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Fire Detection and Localization in Video Surveillance Application

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Abstract: *In recent years there has been rapid development in technology which has made human life easier in several aspects. Fire is an abnormal event which can cause significant damage to lives and property. fires are an uncontrollable disaster which causes damages to the society as well as endangering nature. Fire Analysis and Prediction System is made to detect the fires then performs prediction of the hearth spread. Fire accidents pose a major threat to the world. These could be prevented by deploying fire detection systems, but the prohibitive cost, false alarms, need for dedicated infrastructure, and the overall lack of robustness of the present hardware and software-based detection systems have served as roadblocks in this direction*

Keywords: Convolutional Neural Networks (CNN), Deep Learning, Fire Detection

I. INTRODUCTION

Fire is an uncontrollable disaster to ecological systems, infrastructures, and human and animal lives. This change makes the fires more frequent and causes damage to human lives and property. Fire is a natural disaster or can be in the form of human negligence. The recent forest-fires in Australia reminded the world, the destructive capability of fire and the impending ecological disaster, by claiming millions of lives resulting in billions of dollars in damage. In order to achieve high accuracy and robustness in dense urban areas, detection through local surveillance is necessary and also effective

II. LITERATURE SURVEY

In this work risk management for forest fire has been aimed it includes many measures like preventing fire, preparedness for fire protection people. Optimization of geographic information such as creating thematic layers, development of digital terrain model, analysis of matrix substrate and soil type, all this recorded risk objects will help to respond in the event of forest fires. [1]

In this work Fire detection based on the colour of the flame using RGB, HSV, YCVCR colour model is discussed by Yen Feng, Luo Ning Zhao, Wu Benxi Ang. Algorithms like YOLO, YOLOv2 are used to detect the location of multiple classes at one time. The captured images are detected for fire and smoke and with the score of fire and smoke the accuracy value is computed based on the value the fire situation is printed. [2]

III. MODELLING AND DESIGN

3.1 SDLC–Waterfall Model

It is performed by the senior members of the team with inputs from the customer, the sales department, market surveys and domain experts. This information is then used to plan the basic project approach and to conduct product feasibility study in the economical, operational and technical areas. Planning for the quality assurance requirements and identification of the risks associated with the project is also done in the planning stage

3.2 Waterfall Model–Design

Based on the requirements specified in SRS, usually more than one design approach for the product architecture is proposed and documented. This is reviewed by all the important stakeholders and based on various parameters as risk

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assessment, product robustness, design modularity, budget and time constraints, the best design approach is selected for the product. A design approach clearly defines all the architectural modules of the product

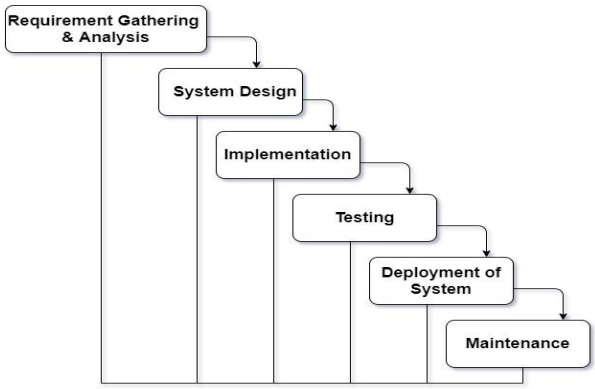

Fig 1.0. Waterfall Model

IV. BLOCK DIAGRAM

Fire detection using hand-crafted features is a tedious task, due to the time- consuming method of features engineering. It is particularly challenging to detect a fire at an early stage in scenes with changing lighting conditions, shadows, and fire-like objects; conventional low-level feature-based methods generate a high rate of false alarms and have low detection accuracy. To overcome these issues, we investigate deep learning models for possible fire detection at early stages during surveillance.

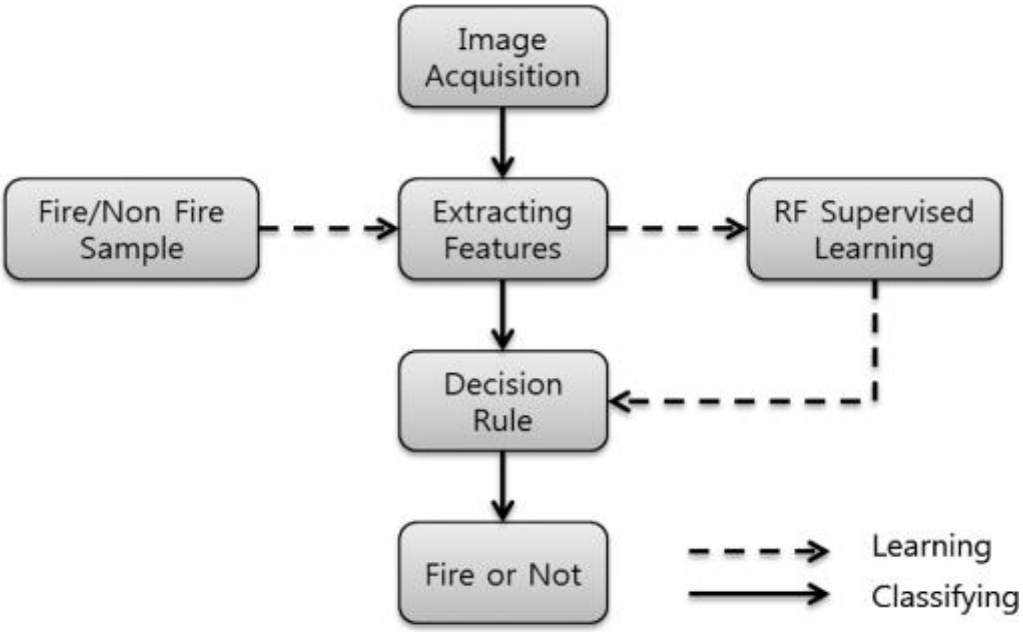

Fig 2.0. Block diagram

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Outputs

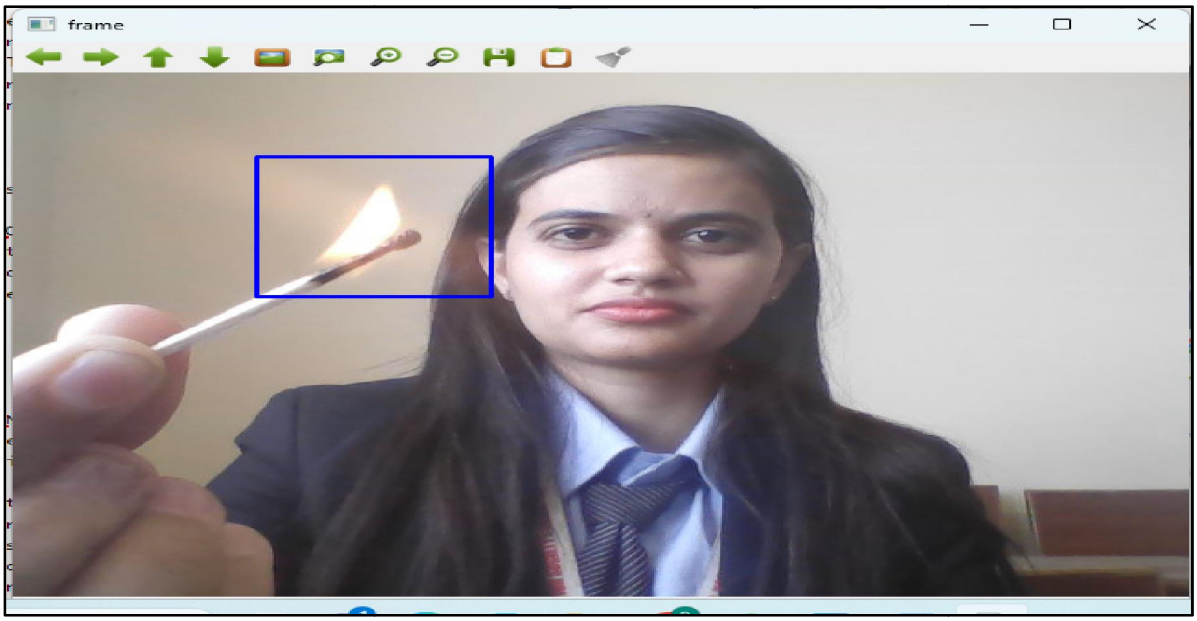

Fig 3.0 Fire Detection

We give input image to our model to train that model. After the training process the testing process is done. In testing process, it uses testing datasets. the camera if fire is shown then blue colour square is assign to the area of fire. It shows in how much area is covered by fire.

```
Fire alarm initiated
Mail send initiated
Mail is already sent once
Fire alarm initiated
Mail is already sent once
Fire alarm initiated
```

Fig 4.0 Message Displayed

After Detecting fire the alarm is activated and mail sent to the user or particular department to take an immediate action to save lives.

V. CONCLUSION

Fire Detection is tantamount to saving lives and property. Thus, investing in a good fire alarm system will help prevent a tragic incident from happening. Fire accidents will be able to detect using the cameras. We will be implementing a fire detection system to detect fire by capturing images. The system uses CNN, Deep learning techniques. In this system, so that, CNN approach for fire detection using cameras. Our approach can identify the fire under the camera surveillance. The system will be helpful to disaster management teams in controlling fire disasters in a short time. Thus, avoiding huge losses.

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