors. The system aims to predict fire danger by sensing various parameters i.e. smoke, temperature etc. at the early stage. Artificial neural fuzzy inference system (ANFIS) has been utilized in order to enhance the reliability and certainty of real time fire detection mechanism and to reduce the false alarm rates. The system will focus on collection of data from sensors, data fusion through fuzzy logic and quantification of fire warning level. This neural network based fire alarm system
can fuse a variety of data set obtained from sensors and also provide the improved ability to adapt in the environment and predict fire in an accurate manner, which has great significance for the safety of human lives as well as property.

References

Conference on Neural Networks, IEEE, July 16-21, 2006.

Index Terms

Computer Science Fuzzy Systems

Keywords

Fire detection, fuzzy inference system, fuzzy logic, data fusion, artificial neural Network (ANN), graphical user interface (GUI)