DESIGN AND ANALYSIS OF AN INTELLIGENT FIRE DETECTION SYSTEM FOR CARGO COMPARTMENT OF AIRCRAFT

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Abstract

The fire detection system and fire warning are design features of an aircraft. The fire detection system protects the aircraft and passengers in case of actual fire during flight. But spurious fire warning during flight creates a panic situation in flight crews and passengers. The conventional fire alarm system of an aircraft is triggered by false signal. The artificial neural network has capability of fault tolerance and robust in nature. Its performance is dependent on its training, which is done on the real time data collected from the aircraft. Neural network based fire detection system provides real time surveillance, monitoring and automatic alarm. An intelligent fire detection system is developed based on artificial neural network in MATLAB using three inputs such as temperature, smoke density and CO concentration. This information helps in determining the probability of three representative of fire condition which is Fire, smoke and No fire. The simulated test results show that the identification error rates are very less. This greatly reduces leak check rates and false alarms. The neural network based fire detection system uses a variety of sensor data and improves the ability of system to adapt and accurately predict fires. It sends early alarm when the fire/smoke occurs and helps to reduce the spurious fire warning.

Keywords: Fire Detection, Artificial Neural Network, Intelligent Fire Alarm, Aircraft Safety