Female Security Monitoring System Using Artificial Intelligence and IOT

Abstract

Female security is one of the biggest concerns in our country and every day we hear news about different crimes. This smart AI system is developed considering the same. It has seen that Males look into the female's toilet on several occasions in Malls, Colleges, Airports, Railway Stations or other such public places. This model uses CCTV for camera and sensors for detecting human presence. Later, Artificial Intelligence takes part in the form of Image recognition, Gender Classification and Age Estimation. Whenever a male will look or roam in front of female's toilet then CCTV will take his image and Computer vision concepts will classify whether He is a male or a female. After Classification, it will estimate his age. After 3 minutes of wait, the image will be send to the Security Guard who is monitoring the CCTVs. The whole model is developed using IOT and AI concepts. This can be very vital and productive in security concerns.

Introduction

India is among one of the highly ranked countries in crime rate and female got molested and tortured on several occasions. We as a team are developing a system which is smart enough to solve the major security concern for female. Recently, we were on the Bangalore Airport and we seen that Boys are looking inside the girls toilet. Everyone is busy there and no one taking it serious. We have started developing the system months ago and going well into this. This system is AI based smart model which will take live pictures from the CCTV and back end codes will classify the gender and estimate age of the male. We have used computer vision concept and Open CV played an important role. We have used heat sensors for detecting the human being. Later on after 3 minutes of monitoring and generating an alarm to notify the male that go away because it is a female toilet. But if male doesn't go then after 2-3 minutes, the image will be send to the security guard who monitors the CCTV with age and gender labeled on the image. This can solve major security problem that is really a big issue in our society especially for females.

Tools and Techniques

We have used several tools for developing this model as follows:

1. CCTV or camera
2. Heat Sensors
3. RF signal or GPS
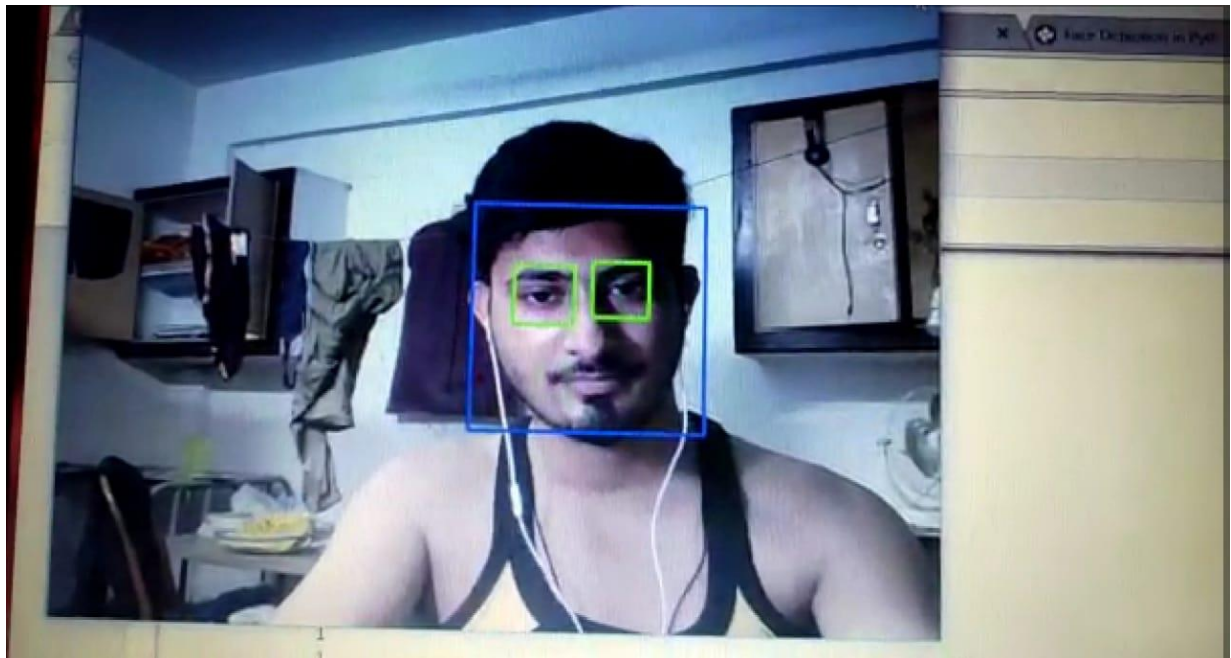4. Anaconda
5. Open CV
6. Tensorflow and Keras

Learning Algorithms

The model first works after detecting the human from the heat sensors. It will recognize the image by the Open CV library.


The heat sensor will sense the warmness of human body and then CCTV will start processing the image recognition part by the help of Open CV and machine learning algorithms.

First image recognition will start doing its work then gender classification and age estimation start working. After monitoring for 2 minutes, an alarm will be generated for notifying the surrounding that go away. If boy still there looking inside the toilet, Image with labeling of age & gender will be forwarded to the CCTV monitoring guy.
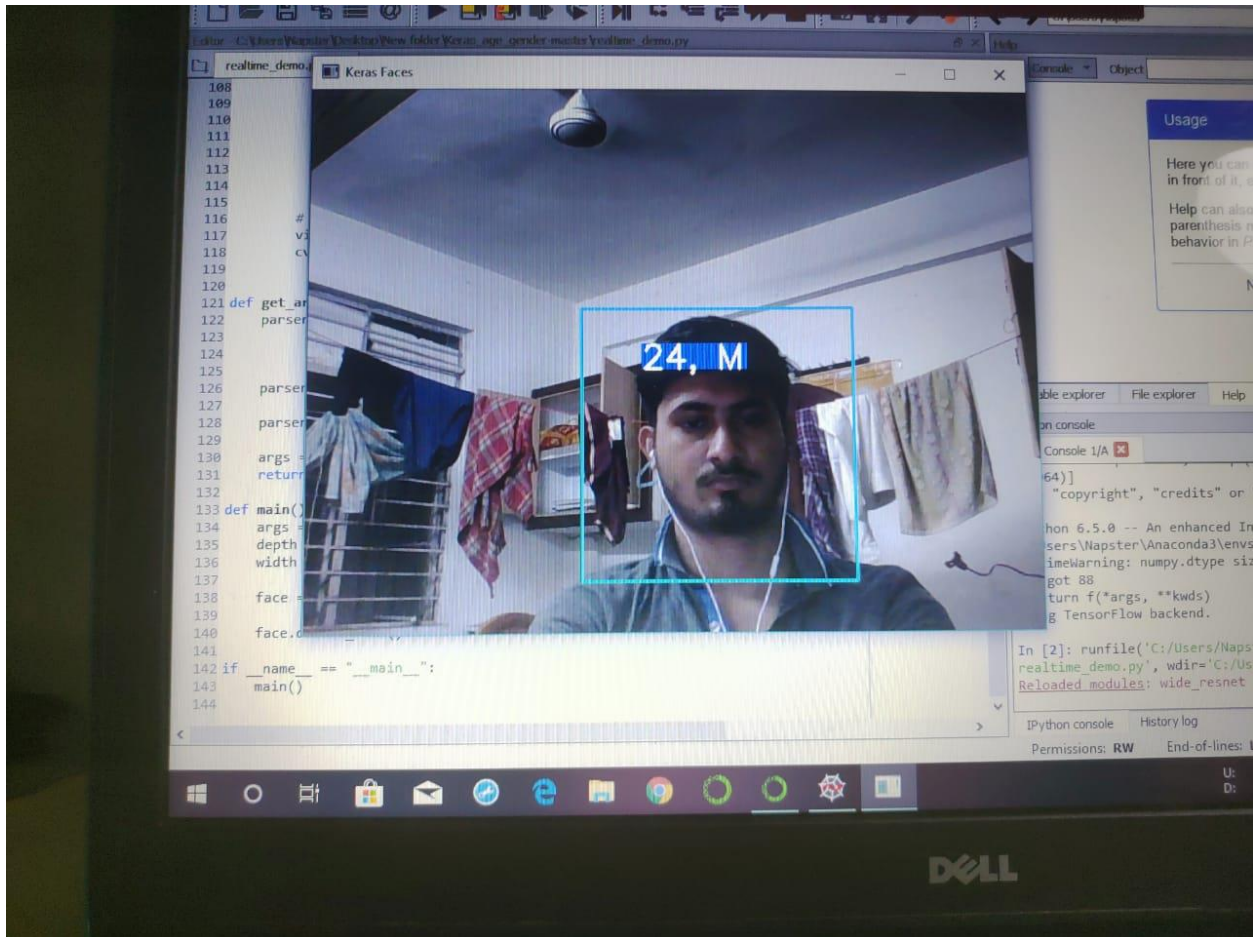
The whole model is developed using Python inside Anaconda environment. We have used Raspberry Pi for the learning purpose with web cam but later on we are developing the model with CCTV integration.

The code is clean and consumes less computing power because of Open CV and tensorflow API.

```python
# loop over the face detections
for (i, rect) in enumerate(rects):
    # determine the facial landmarks for the face region, then
    # convert the facial landmark (x, y)-coordinates to a NumPy
    # array
    shape = predictor(gray, rect)
    shape = face_utils.shape_to_np(shape)

    # convert dlib's rectangle to a OpenCV-style bounding box
    # [i.e., (x, y, w, h)], then draw the face bounding box
    (x, y, w, h) = face_utils.rect_to_bb(rect)
    cv2.rectangle(image, (x, y), (x + w, y + h), (0, 255, 0), 2)

    # show the face number
    cv2.putText(image, "Face #{}".format(i + 1), (x - 10, y - 10),
        cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 255, 0), 2)

    # loop over the (x, y)-coordinates for the facial landmarks
    # and draw them on the image
    for (x, y) in shape:
        cv2.circle(image, (x, y), 1, (0, 0, 255), -1)

# show the output image with the face detections + facial landmarks
cv2.imshow("Output", image)
cv2.waitKey(0)
```

Conclusion

This model can be ready for the society in upcoming weeks and with good production modeling, this could be very helpful to solve the female security concern. Further, this model can be used to send message directly to the nearest police station using GSM module or RF signal with the faxed labeled image of the boy.