Abstract

The line of sight and the early stage of the fire process problem could be solved with the second type of sensors. A new technology called Wireless Sensor Network (WSN) is nowadays receiving more attention and has started to be applied in forest fire detection. The Wireless nodes integrate on the same printed circuit board, the sensors, the data processing, the wireless transceiver and they all consume power from the same source- batteries. Unlike cell phones, WSN do not have the capability of periodic recharging. The sensors are devices capable of sensing their environment and computing data. The sensors sense physical parameters such as the temperature, pressure and humidity, as well as chemical parameters such as Carbon Monoxide, Carbon Dioxide and Nitrogen Dioxide. The sensors operate in a self-healing and self-organising wireless networking environment. One type of wireless technology is ZigBee which is a new industrial standard based on IEEE 802.15.4. This technology emphasises low cost battery powered application and small solar panels and is suited for low data rates and small range communications. Wireless Sensor Networks have seen rapid developments in a large number of applications. This kind of technology has the potential to be applied almost everywhere; this is why the research interest in sensor networks is becoming bigger and bigger every year. Forest fire detection and prevention is another real problem faced by a number of countries. Different methods for monitoring the emergence of fires have been proposed. The early methods were based on manned observation towers but this technique was inefficient and not entirely effective. Subsequently, camera surveillance
systems and satellite imaging technologies were tried but this also proved ineffective at being able to efficiently monitor the initial start of the surface fire. For example, camera networks can be installed in different positions in the forests but these provide only line of sight pictures and may be affected by weather conditions and/or physical obstacles. The revolution of WSN technology in recent years has made it possible to apply this technology with a potential for early forest fire detection. These sensors need to be self-organised and follow an efficient algorithm, interfaced with other technologies or networks. A number of studies have considered using WSN in wood fire systems. In this work, we relied on WSN and all nodes only use temperature sensors as they are programmed on a certain threshold temperature, above it the node will send an alarm message to the sink. This concept relies solely on the node behaviour to alert of crises possibility using simple node components to provide detection and information on whether this is a peaceful fire, or the beginning of wild fire. The key in this method is to make decisions by tracking the fire propagation and check the logic behind it.

References


Index Terms

Computer Science

Wireless
Keywords
Wireless Sensor Network  WSN  efficient system for forest fire detection  efficient detection method for forest fire systems

Wireless Sensor Network for Forest Fire Detection and Decision Making