Fire Detection Using CNN IN PI

Fire detection and alert is one such task done with utmost accuracy. Using sensors may not be as accurate as inaccurate reading may lead to loss of both lives and property, as Advancement in the field of Artificial intelligence provided opportunity of integrating with edge devices. However, with the introduction of deep learning algorithms, indoor fire detection is becoming more efficient and accurate. This research is to show you how.

Three major steps are now

i)Preprocessing data and Training model:-

The Dataset contains images of fire and normal images. So the model we train is for binary classification. The dataset is loaded into colab and preprocessed using keras and tensorflow.split into test and train data. Then train data is used by the standard cnn models for better depth resolution ,depth and accuracy. Here we standard cnn architectures like

1)MOBILENET-94.3%

2)SQUEEZENET-86.4%

3)EFFICIENT NET-74.4%

Now we take tf.lite.save.model and save mobilenet model.

ii)Setting Up Raspberry pi:-

First take an SD card and insert it in the pc. Download raspberry pi OS 32-bit using a pi imager. Then insert the SD card into the memory card slot of pi. Connect the HDMI cable to the HDMI slot of the pi and Desktop and power bank for power supply.

Connect the peripherals like the keyboard, mouse and webcam.

Login using the default username-pi and password-raspberry.

Now enable ssh command using sudo raspi-config in the command prompt.

Now connect laptop to same wifi and open vnc viewer connect wirelessly

iii)Prerequisites for implementing cnn in pi:-

For any CNN model to work, we need TensorFlow and OpenCV

a)**Tensorflow** is a library used for multiple machine learning tasks.

The tflite_runtime package is a fraction of the size of the full TensorFlow package. It includes the bare minimum code required to run inferences with TensorFlow Lite, primarily the Interpreter Python class. That is used for detection. Can be installed on the pi by running python3 -m pip install tflite-runtime in the command prompt.

b)**OpenCV** is a python library that allows you to perform image processing and computer vision tasks. It provides a wide range of features, including object detection, face recognition, and tracking.

OpenCV can be installed by using the command

```
pip install opencv-python
sudo apt-get install libcblas-dev
sudo apt-get install libhdf5-dev
sudo apt-get install libhdf5-serial-dev
sudo apt-get install libatlas-base-dev
sudo apt-get install libjasper-dev
sudo apt-get install libqtgui4
sudo apt-get install libqt4-test
```

for better working of OpenCV. Is now installed in Pi. Now run python code fire.py in thony.