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Gender Detection Using Smart Camera

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Abstract: A smart camera is a camera which can be trained in any feature it detects the face and then it checks for the feature for now we have turned the smart camera into gender detection. A gender detector system can be implemented to check this. Gender detector means to identify whether a person is a male or a female. The first step is to recognize the presence of the face , which makes the strategy divided into two parts: to detect faces and to detect gender of those faces.

1.Introduction:

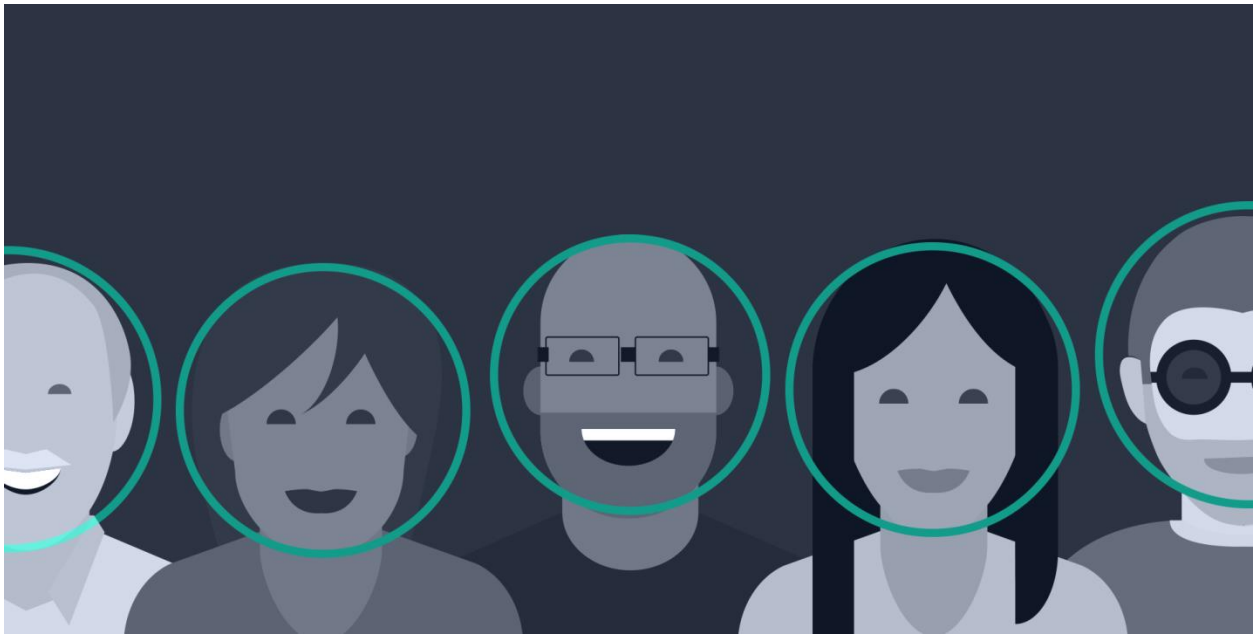
In computer vision, one essential problem we are trying to figure out is to automatically detect objects in an image without human intervention. Gender detection can be thought of as such a problem where we detect human faces in an image. There may be slight differences in the faces of humans but overall, it is safe to say that there are certain features that are associated with all the human faces.

Gender detection is usually the first step towards many gender-related technologies, such as Gender Detection or verification. However, gender detection can have very useful applications. The most successful application of gender detection would probably be photo taking. When you take a photo of your friends, the face detection algorithm built into your digital camera detects where the faces are, adjusts the focus accordingly and also tells about the person's age and gender.

II. DOMAIN EXPLANATION:

A. Proposed Concept

The project Is wholly based on face detection and without it gender detection implementation and the training of smart camera without face detection in this project can only be dreamt of. The gender recognition in this study is developed with a machine learning algorithm through the image classification method: cvlib is a method based on Convolutional Neural Network (CNN) that developed by Google with improved performance and enhancement to be more efficient.



B. Methods and Technologies used in Project:

Face Detection from an image where that face is detected and processed face is compared to a database of known or unknown faces, to decide who that person is whether it's a male or a female, gender detection can be performed fairly easily and reliably with Intel's open source framework called Open CV . This framework has an in-built Face Detector that works in roughly 90-95% of clear photos of a person looking forward at the camera. However, detecting a person's face when that person is viewed from an angle is usually harder, sometimes requiring 3D Head Pose Estimation. Also, lack of proper brightness of an image can greatly increase the difficulty of detecting a gender from that face, or increased contrast in shadows on the face, or maybe the picture is blurry, or the person is wearing glasses, etc.

Gender Detection has been a strong field of research since the 1990s, but is still a far way away from a reliable method of user authentication. More and more techniques are being developed each year. The Eigen face technique is considered the simplest method of accurate gender recognition, but many other (much more complicated) methods or combinations of multiple methods are slightly more accurate.

Technologies Used:

- Tensorflow
- Keras
- Opencv-Python

Open CV

Open CV was started at Intel in 1999 by Gary Bradski for the purposes of accelerating research in and commercial applications of computer vision in the world and, for Intel, creating a demand for ever more powerful computers by such applications. Vadim Pisarevsky joined Gary to manage Intel's Russian software Open CV team. Over time the Open CV team moved on to other companies and other Research. Several of the original team eventually ended up working in robotics and found their way to Willow Garage. In 2008, Willow Garage saw the need to rapidly advance robotic perception capabilities in an open way that leverages the entire research.

Intel's open-source computer-vision library can greatly simplify computer-vision programming. It includes advanced capabilities - face detection, face tracking, face recognition, Kalman filtering, and a variety of artificial-intelligence (AI) methods - in ready-to-use form. In addition, it provides many basic computer-vision algorithms via its lower-level APIs. Open CV has the advantage of being a multi-platform framework; it supports both Windows and Linux, and more recently, Mac OS X. Open CV has so many capabilities it can seem overwhelming at first. A good understanding of how these methods work is the key to getting good results when using Open CV. Fortunately, only a select few need to be known beforehand to get started.

TensorFlow:

TensorFlow is Google Brain's second-generation system. Version 1.0.0 was released on February 11, 2017.While the reference implementation runs on single devices, tensorflow can run on multiple CPUs and GPUs (with optional CUDA and SYCL extensions for general-purpose computing on graphics processing units).TensorFlow is available on 64-bit Linux, macOS , Windows, and mobile computing platforms including Android and iOS.

Its flexible architecture allows for the easy deployment of computation across a variety of platforms (CPUs, GPUs), and from desktops to clusters of servers to mobile and edge devices.

TensorFlow computations are expressed as stateful dataflow graphs. The name TensorFlow derives from the operations that such neural networks perform on multidimensional data arrays, which are referred to as *tensors*. During the Google I/O Conference in June 2016, Jeff Dean stated that 1,500 repositories on GitHub mentioned TensorFlow, of which only 5 were from Google.

VI. EXTENSIONS, OTHER APPLICATIONS AND CONTACT:

This system built by us not foolproof system. It’s not hard to think to defeat this system or to think the ways to improve it. This System was built to overcome the problems of area where the gender detection was necessary just like in these Covid-19 conditions where everyone wear face mask it is essentially required as to not make a huge line of everyone together, so there are separate lines for men and women everywhere like shopping malls, railway stations, metro stations, airports so to easily detect the person’s gender .

VII. CONCLUSION

To mitigate the spread of COVID-19 pandemic, measures must be taken. We have modeled a gender detector using CNN architecture and transfer learning methods in neural networks. To train, validate and test the model, we used the dataset that consisted images of men and women faces images. Else we can train the software in any way we want in terms of gender detection or face detections and many more. These images were taken from various resources like Kaggle, google and RMFD datasets. The model was inferred on images and live video streams. To select a base model, we evaluated the metrics like accuracy, precision and recall and selected CNN architecture with the best performance having 100% precision and 99% recall. It is also computationally efficient using CNN which makes it easier to install the model to embedded systems. This gender detector can be deployed in many areas like shopping malls, airports and other heavy traffic places to monitor the public and to avoid the spread of crowd by checking who is following basic rules and who is not.

VIII. APPENDIX

1. Tensorflow-→2.5.0v
2. Keras→2.4.3v
3. Opencv-python→4.5.1.v

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REFERENCES:

1] Face Detection and Recognition using Open CV, Article, http://shervinemami.info/faceRecognition.html, Published by Shervin Emami, 2010

[2] Seeing with Open CV, Article, http://www.cognotics.com/opencv/servo_2007_series/part_1/index.html, Published by Robin Hewitt, 2010

[3] Open CV Homepage, http://opencv.willowgarage.com

[4] Face Recognition Homepage, http://www.face-rec.org/algorithms/

[5] Wikipedia, Three-dimensional gender recognition, http://en.wikipedia.org/wiki/Three-dimensional_gender_recognition

[6] Wikipedia, Active appearance model, http://en.wikipedia.org/wiki/Active_appearance_model

[7] Computer Vision Papers, http://www.cvpapers.com/

[8] Wikipedia, Histogram equalization, http://en.wikipedia.org/wiki/Histogram_equalization

[9] Shervin Emami, Rotating or Resizing an Image in OpenCV, http://shervinemami.info/imageTransforms.html