

minus luma)), median, grassy and edge detection filters. The flame image is extracted from the image passed through these filters. In the 2nd stage, the motion feature of the flame was used. At this stage, after the brightness reduction is made, the movements in the pixels are detected by comparing the previous and next frames. Detected moving pixels are marked. The moving area is detected by passing the marked pixels through the red color filter. In the 3rd stage, the presence of fire is detected in the entire image with the CNN algorithm. The flow chart showing all these stages is shown in Figure 1.

As a result of all stages, a decision is made about the existence of the fire on the image. Necessary actions can be taken as a result of



Fig. 2. Sample images from the dataset

2.3. Image Processing

In computer vision applications, the human vision mechanism is imitated. In this way, object detection on images or information about the image can be obtained [37]. The human eye performs its optimum vision function by adjusting itself to external environmental conditions. At this stage of the fire detection framework, filters were applied to detect the fire on the images. These filters are dimming, HSL, YCbCr, median, grassy and edge