

BLACK & WHITE IMAGE COLORIZATION AND EMOTION CLASSIFICATION

A F Z A L M E N G A L

A B D U L R A F E Y Z A F A R

M U H A M M A D M U S A K H A W A J A

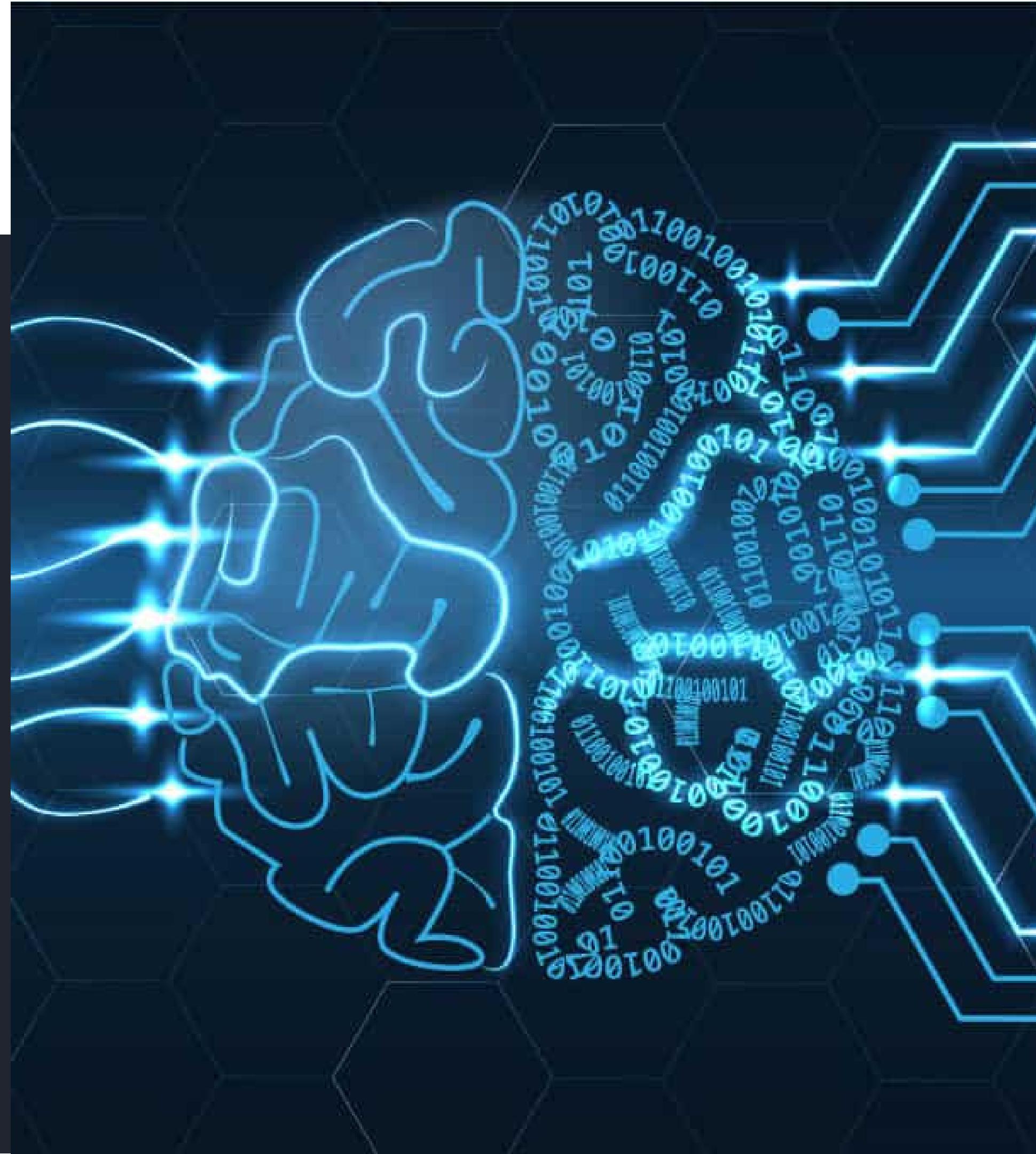
2 0 1 9 2 7 9

2 0 1 9 0 0 8

2 0 1 9 3 5 1

INTRODUCTION

- Our project is based on image processing
- A black and white image will be uploaded
- It will be automatically colorized
- Any faces in the picture will be detected
- Emotions will be classified





MODULES

01

IMAGE
COLOURIZATION

02

FACIAL
RECOGNITION

03

EMOTION
CLASSIFICATION

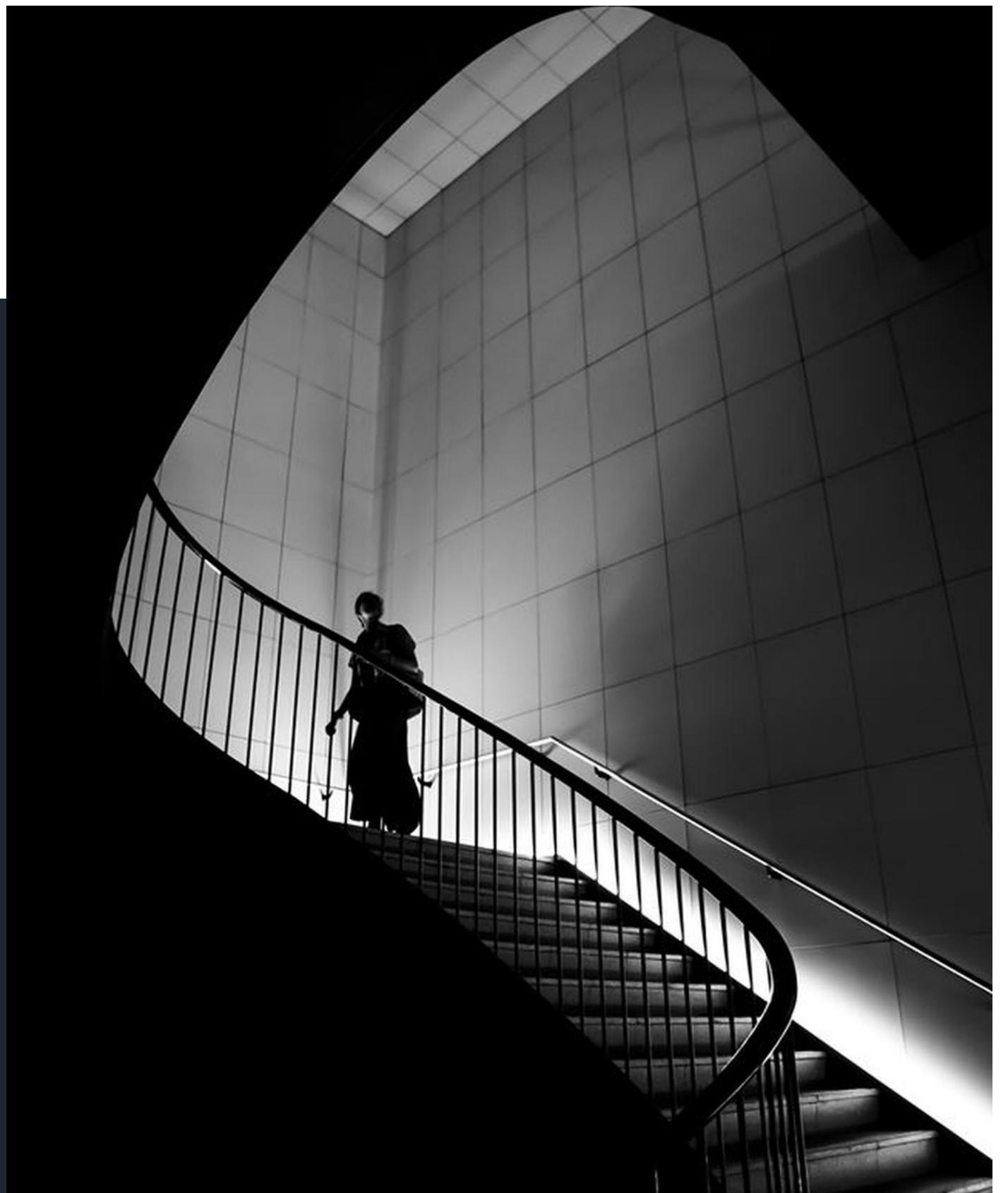


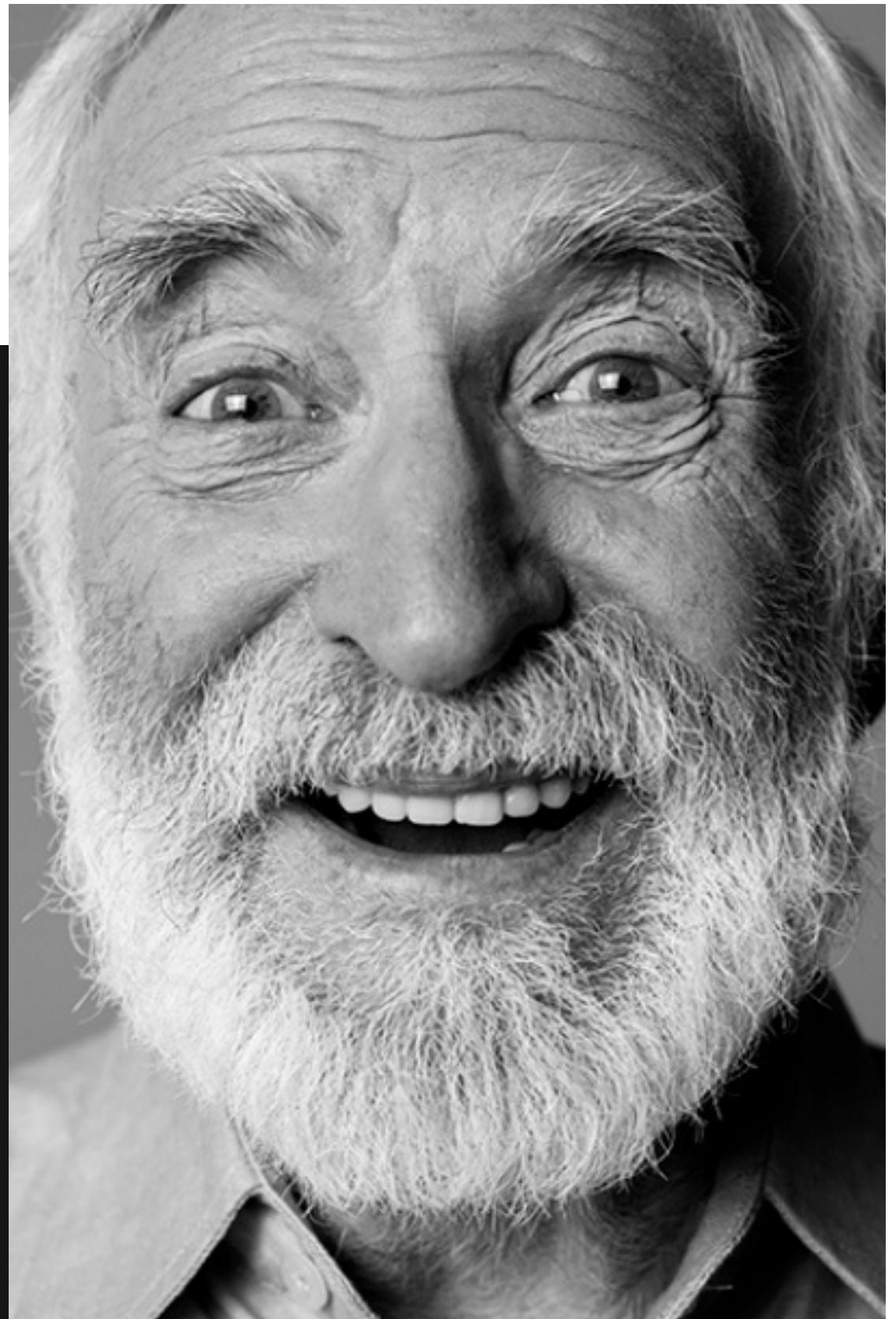
IMAGE COLORIZATION

- We used the model proposed by Richard Zhang in his paper titled “Colorful Image Colorization”
- This model is implemented as a feed forward pass in a CNN at test time and is trained on over a million images
- Image colorization is a difficult pixel prediction problem in computer vision which is tackled here by a deep CNN and a well-chosen objective function.
- This model predicts A and B color channels on a lab image from its L channel.



FACIAL DETECTION

- For face detection we used HAAR CASCADES
- It is an object detection algorithm used to identify faces in an image
- It uses edge and line detection to extract features and use them to detect faces in any image
- The version of HAAR CASCADE used in this project was the HAAR CASCADE FRONTAL FACE



EMOTION CLASSIFICATION

- We trained our own image classification model
- Consists of a CNN of 10 layers
- First six are convolution and pooling layers with the relu activation function
- Next two layers are a dropout layer and a flatten layer
- The next layer was a dense layer which also had the relu activation function
- The final layers is a SoftMax layer which had seven outputs corresponding to the seven emotions we trained our classifier for which were: Anger, disgust, fear, happy, neutral, sad, and surprised



CONTD...

- Our model had a learning rate of 0.000001 and was trained for 500 epochs
- The model was trained on 350 images with 50 images corresponding to each emotion
- Last function used was `SparseCategoricalCrossEntropy` which computes the cross-entropy loss between the labels and the predictions

DATASET

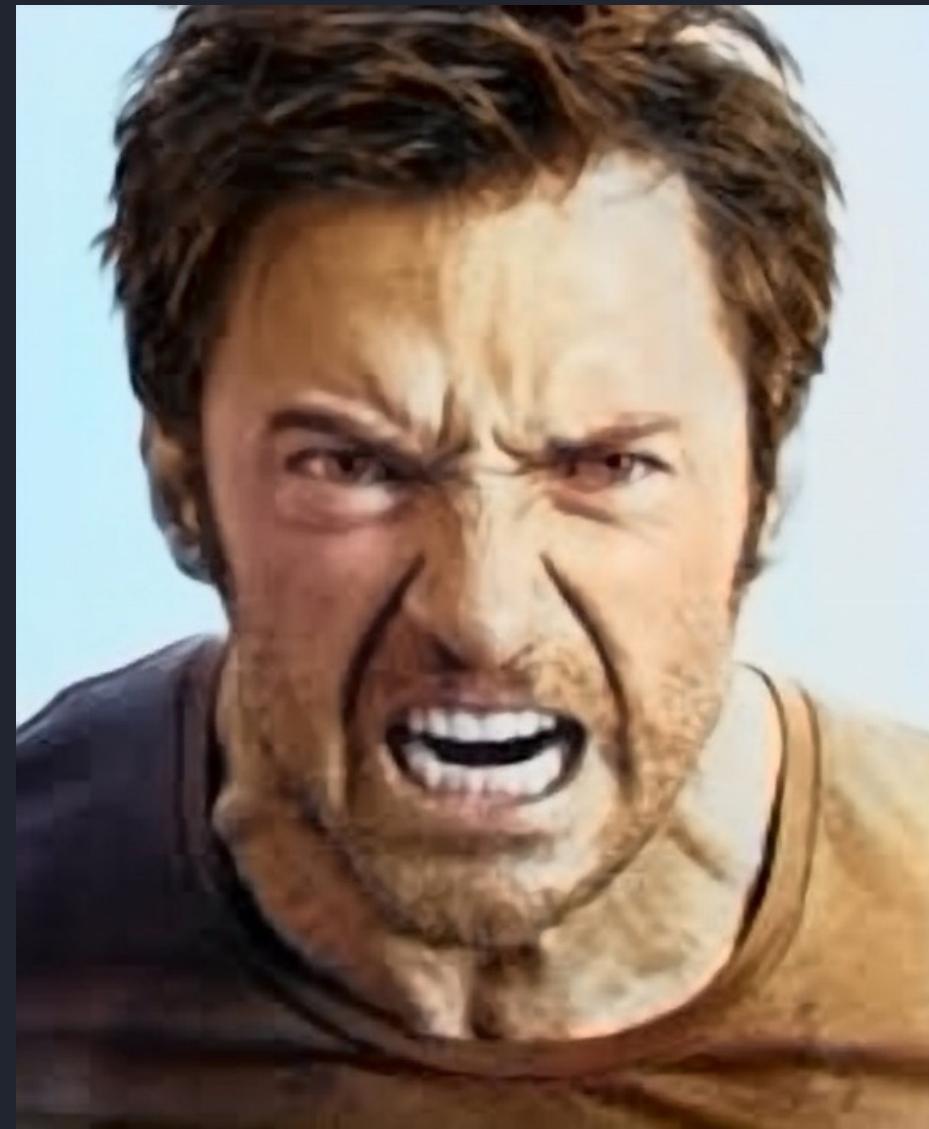
The model we trained was image classification and the dataset we used only consisted of images. The total number of images was 350, with each emotion having 50 images. The rest of the models were pretrained so we did not need to use any datasets for training



RESULTS



RESULTS



RESULTS

The image displays two side-by-side screenshots of the Visual Studio Code interface, each showing a window titled "Face Found".

Left Screenshot: A man with a very angry expression is shown. A green rectangular box highlights his face, and the word "Angry" is displayed in green text above the box. The code editor shows a Python script named "project.py" with the following code:

```
import cv2
import numpy
from color import colorizer
from face import face_detect
from gdl import ImgSelect
from upscale import upscale
import math
img_path=ImgSelect()
if img_path=='':
    print("No image selected")
    exit()
color_img=colorizer(img_path)
upscale(color_img,img_path)
face=face_detect(color_img,img_path)
faces = math.resize(faces, w=640)
cv2.imshow('Faces Found', faces)
cv2.waitKey(0)
```

Right Screenshot: A woman with a neutral or slightly sad expression is shown. A green rectangular box highlights her face. The code editor shows the same "project.py" script with minor differences in the code, specifically regarding the image path and face detection logic.

```
import cv2
import numpy
from color import colorizer
from face import face_detect
from gdl import ImgSelect
from upscale import upscale
import math
img_path=ImgSelect()
if img_path=='':
    print("No image selected")
    exit()
color_img=colorizer(img_path)
upscale(color_img,img_path)
face=face_detect(color_img,img_path)
faces = math.resize(faces, w=640)
cv2.imshow('Faces Found', faces)
cv2.waitKey(0)
```

A large, modern building with a glass and steel facade, viewed from a low angle looking up. The building has a curved, angular design with many windows. The sky is clear and blue.

THANK YOU