Emerging Methods for Early Detection of Forest Fires

Abstract:

Apart from causing tragic loss of lives and valuable natural and individual properties including thousands of hectares of forest and hundreds of houses, forest fires are a great menace to ecologically healthy grown forests and protection of the environment. Every year, thousands of forest fires across the globe cause disasters beyond measure and description. This issue has been the research interest for many years; there are a huge amount of very well studied solutions available out there for testing or even ready for use to resolve this problem. This work will summarise the technologies that have been used for forest fire detection.

Need:

The problem with forest fires is that the forests are usually remote, abandoned/unmanaged areas filled with trees, dry and parching wood, leaves, and so forth that act as a fuel source. These elements form a highly combustible material and represent the perfect context for initial-fire ignition and act as fuel for later stages of the fire. The fire ignition may be caused through human actions like smoking or barbeque parties or by natural reasons such as high temperature in a hot summer day or a broken glass working as a collective lens focusing the sun light on a small spot for

a length of time thus leading to fire-ignition. Once ignition starts, combustible material may easily fuel to feed the fires central spot which then becomes bigger and wider. Millions of hectares of forest are destroyed by fire every year. Areas destroyed by these fires are large and produce more carbon monoxide than the overall automobile traffic. Monitoring of the potential risk areas and an early detection of fire can significantly shorten the reaction time and also reduce the potential damage as well as the cost of firefighting.

Plan:

Nowadays, two different types of sensor networks are available for fire detection, camera surveillance and wireless sensor network. The development of sensors, digital camera, image processing, and industrial computers resulted in the development of a system for optical, automated early recognition and warning of forest fires. This optical system has totally different techniques and is a system based on intelligent analysis of the atmosphere instead of detecting the smoke or fire glow. Forest Fire Finder tracks the way the atmosphere absorbs the sun light, which depends on the chemical composition in the atmosphere. Different composition has different absorption behaviour, so Forest Fire Finder can recognise the organic smoke from burnt trees and the industrial smoke in range of 15 Km. The equipment can be installed in tree crowns for faster detection.