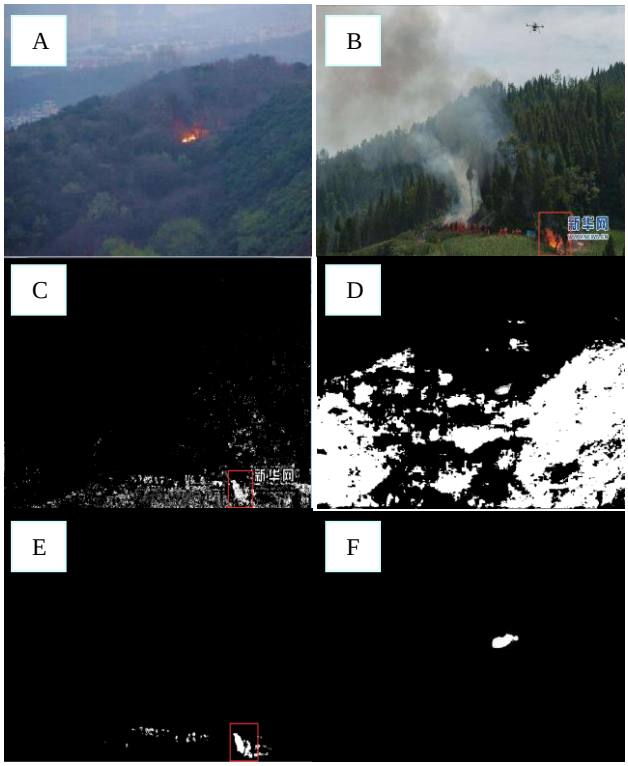

Figure 5 Forest Flame Extraction Results Based on S-Component, Cr Component and K-means Clustering(A,B:the original image of the forest flame, C,D:the S component segmentation result, E:Cr component segmentation result)

Table 1. Forest Flame Sample Data Processing Results

Number of samples	Flame Segmentation Accuracy	Accuracy （%）	Sample description
50	48	96	Large area of forest small flames
50	50	100	The larger flames
11	10	90.9	Dark green trees
8	7	87.5	Yellow grass
20	19	95	Summer forest
4	4	100	fireFall forest fire
5	5	100	Winter forest fire
18	17	94.4	Sunny forest fire
21	20	95.2	Cloudy forest fireThe
3	3	100	forest is bare yellow land
6	5	83.3	Sunset
9	8	88.9	sun
12	11	91.7	Forest fauna

By experimenting with 150 samples, when the initial clustering center is 5, the flame can not be segmented accurately when the k-means is used for secondary division. After repeated experiments, when the initial cluster center is 8, the flame recognition effect is better. Compared with the HSI color model, based on the YCrCb color model, the k-means clustering algorithm can eliminate the external noise interference more effectively and divide the flame area more accurately. In the case of less external interference sources, the accuracy of the flame segmentation of 94 or more.

The experimental samples of this paper mainly from the National Forest Fire Network, Baidu, Google Photo Gallery and so on. A total of 100 samples of forest fireworks were collected and 50 negative samples were collected.

4 CONCLUSION

In this paper, we propose a flame segmentation algorithm based on the combination of color feature and K-means clustering of forest flame image. The K-means clustering of the forest flame image is initialized k to 8 and is converted to YCrCb color space. By separating the color channels, the gray value of the forest flame area in different color space chromaticity channels is analyzed in the sample image. The gray value of the flame on the chromaticity channel is analyzed, and the threshold of the forest flame is set to judge the image Whether there is a flame. This algorithm greatly improves the accuracy of forest flame recognition, reduces the rate of misjudgment and the rate of failure, so that it can meet the accuracy and real - time of forest fire identification. Through a large number of experiments, based on the forest flame image color characteristics and K-means clustering algorithm can quickly and accurately segment the flame image, and achieved good recognition results.

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