VIETNAMESE - GERMAN UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE

Introduction to Information Technology Project

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Content

1 Introduction

Our AI project focuses on distinguishing faces with mask and glasses on using Google Teachable Machine platform. In this project, we will train the AI to as accurately as possible to tell if someone is wearing a mask, glasses or both. We want achieve highest matching percentages when detected so that the errors are minimized. Here are the methods and the interpretation of our works.

2 Classes

We has captured multiples images of people wearing a mask, wearing glasses, wearing both as well as wearing none and these images are sorted into classes with the name of their descriptions. Our aim is to maximize the accuracy of the recognition system; therefore, we input more than 50 images for each class.

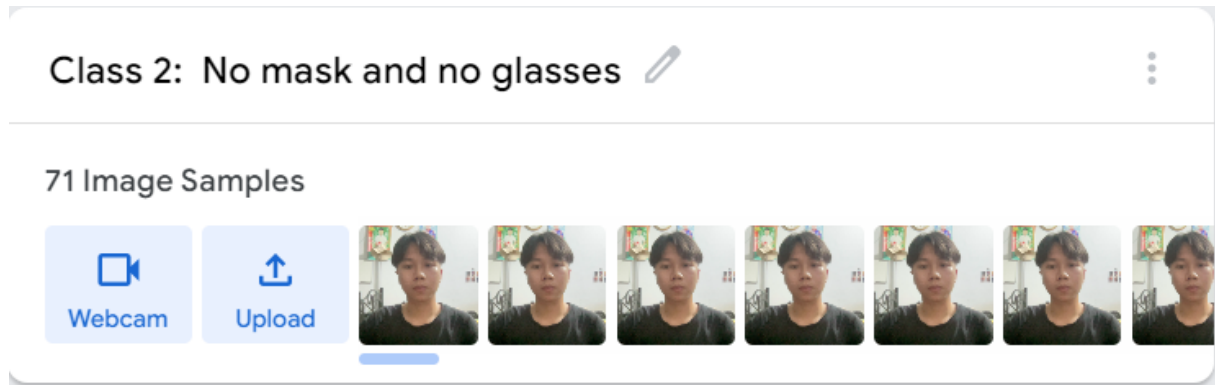## 2.1 Classes 1: Background

This class contains images of the background where other images took place.
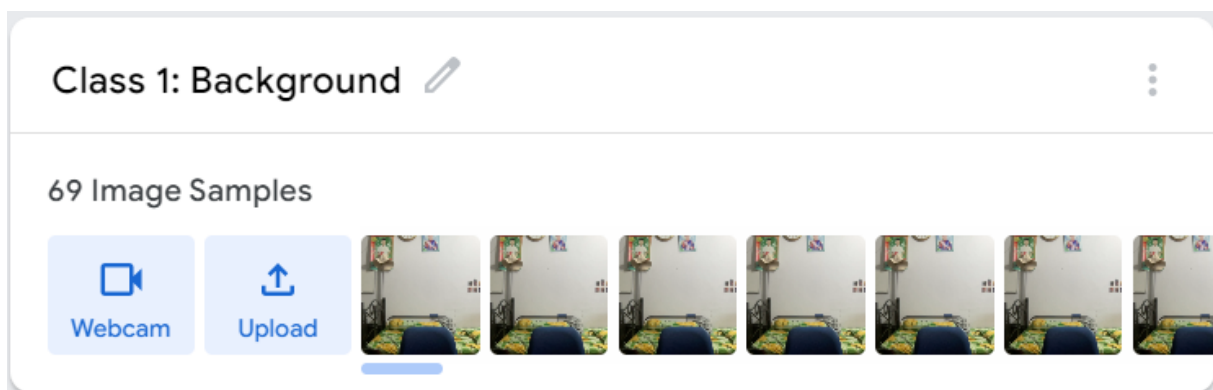
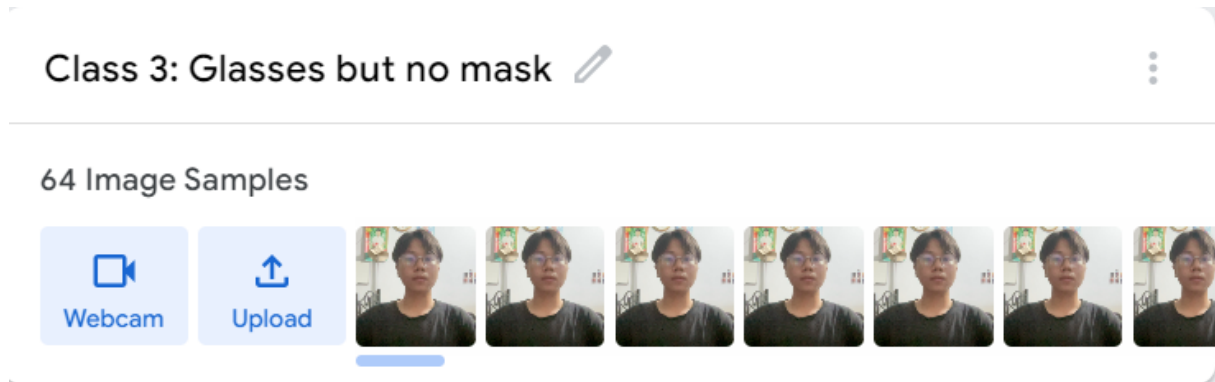Hình 1: Background images

2.2 Classes 2: No mask and no glasses

This class contains images of the person without mask and glasses.

Hình 2: Class 2: Person without mask and glasses

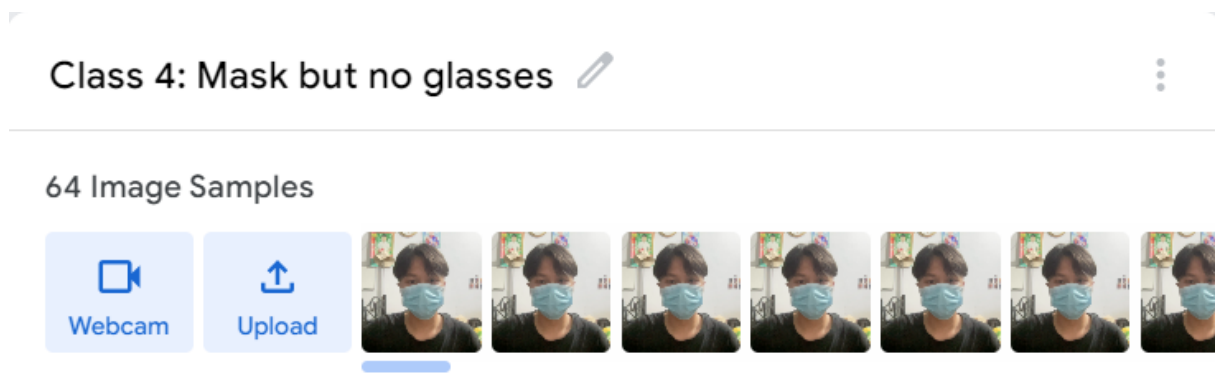### 2.3 Classes 3: Glasses but no mask

This class contains images of the person with glasses but no mask.

Hình 3: Class 3. Person with glasses but no mask

2.4 Classes 4: Mask but no glasses

This class contains images of the person with mask but no glasses.

Hình 4: Class 4. Person with mask but no glasses

2.5 Classes 5: Mask and glasses

This class contains images of the person with both mask and glasses on.

Hình 5: Class 5. Person with mask and glasses

2.6 AI training of models

After inputting all the raw data, we must train the Google Teachable Machine so it is able to recognize and differentiate between the implemented situations. This process is usually quite short and only takes up to 10 minutes. The advanced features can also be chosen for detailed training.
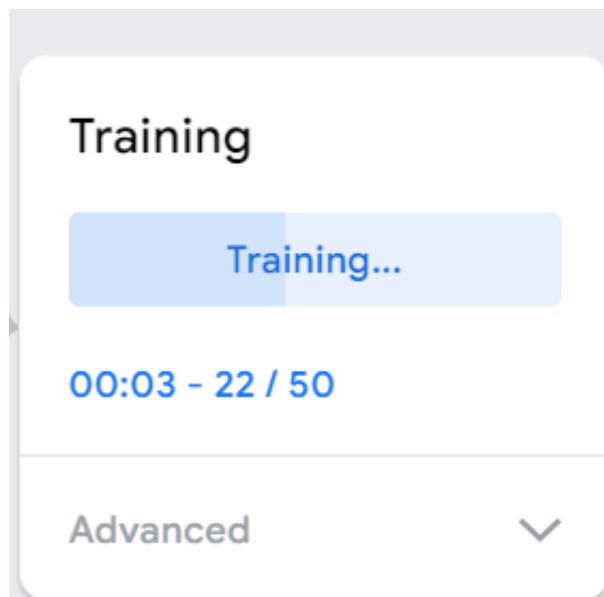
Hình 6: Google Teachable Machine in training

3 Python Source Code

The python source code of your project is presented in this part, for instance:

Listing 1: Example of your Python code

```python
Import time
print("Hello AI")
```

```
 3  from keras.models import load_model  # TensorFlow is required for ↩
        Keras to work
 4  import cv2  # Install opencv-python
 5  import numpy as np
 6
 7
 8  # Disable scientific notation for clarity
 9  np.set_printoptions(suppress=True)
10
11  # Load the model
12  model = load_model("keras_Model.h5", compile=False)
13
14  # Load the labels
15  class_names = open("labels.txt", "r").readlines()
16
17  # CAMERA can be 0 or 1 based on default camera of your computer
18  camera = cv2.VideoCapture(1)
19  #camera = cv2.VideoCapture("http://192.168.1.6:4747/video")
20
21  def image_detector():
22      # Grab the webcamera's image.
23      ret, image = camera.read()
24
25      # Resize the raw image into (224-height,224-width) pixels
26      image = cv2.resize(image, (224, 224), interpolation=cv2.INTER_AREA↩
            )
27
28      # Show the image in a window
29      cv2.imshow("Webcam Image", image)
30
31      # Make the image a numpy array and reshape it to the models input ↩
            shape.
32      image = np.asarray(image, dtype=np.float32).reshape(1, 224, 224, ↩
            3)
33
34      # Normalize the image array
35      image = (image / 127.5) - 1
36
37      # Predicts the model
38      prediction = model.predict(image)
39      index = np.argmax(prediction)
40      class_name = class_names[index]
41      confidence_score = prediction[0][index]
42
43      # Print prediction and confidence score
```
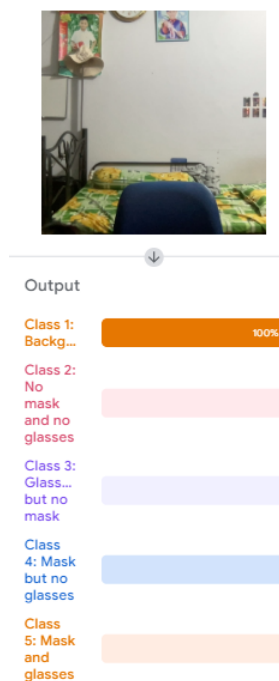
```
44      print("Class:", class_name[2:], end="")
45      print("Confidence Score:", str(np.round(confidence_score * 100))↩
            [:-2], "%")
46
47
48  while True:
49      image_detector()
50      time.sleep(5)
```

4 Results

After training, it is able to detect what the person is wearing. Here are the screenshots of the results.
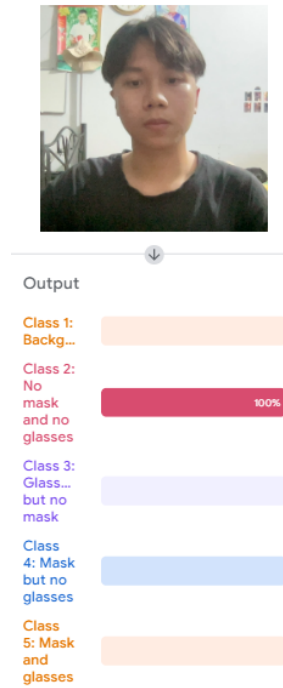
4.1 Result 1: Background

This class contains images of the background where other images took place.

Hình 7: Background images
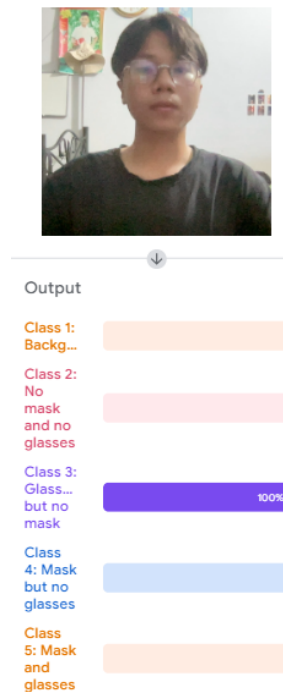
4.2 Result 2: No mask and no glasses

This class contains images of the person without mask and glasses.

Hình 8: Person without mask and glasses

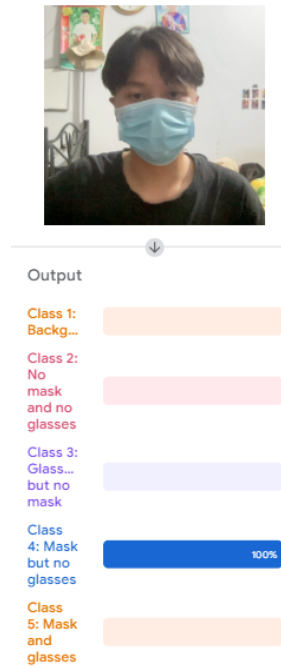## 4.3   Result 3: Glasses but no mask

This class contains images of the person with glasses but no mask.

Hình 9: Person with glasses but no mask
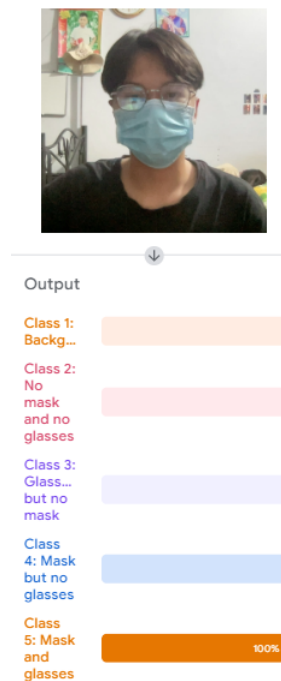
4.4   Result 4: Mask but no glasses

This class contains images of the person with mask but no glasses.

Hình 10: Person with mask but no glasses

4.5 Result 5: Mask and glasses

This class contains images of the person with both mask and glasses on.

Hình 11: Person with mask and glasses

5 Conclusion

This project is basic and simple as we just use the implemented function which is Google Teachable Machine. We do not need to do any actual coding to make the program works. However, we are at last able to accomplish our goals as the conditions are differentiated pretty accurate. This project is a good pratice for our more complicated projects in the future