REAL TIME EMOTION DETECTION FROM FACE

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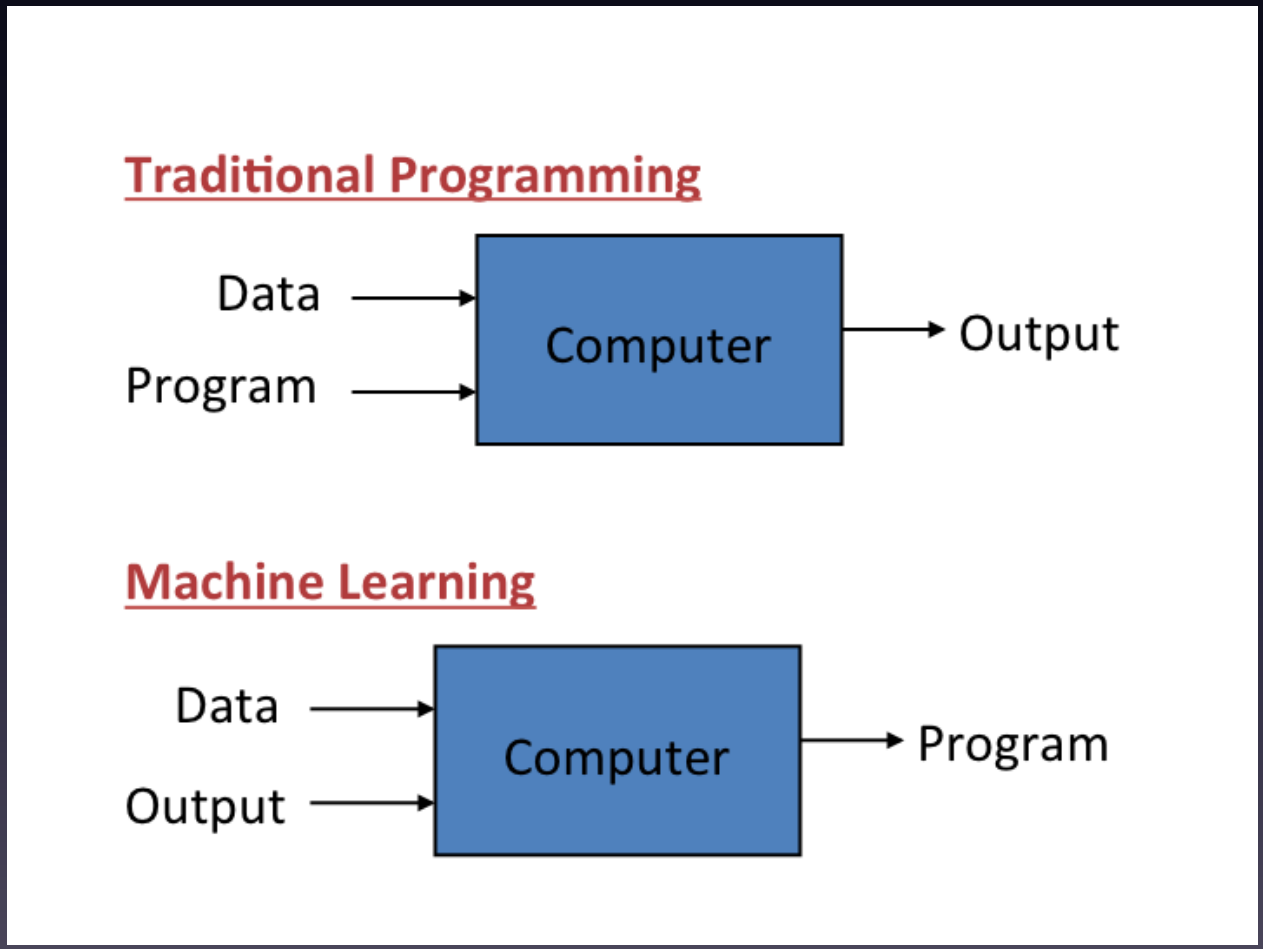
Abstract

Our project can be used to identify different types of emotions from the Face.

Machine Learning

- Machine learning is a field of computer science that gives computer systems the ability to "learn" with data, without being explicitly programmed.



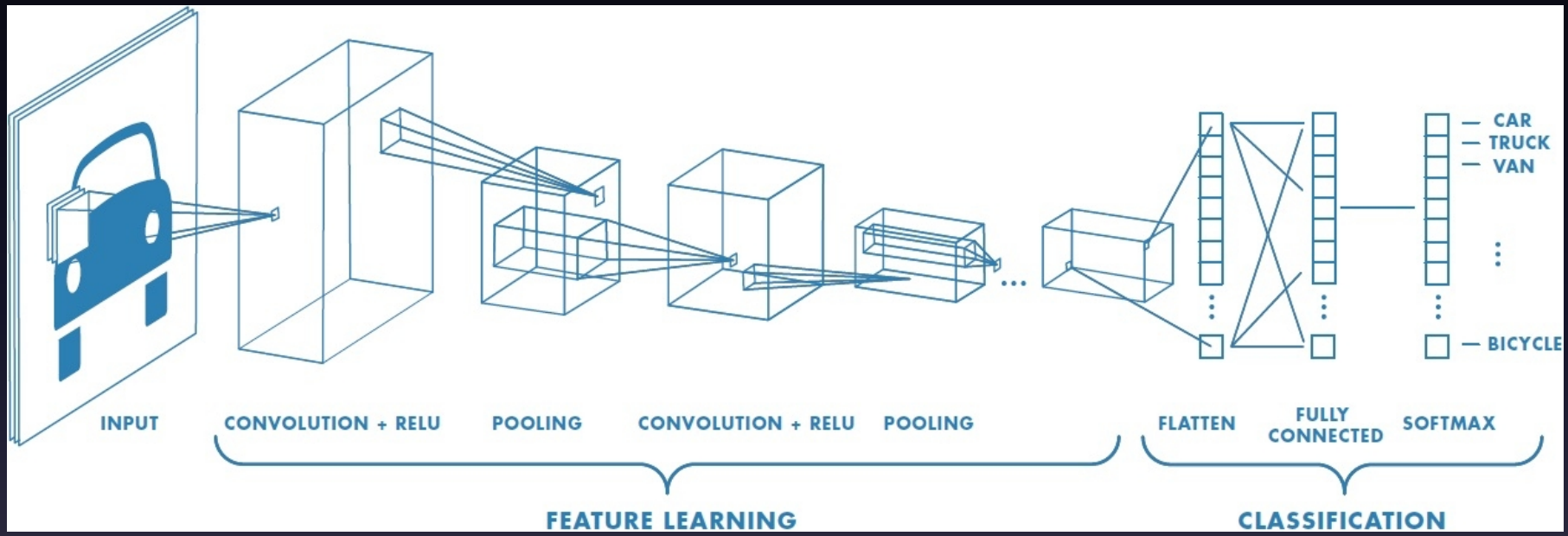
OpenCV

- OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library.
- The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms.
- These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects,etc.

Conventional Neural Network

- In machine learning, a convolutional neural network (CNN, or ConvNet) is a class of deep, feed-forward artificial neural networks that has successfully been applied to analyzing visual imagery.
- They are made up of neurons that have learnable weights and biases
- Each neuron receives some inputs, performs a dot product and optionally follows it with a non-linearity.
- They learn directly from image data, eliminating the need for manual feature extraction

CNN Contd..



Example of a network with many convolutional layers.

Keras

Keras is a high-level neural networks API, written in Python and capable of running on top of TensorFlow.
Use Keras if you need a deep learning library that:

- 1.Allows for easy and fast prototyping (through user friendliness, modularity, and extensibility).
- 2.Supports both convolutional networks and recurrent networks, as well as combinations of the two.
- 3.Runs seamlessly on CPU and GPU.

Implementation

- For implementation on CNN , keras deep learning library is used.
- Keras Contains all the functions for the implementation of CNN

Whole Process Can be divided into following steps

- 1.Dataset Generation
- 2.Training CNN and Building a Model
- 3.Emotion Detection using Trained Model

Dataset used for Traning

DataSet used For training is FER-2013 (Facial Expression Recognition)

Samples of the FER-2013 emotion dataset

FER 2013 Dataset

- The data consists of 48x48 pixel grayscale images of faces.
- This dataset contains 35,887 grayscale images where each image belongs to one of the following classes angry, disgust,fear, happy, sad, surprise, neutral.
- train.csv contains two columns, "emotion" and "pixels".

FER 2013 Dataset

- The "emotion" column contains a numeric code ranging from 0 to 6, inclusive, for the emotion that is present in the image .
- The "pixels" column contains a string surrounded in quotes for each image. The contents of this string a space-separated pixel values in row major order.

Training A CNN Model

We require mainly 2 model for emotion detection

- 1.Face Detection Model
- 2.Emotion Model

Face Detection Model

- A Pre-trained Detection Model is used to identify the face Coordinates in the Frames
- A Haar-like Feature is used to train the Detection model
- Haar-like features are digital image features used in object recognition.
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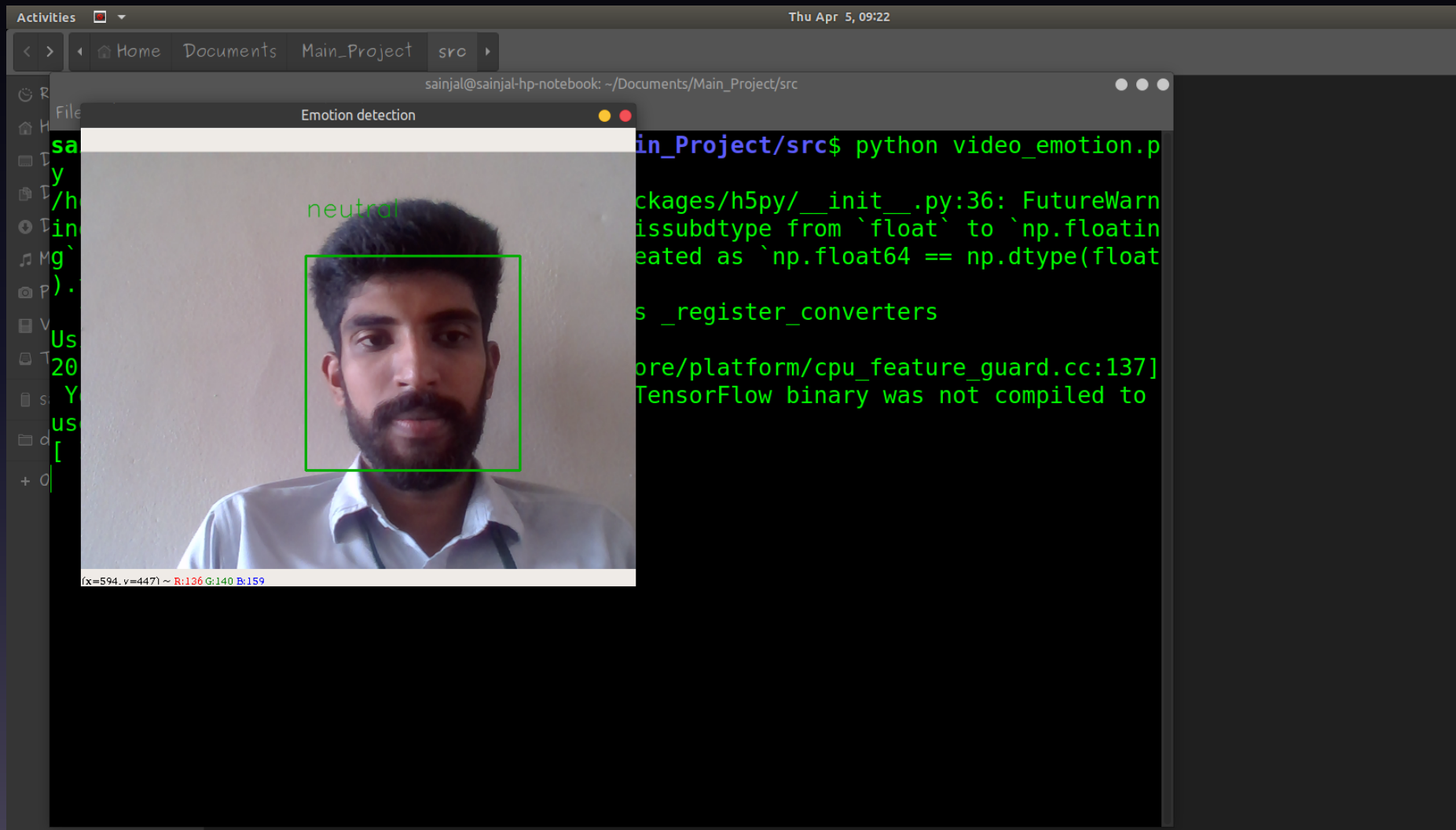
Emotion Model

An Emotion model is build using FER 2013 Dataset.Each image in the dataset is processed and given to the model.The Model extract features from the pixel values of the 48*48 image

Emotion Detection

- Each Frame is extracted from the live video through a Web Cam
- Using the face detection model face coordinates is identified from the frames
- Map these face into a 48*48 pixel frame
- And These frame is given to emotion model for prediction
- Emotion label is displayed in the face along with face boundary

Screenshot


Activities
Thu Apr 5, 09:22
Home
Documents
Main_Project
src
sainjal@sainjal-hp-notebook: ~/Documents/Main_Project/src
Emotion detection
neutral
in_Project/src$ python video_emotion.p
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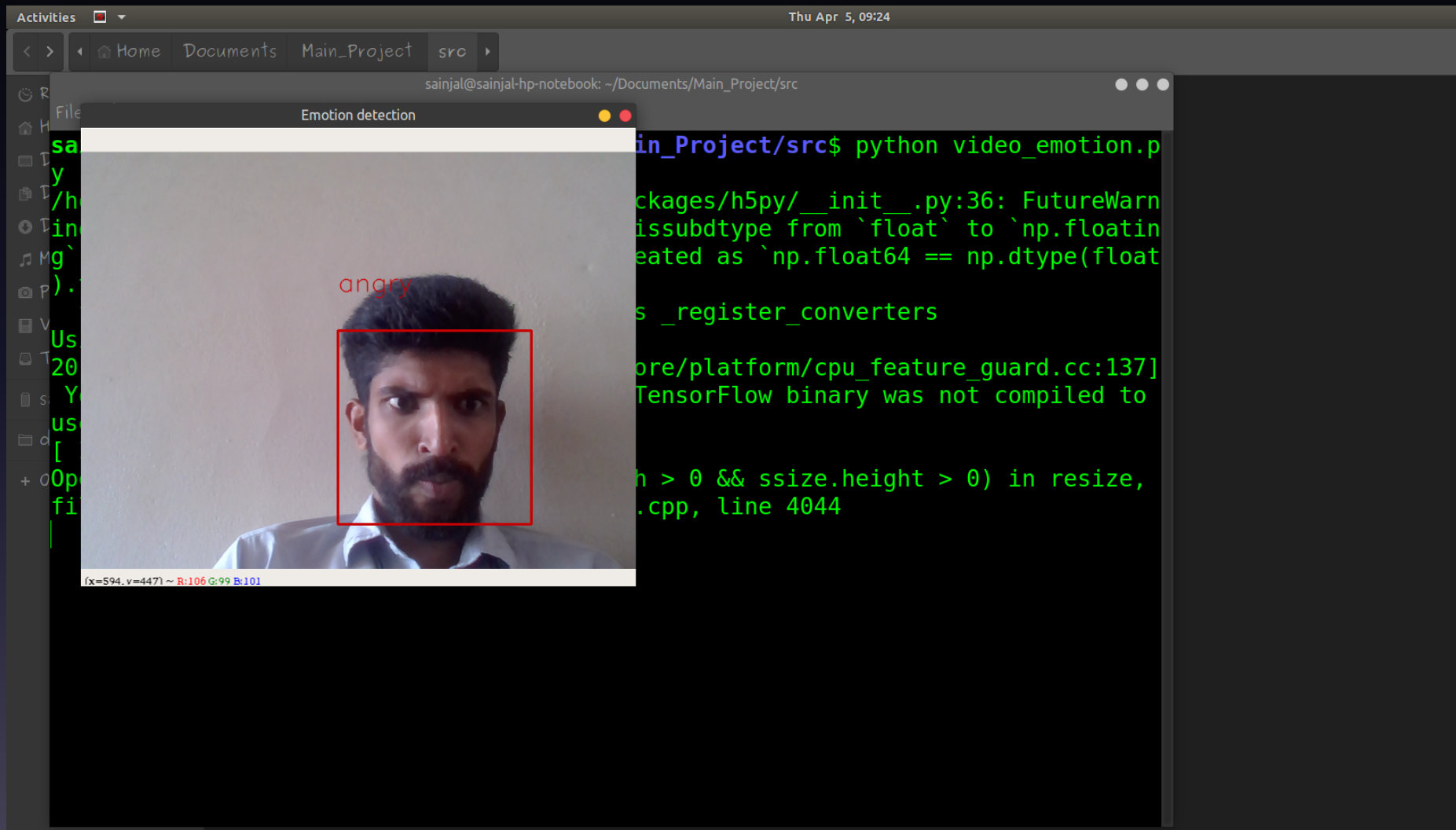
Screenshot


Activities
Thu Apr 5, 09:24
Home
Documents
Main_Project
src
sainjal@sainjal-hp-notebook: ~/Documents/Main_Project/src
Emotion detection
angry
in_Project/src$ python video_emotion.p
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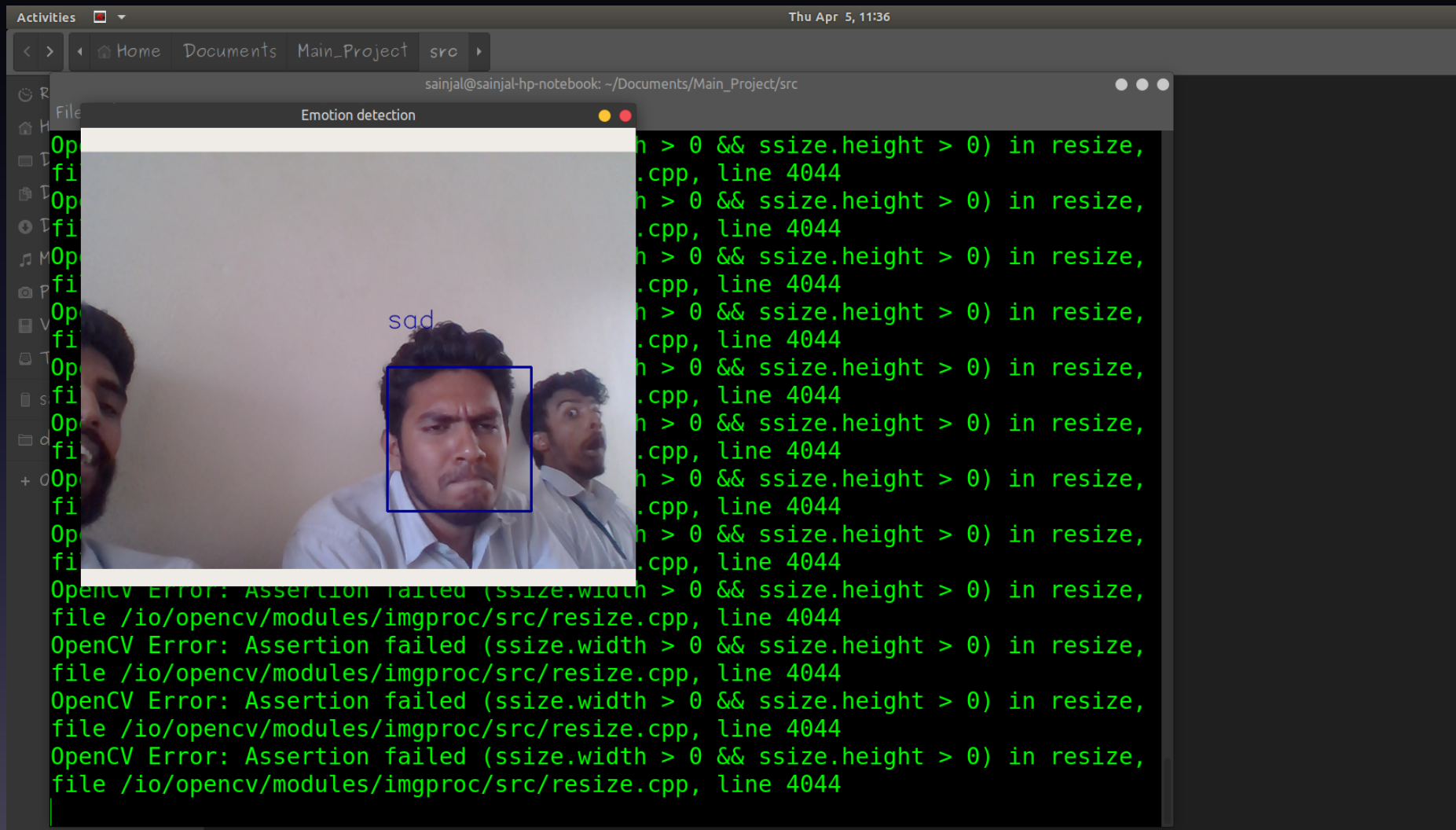
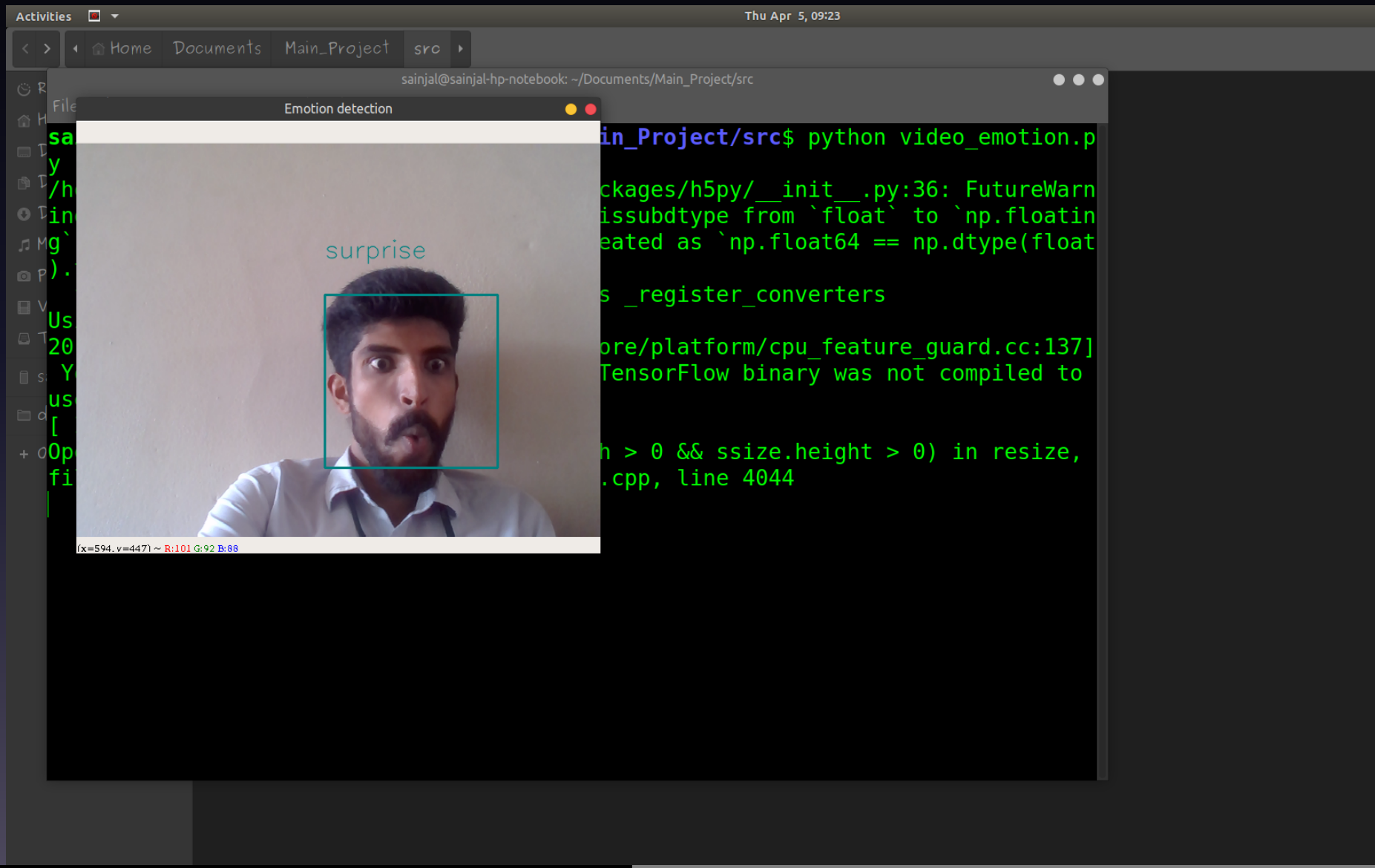
Screenshot


Activities
Thu Apr 5, 11:36
Home
Documents
Main_Project
src
sainjal@sainjal-hp-notebook: ~/Documents/Main_Project/src
Emotion detection
sad
OpenCV Error: Assertion failed (ssize.width > 0 && ssize.height > 0) in resize,
file /io/opencv/modules/imgproc/src/resize.cpp, line 4044

Screenshot


Activities
Thu Apr 5, 09:23
Home
Documents
Main_Project
src
sainjal@sainjal-hp-notebook: ~/Documents/Main_Project/src
Emotion detection
surprise
in_Project/src$ python video_emotion.p
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ore/platform/cpu_feature_guard.cc:137]
TensorFlow binary was not compiled to
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THANK YOU