Literature Survey

Emerging methods for Early Detection of Forest Fire

Author name: Moragues J

Year of publishing: 2007

Description: Forests are the protectors of earth's ecological balance. Forest fires can potentially result in a great number of environmental disasters, causing vast economic and ecological losses as well as endangering human lives. In order to preserve natural resources and protect human safety and properties, forest fire monitoring and detection have become a significant solution, which attract an increasing interest around the world. Especially, the growth number of large scale worldwide forest fires has made automatic fire detection as an important technique for the early fire alarm. Unfortunately, the forest fire is usually observed when it has already spread over a large area of forest, making fire control and stoppage is very difficult and impossible. The result is devastating loss and irreparable damage to the environment and atmosphere (30% of carbon dioxide (CO_2) in the atmosphere comes from forest fires), in addition to irreparable weaken the ecology. Among other dreadful consequences of forest fires are long-term calamitous effects such as impacts on local weather patterns and global warming.

Author name: Dr. Satendra and Dr. Ashutosh Dev Kaushik

Year of publishing: 2014

Description Forestry is a comparatively labour-intensive activity. Forests and the diverse forest-based enterprises provide direct and indirect employment. As per Global Forest Resources Assessment (GFRA) 2010 about ten million people are employed in forest management and conservation globally, but many more are directly dependent on forest for their livelihood.. It is estimated that about 250 million person days are generated annually under various plan schemes taken up for forestry development in forest areas and other government lands. In Forest - An Overview 28 Forest Fire Disaster Management addition, about 75 million person days are generated annually under agro-forestry and farm-forestry programmes. Non-plan activities, which include protection, maintenance and harvesting of forests, are estimated to generate about 100 million person days

Author name: Yuan C

Year of publishing: 2015

Description: In this paper, an unmanned aerial vehicle (UAV) based forest fire detection and tracking method is proposed. Firstly, A UAV-based forest fire detection and tracking system is

presented first. Most of the early researches detect fire by videos, and then researchers gradually use cameras to do fire detection in the real situation. Vision-based fire detection usually makes use of three dominant features of fire: color, motion, and geometry. Variety of vision-based methods primarily depends on image processing algorithms. In order to achieve the goals of automatic forest fire detection and tracking, this paper conducts a preliminary research on developing a set of image processing algorithms that is capable of effectively detecting and tracking forest fire. The basic idea of the proposed method is to adopt the channel "a" in Lab colour model to extract fire pixels by making use of chromatic features of fire.

Author name: Hang W.B

Year of publishing: 2005

Description: Fire flame detection is an important issue because it closely related to every people's safety and property. The frequently used flame detection methods are based on particle sampling, temperature sampling, and air transparency testing, to the traditional ultraviolet and infrared flame detectors. However, most of these detectors suffer from some serious problems. They require a close proximity to the flame. In this paper, a new visual real-time flame detection method is proposed based on, machine vision techniques and the theory of chromatics to meet the above requirements. The intuitive HSI colour model is chosen to describe flame features extracted from a set of flame images. The colour separation method is applied to roughly segment regions with fire-like colours based on the extracted flame features. Then, the image difference method and the invented colour masking technique based on chromatics are used to remove spurious fire-like regions, such as objects with similar fire colours or areas reflected from fire flames. They have developed the rules for brighter and darker environments. After segmenting the fire region based on HSI rules the lower intensity and lower saturation pixels are removed to avoid fire aliases (fire like region). They also formed a metric based on binary counter difference images to measure the burning degree of fire flames such as no fire, small, medium, and big fires.

Author name: Turgay, Demirel H

Year of publishing: 2009

Description: A rule-based generic colour model for flame HBRP Publication Page 1-8 2019. All Rights Reserved Page 4 Research and Applications: Embedded System Volume 2 Issue 3 DOI: [To be assigned] pixel classification is proposed. The proposed method is use the yCbCr colour space to construct a generic chrominance method for flame pixel classification. In addition to translating the rules developed in the RGB and normalized Rgb to YCbCr colour space, new rules are developed in YCbCr colour space which further alleviate the harmful effects of changing illumination and improves detection performance.