LITERATURE SURVEY :

Surapong Surit, Watchara Chatwiriya proposed a method to detect fire by smoke detection in video. This approach is based on digital image processing approach with static and dynamic characteristic analysis. The proposed method is composed of following steps, the first is to detect the area of change in the current input frame in comparison with the background image, the second step is to locate regions of interest (ROIs) by connected component algorithm, the area of ROI is calculated by convex hull algorithm and segments the area of change from image, the third step is to calculate static and dynamic characteristics, using this result we decide whether the object detected is the smoke or not. The result shows that this method accurately detects fire smoke.

P.Piccinini, S. Calderara, and R. Cucchiara 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.

R.Gonzalez proposed a method to detect fire based on Wavelet Transform. Stationary Wavelet Transform is used to detect Region of Interest. This method involves three steps preprocessing, SWT, histogram analysis. In preprocessing unwanted distortions are removed and image is resized and transformation of resized image is performed. High frequencies of an image are eliminated using SWT and the reconstruction of image is done by inverse SWT. Image indexation is performed to group the intensity colors that are closed to each other. Histogram analysis is used to determine the various levels of indexation. After analysis a comparison is made with non-smoke frame and non-smoke images are eliminated. These three are combined and fire is detected.

Osman Gunay and Habiboglu proposed a system based on Covariance Descriptors, Color Models, and SVM Classifier. This system uses video data. Spatio-temporal Covariance Matrix (2011) is used in this system which divides the video data into temporal blocks and computes covariance features. The fire is detected using this feature. SVM Classifier is used to filer fire and fire-like regions. This system supports only for clear data not for blur data.

Dimitropoulos (2015) 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 phase. The first phase involves segmentation of image using LBP. LBP is a texture operator whose value is computed using image's center and neighboring pixel values. Further accuracy is improved using Wavelet Transform and complicated data is classified using this approach. 2D Discrete Wavelet Transform is used for decomposition in this system. 2 images should be used as input and the sub bands of every image are compared with the other, if sub bands are equal the images are same else different.

Hamed Adab proposed another system which is based on Indexing. GIS techniques and remote sensing provides further assistance. The indexing may be structural fire index, Fire risk index, Hybrid fire index. Depending on the geographical condition of the area the indexing differs. Validations of indices are based on hot spot data. Structural fire indices show static information and it does not change over short time span and used to predict the risk in advance. Fire risk index changes as the vegetation or climate changes.