



HACKFEST '22

Envision; Evaluate; Execute;

System Zombies

Final Evaluation



Meet Our Team

System Zombies



Kashish

Computer Science and Engineering

Team Leader



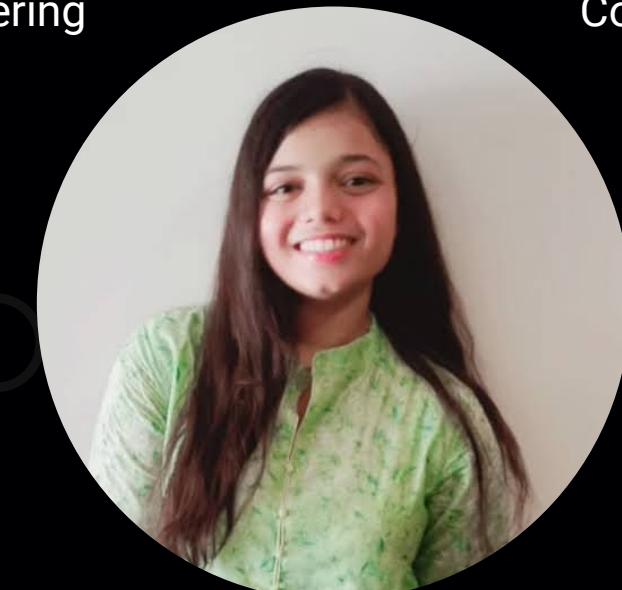
Dhruvil Patel

Computer Science and Engineering



Jainendra Tripathy

Applied Geophysics



Kriti Thawaria

Computer Science and Engineering



Dhruv Pathak

Computer Science and Engineering





Problem Statement

FIRE ALARM ALERT

When you sleep at night, one thing that you want the most is peaceful nights where your family is safe from any kind of hazards. With the vision to keep the house and public places safe from unexpected fires arising from short circuits, excess overheating of electronic appliances and other relatable factors, the intention of this project is to design an automatic informer system with codes to inform the concerned authorities in case of unexpected fires. This system will be able to help reduce the losses caused in machinery as well as the environment we live in. We are going to implement the various algorithms used to fulfil the purpose of informer.

From sensing to actuation, this system will perform all tasks on its own ensuring the safety of the people. This system will create a difference in the modern world as this is going to be better than carbon dioxide based fire extinguishers present in any general building of India.



TECH STACK

- PYTHON
- CV2 MODULE
- NUMPY MODULE
- TENSORFLOW
- KERAS



Solution

01

Sensing , Processing
& Actuation

03

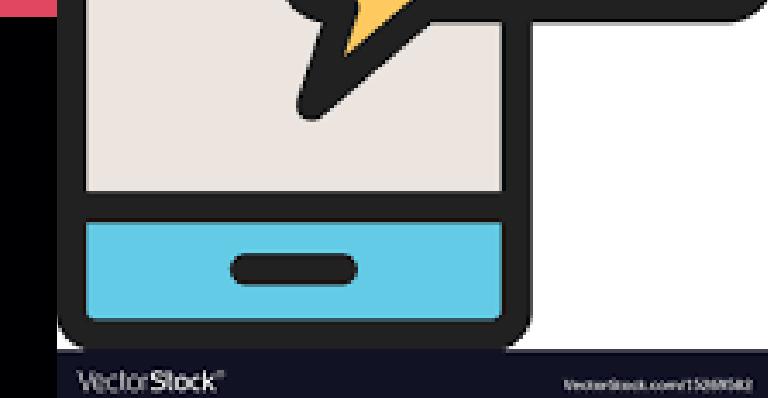
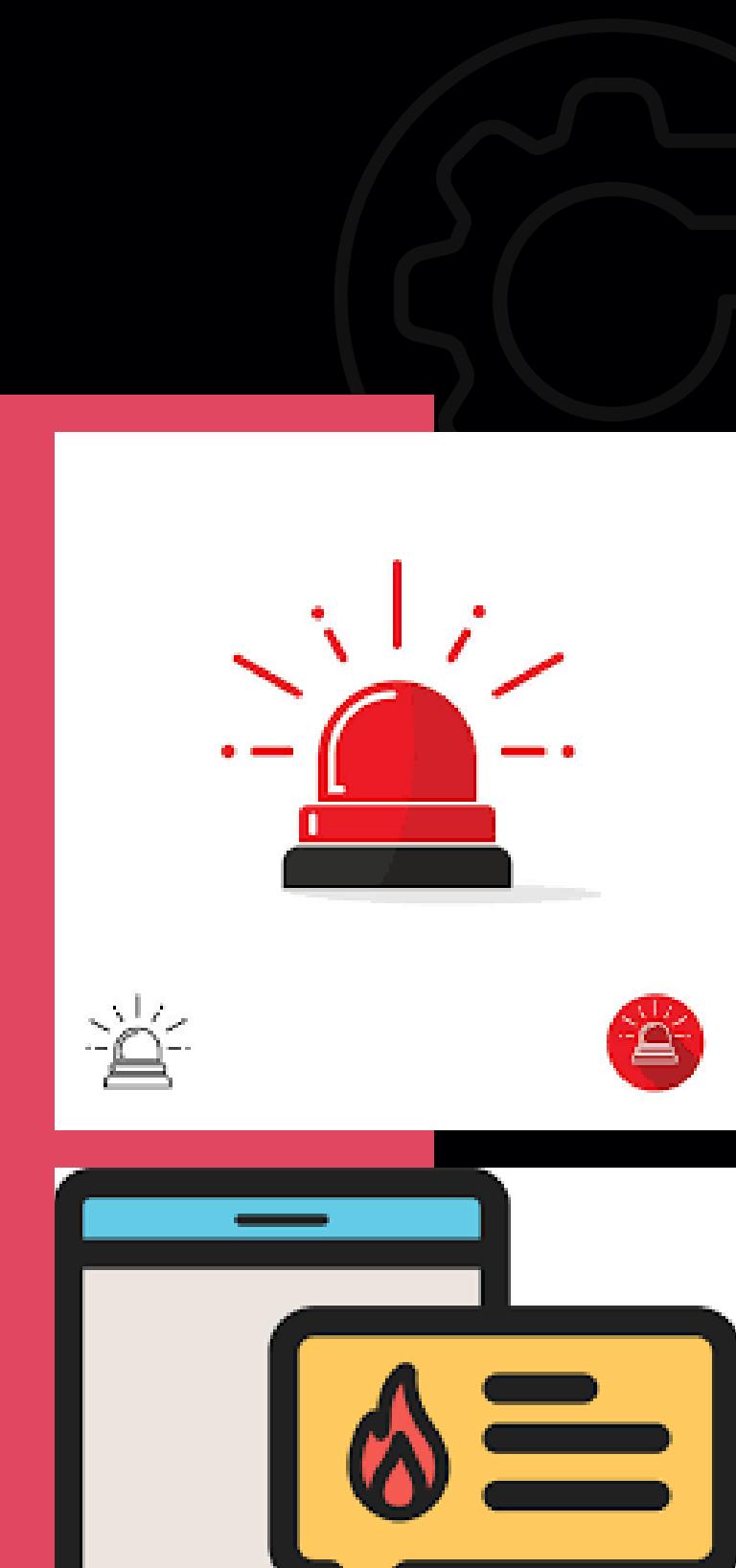
Libraries used : Tensorflow
& keras
Under Keras ,
ImageDataGenerator ,
Inception V3 and layers like
dense,Global Average
Pooling 2D,Input,Dropout
have been used.

02

For sensing , frames would
be extracted from the live
feed captured by the camera

04

While training and
validation,data augmentation
has also been done using
rescale , horizontal
flip,rotation,height shift and
fill mode.





05

While developing the InceptionV3 model , input is being taken in RGB format of size 224×224 .Our model contains 1 input layer i.e. Global average pooling2d , 3 dense layers , 3 dropout layers and 1 output layer.

07

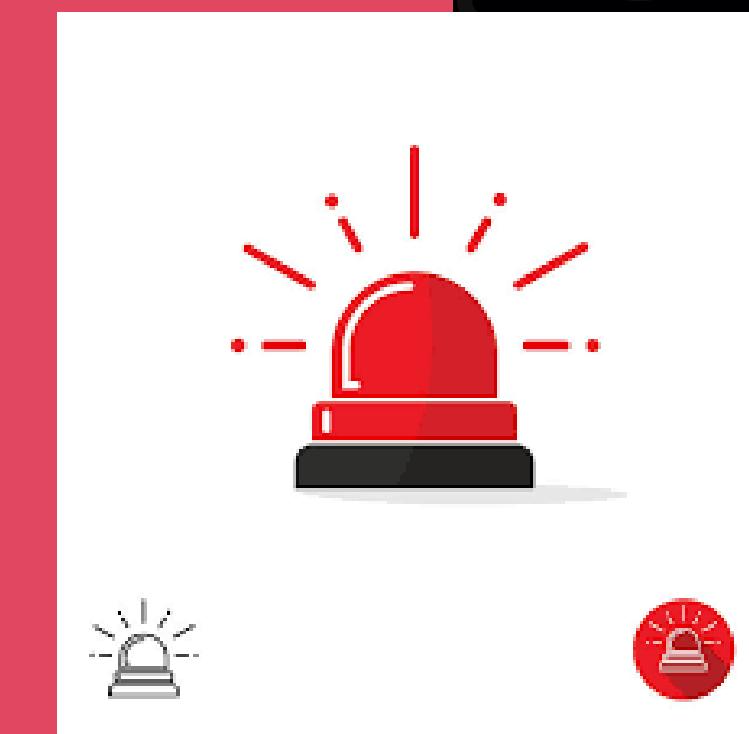
We have chosen to train the top 2 inception blocks and for this we will freeze the first 249 layers and unfreeze the rest

06

For dense layer , ReLU activation function has been used. For predictions , softmax function has been used.

08

Next we need to recompile the model for these modifications to come in effect . For this, we have used SGD with a low learning rate of 0.0001





09

For application of our model on live feed , again the libraries CV2, numpy,PIL , tensorflow and keras have been imported.

11

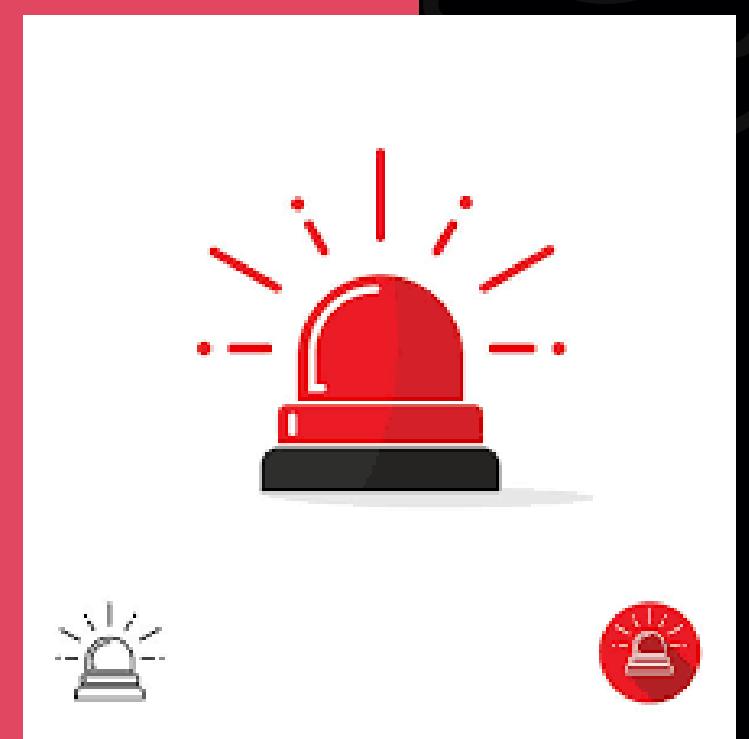
Then the captured frame have been converted into RGB and resized into desired 224×224 size format.

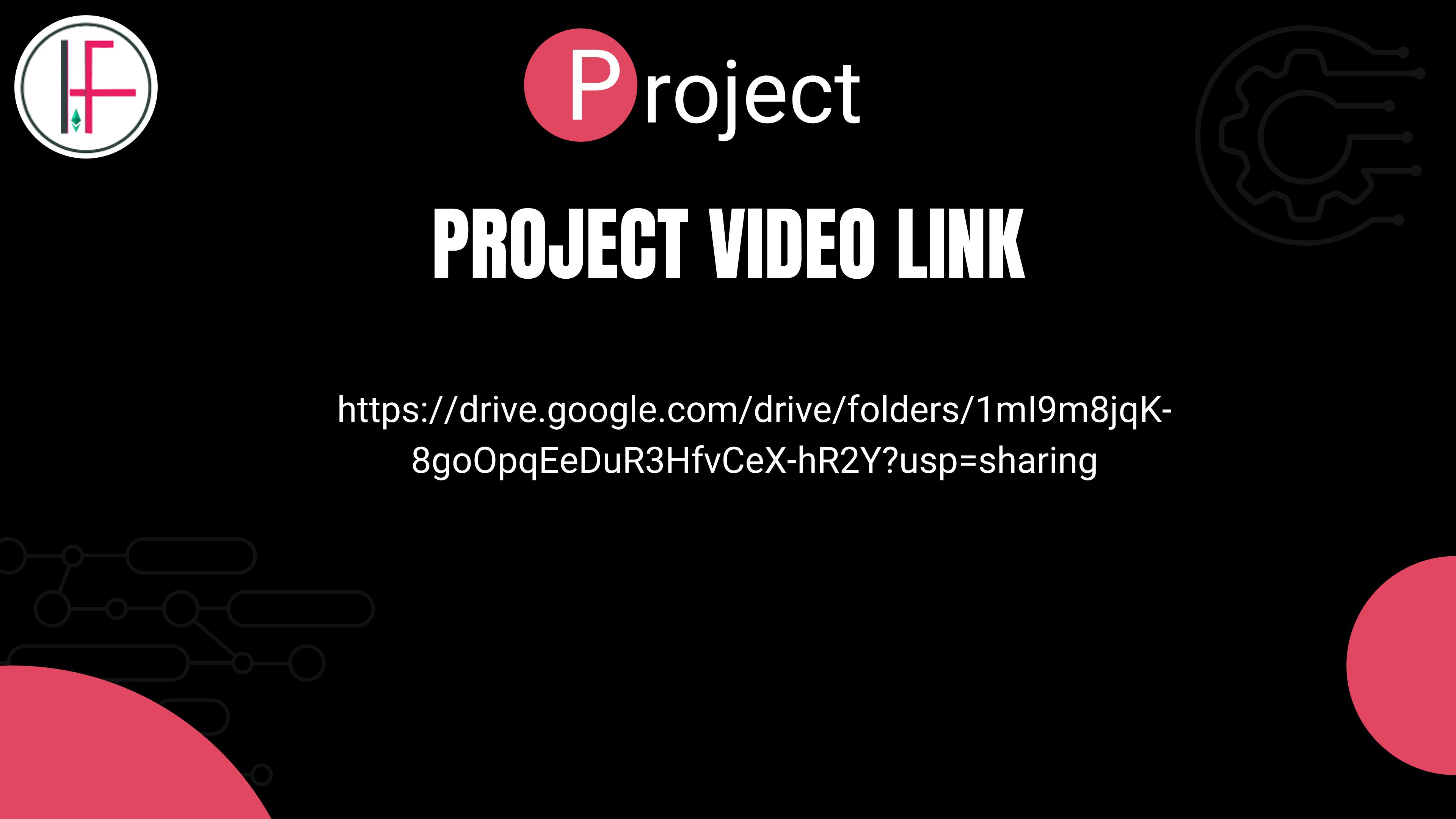
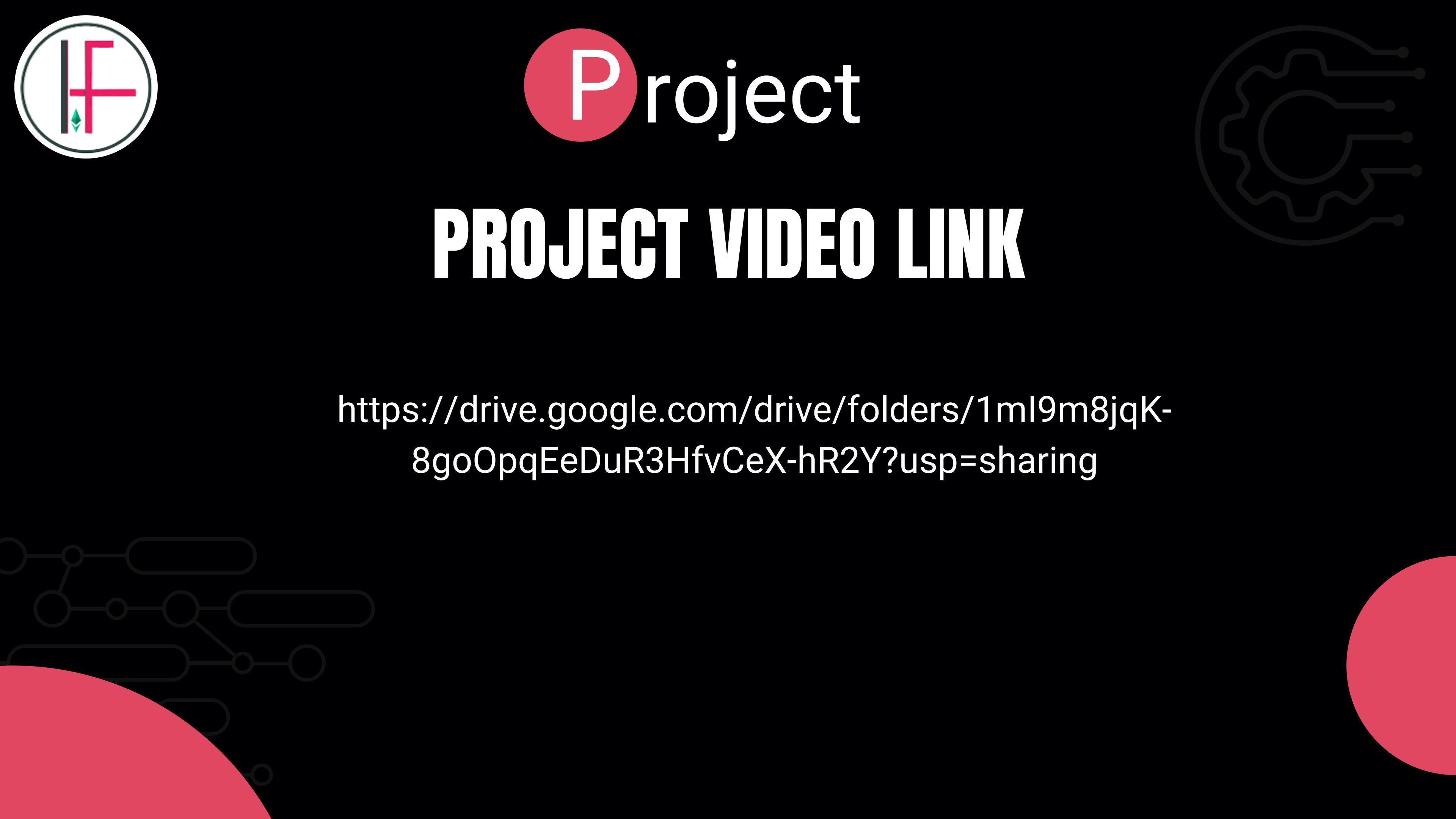
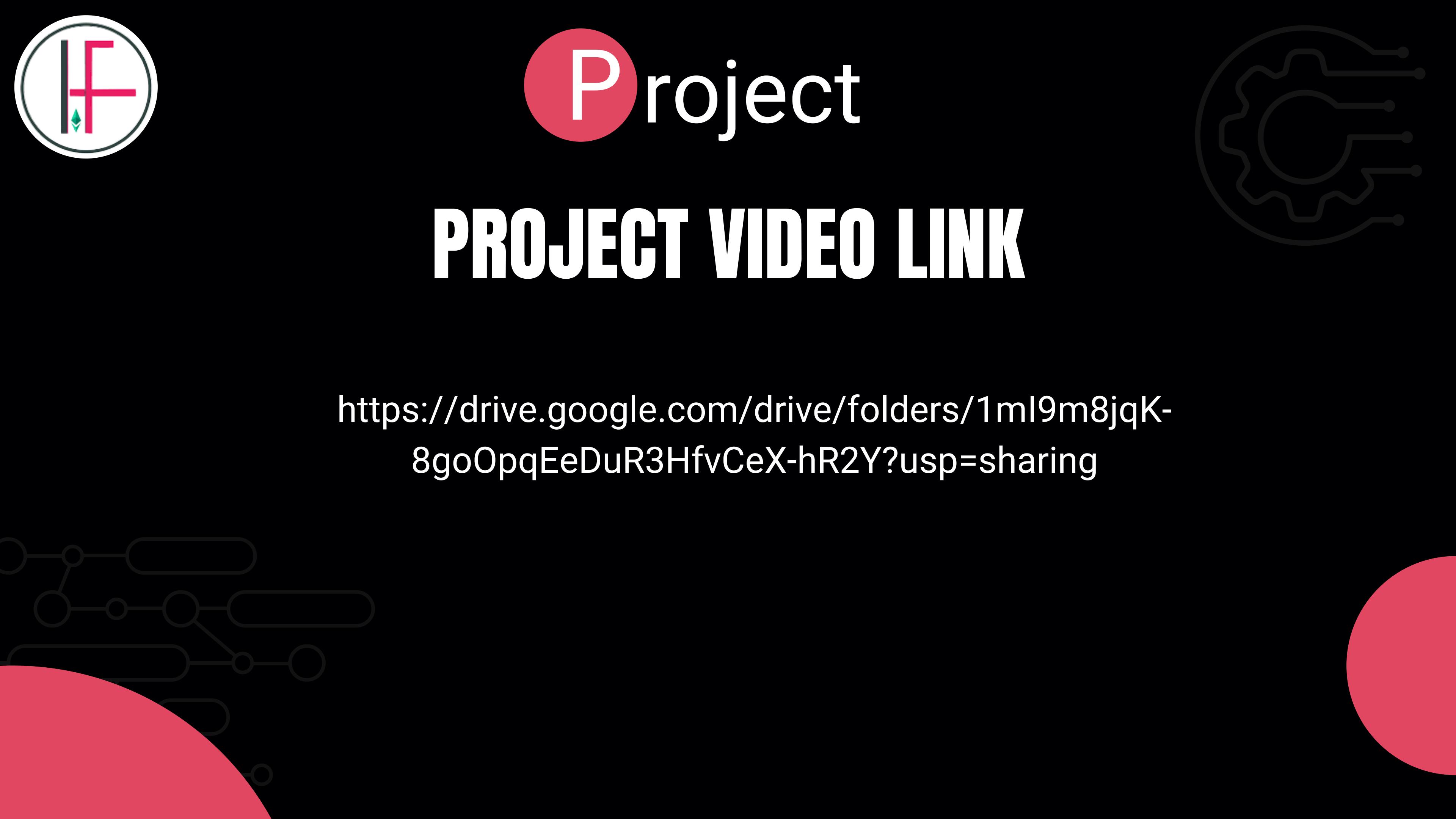
10

Then we loaded the saved model using CV2 and while FRAME READING , a range of 100 frames have been set up.

12

Now the argmax function of numpy has been used to call the predict method on model to predict fire in the image.If prediction comes out to be zero(0),it means there is fire in the frame and then accordingly,beep sound and concerned phone calls would be made.







BEHIND THE SCENES

Project





Project



GitHub Link:

https://github.com/dhruvilun522/fire_alarm/blob/main/fire1.ipynb



Technological Benefits

- **Early Detection of Smoke and Fire:**

We all have heard the old saying ‘prevention is better than cure’. Having a fire alarm and detection system can give you early alerts in case of a fire. Therefore you can prevent any serious disaster.

- **Reduce the Risk of Damages:**

Identifying a fire as early as possible can let us minimize the damages it can cause to your business. If we want to protect our business better.



- **Risk Reduction for Employees:**

The responsibility for monitoring alarm systems no longer falls to your employees if you employ a third-party service. If a fire does break out, employees will all be able to leave the site safely without having to notify emergency services about the alarm activation, which might endanger their lives .

- **24/7 Protection:**

Fire alarm monitoring is performed 24 hours a day, seven days a week, 365 days of the year, ensuring that your location is always under surveillance. As a result, you will have greater potential for fire and improved overall safety than if your system was unmonitored.

- **Solving parking Issues:**

In the recent time we have came across several cases of automobiles catching fire in the parking area or in the open spaces in such situation our project plays a crucial role.



Bibliography



- <https://www.kaggle.com/datasets/atulyakumar98/test-dataset>
- https://www.tensorflow.org/api_docs/python/tf/keras/optimizers/SGD
- https://keras.io/api/models/model_training_apis/
- <https://www.kaggle.com/datasets/phylake1337/fire-dataset>
- <https://www.twilio.com/>
- <https://www.twilio.com/blog/make-phone-call-python-twilio-programmable-voice>
- <https://www.youtube.com/playlist?list=PLfP3JxW-T70G5FB9vcmT6T3xnmvFvqV7w>



Contributions



Kashish

Computer Science and Engineering

Trained and validated dataset used in inception V3 model and prepared basic coding sets and prepared the final ppt for presentation.



Dhruvil Patel

Computer Science and Engineering

Developed the Inception V3 model, worked on OpenCV for taking live feeds through webcam and giving beeping sound



Jainendra Tripathy

Applied Geophysics

Worked on OpenCV , helped in developing the Inception V3 model and worked on sending e-mails along with the beeping sound.



Kriti Thawaria

Computer Science and Engineering

Proposing problem statement, supervising all the activities, attending tech talks,making presentations.



Dhruv Pathak

Computer Science and Engineering

Helped in building the basic testing and validation model using in Inception V3 model and attended the tech talks.



THANK YOU

System Zombies

System

