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COVI-PROC

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ABSTRACT

As confusing as the world is right now, there are not that many options but to live through it. With safety belts fastened and survival kits prepped, we're going to keep on rolling' into 2022. In the upcoming years it is going to be mandatory to wear masks to protect each and everyone. People who don't follow the safety protocols are a big danger to themselves and to the society. To address this issue we have come with a device called "CovidProc", which are software systems which can be implemented using various hardware products like cameras, speakers, etc. to check if the people who aren't following safety protocols. So, we plan to do our device with the help of AIML algorithms.

INTRODUCTION

An ecosystem is a community of living organisms in conjunction with the nonliving components of their environment, interacting as a system. Ecosystem means people and belongings in their surroundings. Initially reported to the World Health Organization (WHO) on December 31, 2019, the COVID was declared an outbreak followed by a pandemic. This was followed by the hands of black fungus, white fungus. The succeeding variants are the Delta and freshly brewing Omicron.

The most effective countermeasure at the play is to vaccinate along with booster shots. Wearing masks, maintaining a healthy diet and maintaining social distancing are the key operations that will reduce the probable risk factor involved. Maintaining social distancing at public places is a duty that is barely followed in most of the places. To maintain and improve the standard of living, the government is deploying the police force and medical personnel to make sure that the pandemic health care regulations are followed throughout at all places. But it is not possible for the small share of people to monitor and guide a huge population for following the guidelines at all the public spots. The purpose of the coding systems is to be a helping hand and monitor and guide people in public spots where the healthcare workers can not present by implementing them in various applications.

PROPOSED ARCHITECTURE

The model consists of 3 interconnected machine learning models . Our model consists of 3 ML architectures: one for identification masks worn or not, next one whether the place is crowded or not and the last one for the identification of the shirt color of the person who is not wearing a mask and not maintaining social distance. Basic idea is that in small shops in present Covid times no social distancing is followed and also many people have forgotten the habit of wearing masks.

Though many policemen, society activists and commoners insist on the importance of social distancing and mask, many never follow. In order to monitor and create an awareness we have come up with a cost efficient as well as a productive model which identifies and) the people a who haven't worn mask and displays a message stating that “_____ SHIRT/D IS NOT FOLLOWING SOCIAL DISTANCING , PLS FOLLOW AS THE CASES ARE RISING UP AND IT'S ALL FOR YOUR BENEFIT “ will come through the loud speaker and ‘___’ here gets filled up by the color of the shirt/dress worn by the person who is not following social distancing and not wearing a mask. All the machine learning models can be trained by uploading a wide range of photos based on the condition.

WORKING MODULES

1. AIML Component design

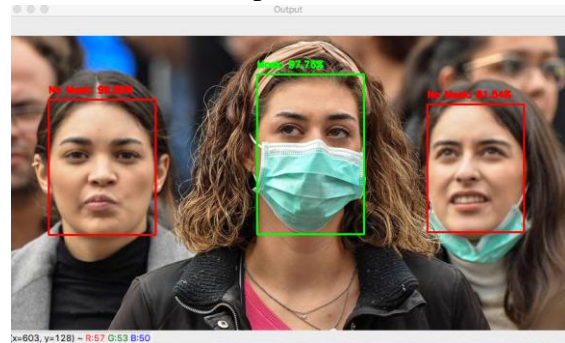
The basic concepts used in our device is executed using the AIML models. The use of pattern detection and feature training is a great boost to our device. Using AIML pattern detection, our device can determine if the user or the person is wearing mask or not, the place is crowded or not and to determine the dress color of the person. The applied AI algorithms are fast to act and determines the results in seconds.

A.AI model for cough and mask detection to confront COVID-19

```
from tensorflow.keras.applications.mobilenet_v2 import preprocess_input
from tensorflow.keras.preprocessing.image import img_to_array
from tensorflow.keras.models import load_model
from imutils.video import VideoStream
import numpy as np
import argparse
import imutils
import time
import cv2
import os

def detect_and_predict_mask(frame, facelnet, masknet):
```

Just an random output of what this model will do



The AI model we designed supports public safety by using deep learning mobilenet v2 model using the tensorflow and keras framework to detect safety equipment, such as masks and other personal protective gear, and signs of illness, such as coughing, in public places. Using PPE Detection our cough and mask detection model lower the risk of spreading COVID-19 which can help reduce costs and save lives. The customers who use our device enjoy the benefit of protecting their employees and customers

from COVID-19 using a fast, accurate, and cost-effective method. Our model is trained to detect instances of coughing and mask-wearing. It processes video streams to identify instances of coughing and to detect mask-wearing.

B. CNN based methods in crowd counting

```

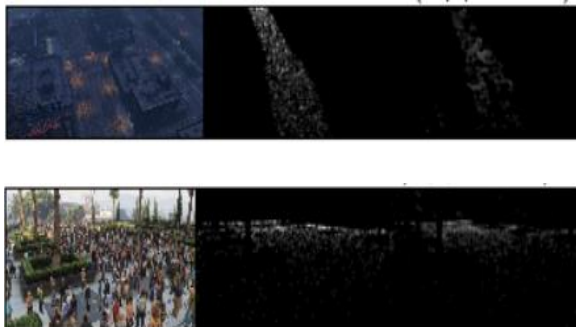
-15,8 +15,7 @@ def __init__(self, load_weights=False):
    if not load_weights:
        mod = models.vgg16(pretrained = True)
        self.initialize_weights()
    for i in range(len(self.frontend.state_dict().items())):
        self.frontend.state_dict().items()[i][1].data[:] = mod.state_dict().items()[i][1].data[:]
    self.frontend.load_state_dict(mod.features[0:23].state_dict())

def forward(self,x):
    x = self.frontend(x)
    x = self.backend(x)

-50,4 +49,4 @@ def make_layers(cfg, in_channels = 3,batch_norm=False,dilation = False):
    else:
        layers += [conv2d, nn.ReLU(inplace=True)]
        in_channels = v
    return nn.Sequential(*layers)
    return nn.Sequential(*layers)

```

Using convolutional neural networks (CNN), we can observe and calculate the number of people that are present in a given image.



C. Color detection model

Here we have used a basic color detection model to identify the person who is not following social distancing and not wearing masks in crowded places. And our device will voice out the color of the dress, the person wearing which makes the person cautious.

Step 1: Input: Capture video through webcam.

Step 2: Read the video stream in image frames.

Step 3: Convert the imageFrame in BGR(RGB color space represented as three matrices of red, green and blue with integer values from 0 to 255) to HSV(hue-saturation-value) color space. *Hue* describes a color in terms of *saturation*, represents the amount of gray in that color and *value* describes the brightness or

intensity of the color. This can be represented as three matrices in the range of 0-179, 0-255 and 0-255 respectively.

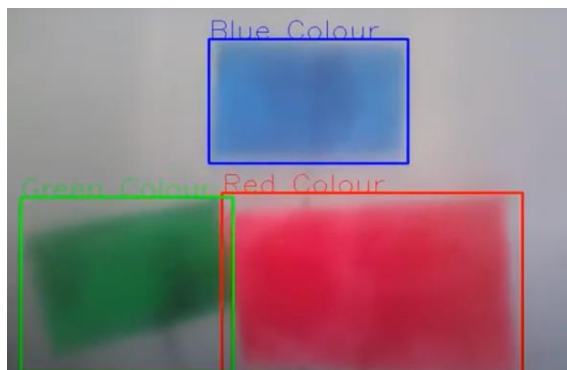
Step 4: Define the range of each color and create the corresponding mask.

Step 5: Morphological Transform: Dilation, to remove noises from the images.

Step 6: bitwise_and between the image frame and mask is performed to specifically detect that particular color and discard others.

Step 7: Create contour for the individual colors to display the detected colored region distinguishably.

Step 8: Output: Detection of the colors in real-time.



OUTPUT

2. Data Storage

A Biometric Data Storage Design : The data regarding shirt color, mask and face details will be stored in an organized manner for creating it easier for the engine to access it. Our model stores data in software designed storage such as to any server such as mysql or docker environment etc. We have designed our model to be strict as just pointing out people doesn't make any use to this society and that's why we have added a storage system so as to monitor the people who are continuously not following the social norms.

RELATED WORK

Madurai City Police have introduced a new video analytic software for its closed-circuit television camera network that will detect people walking on road without wearing mask. With the new technology, the CCTV cameras installed under Thilagar Thidal and Vilakkuthoon police station limits will also detect those who have not worn the mask in the proper fashion. The software will automatically click the images of such violators and send an alert with their photographs to the mobile phones of the police personnel deployed in the bazaar through an android mobile application,” Cameras installed to measure the happiness of visitors at customer happiness centres of the Roads and Transport Authority (RTA) have been fitted with new AI technology to monitor the compliance of those visitors with the wearing of face masks. The step is part of the RTA's

precautionary measures to curb the spread of COVID-19. We have successfully fitted the cameras with a new technology whereby they can also monitor whether clients are wearing face masks as part measures to curb the spread of COVID-19. The technology recorded an accuracy rate of 99.1 per cent in this field.”The RTA says the cameras generate analytical reports and daily indicators, which will help officials to take appropriate actions towards any failure of compliance with the precautionary measures in place. The cameras, which had been installed more than 18 months ago, can capture images at a rate of 30 frames per second, with a range of seven metres.

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CONCLUSION

The objective of the proposed system is to implement social distancing with better ways to identify people not following the COVID protocols during this pandemic time. In the future we can also use the software embedded in security cameras which is available in most of the areas in today’s world. In the upcoming periods many such times may come and we have to be equipped with proper technology and work together to overcome such difficulties. This work will be very useful in reducing the crowds and decreasing the chance to contact covid in crowded areas. This doesn’t require much financial need to set it up. It is simple to install and use and it is cost efficient. This may reduce the chance to contact covid up to 60% and it may even become as low as 30% if everyone complies with the surveillance project. This is easy to use and doesn't require much technological knowledge to operate. This makes your job easier to implement COVID norms.