Literature survey

P. Tamil Mathi and Dr. L. Latha[1] Proposed this method and definition on fire detection.To detect fire at early stage we use smoke which is the good indicator of fire which is visible before flames. Characteristics of smoke need to be considered such as transparency, its response to environmental condition, its shape. In open environment smoke detection pose a serious challenge in such areas sensors may be used but this has limitations such as time and wide area coverage. To overcome this video fire detection systems are used.

P. Piccinini, S. Calderara, and R. Cucchiara [2] proposed a method based on the wavelet model and a color model of the smoke. The proposed method exploits two features: the variation of energy in wavelet model and a color model of the smoke. Smoke is detected based on the decrease of energy ratio in wavelet domain between background and current. The deviation of the current pixel color is measured by the color model. Bayesian classifier is used to combine these two features to detect smoke.

Ignacio Bosch, Soledad Gomez, Luis Vergara et al. [3] have proposed a paper based on a scheme of infrared sensors. This scheme based on infrared image processing performs the immediate detection of any fire in the forest to determine the presence or absence of fire. Sensor networks are widely used and help the human capabilities to monitor large forest areas. This paper describes a scheme for automatic forest surveillance with the help of IR sensors. The paper describes only about detecting the fire and sending images of detected fire using image processing

Yogesh Deshpande, Krishi Savla, Crispin Lobo, Jahnavi Patel & prof. Shivani Bhattacharjee et al. [4] has proposed a paper on Forest monitoring systems using sensors, wireless communication, and image processing. The forest monitoring system will keep a track of the conditions that are good for the fauna of the forest and collect data which includes temperature, humidity, entry and exit of animals and the various parts of the forest

Wen- Homg et al. [5], used HSI colour model to separate the fire pixels. 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. Their result includes false positives and false negatives. But there is no way to reduce the false positives and false negatives by changing their threshold value.

Töreyin, et al. [6] proposed a system equipped with an optical camera and a methodology that combines feature extraction (moving pixel/region extraction, color-based segmentation, and wavelet analysis in temporal and spatial domains), followed by a voting-based classifier.

Dimitropoulos (2015) [7] proposed an algorithm where a computer vision approach for fire-flame detection is used to detect fire at an early stage. Initially, background subtraction and color analysis is used to define candidate fire regions in a frame and this approach is a non-parametric model. Following this, the fire behavior is modeled by employing various Spatio-temporal features such as color probability, flickering, spatial and spatiotemporal energy. After flame modeling the dynamic texture analysis is applied in each candidate region using Linear Dynamical Systems, Histogram and Mediods. LDS is used to increase the robustness of the algorithm by analyzing temporal evolution of pixel intensities. Pre-processing is done after this to filter non-candidate regions. Spatio- temporal analysis is done to increase the reliability of the algorithm. The consistency of each candidate fire region is estimated to determine the existence of fire in neighboring blocks from the current and previous video frames. Finally, a two-class SVM classifier is used to classify the fire and no fire regions

[1]P. Tamil Mathi PG Student Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore, India Dr. L. Latha ASP Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore, India

[2] Surya.T.S, Suchithra.M.S. Survey on Different Smoke Detection Techniques Using Image Processing. International Journal of Research in Computer and Communication Technology, 16-19.

[3]Bosch, Ignacio & Gomez, Soledad & Vergara, Luis. (2007). Automatic Forest Surveillance Based on Infrared Sensors. 572- 577. 10.1109/SENSORCOMM.2007.4394981.

[4] Y. Deshpande, K. Savla, C. Lobo, S. Bhattacharjee, and J. Patel, "Forest Monitoring System Using Sensors, Wireless Communication, and Image Processing," 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA), Pune, India, 2018, pp. 1-6, DOI: 10.1109/ICCUBEA.2018.8697708.

[5]Wen-Bing Homg, Jim-wen Peng and ChinYuan Chen, “A new image based real time flame detection method using colour analysis”, Proc. of IEEE Network sensing and Control, ICNSC, pp. 100-105, 2005

[6]Töreyin, B.U.; Dedeo ˘glu, Y.; Güdükbay, U.; Cetin, A.E. Computer vision based method for real-time fire and flame detection. Pattern Recognit. Lett. 2006, 27, 49–58

[7] Kosmas Dimitropoulos, Panagiotis Barmpoutis, and Nikos Grammalidis (2015). Spatio Temporal Flame Modeling and Dynamic Texture Analysis for automatic video-based fire detection, IEEE transactions on circuits and systems for video technology, vol. 25, no. 2.