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Mask and social distancing

Machine learning engineer nanodegree

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Contents

project's domain background

the project is in deep learning field and computer vision domain, and image preprocessing.

Computer vision is one of the most used field these days specially with the improvement in deep learning. I choose this project for two reasons:

- Improve my CNN and image preprocessing and intuition and having more experience in this field.
- For fun, I am enjoying of learning and doing new things.

One of the similar projects in real life is a social distance detection in amazon warehouse, where it is detect if two workers were near to each other.

problem statement

the problem is how to detect the people are not wearing mask and localizing the person in the image by putting a box around his face. The detected faces should be labeled to three categories wear mask, not wear mask, wear mask incorrectly. This is a research paper for face recognition and localizing it should be useful for this project, link HERE.

datasets

the dataset used is a face mask detection data from Kaggle website. The data set is created by BibTeX.

The dataset page here.

Data set info:

Training examples	853
Number of labels (classes)	3
labels	• With mask • Without mask

	• Mask wore incorrectly
bounding boxes	In PASCAL VOC format

training samples:

Data set features:

- Generalization
- People in the images has different background
- More than one face in a one image

Why this data set?

It has more than person in one image, different image size, collected from different distribution and labeled correctly.

solution statement

the suggested solution is using deep learning to solve the problem by the following techniques Convolutional neural network and VVG19 CNN architecture. With help of keras and tensor flow packages and OpenCV API this problem can be solved easily and fast because of GPU acceleration.

benchmark model

There is a lot of projects done on the same data set and with great result, for example HERE a project that use VVG19 and reach 98 % accuracy, this project will the reference project of this project.

evaluation metrics

the dataset is unbalanced so the preferred evaluation metrics here is F1-score

project design

the project design will be in two phases training and testing. In training phase, the data will be loaded and processed if needed then the train the VVG19 model. In the testing phase the model will be evaluated according to the chosen metric which is F1-score.

The deploy pipeline