Course Project for CS 434

A CNN Supported Model & Tool For Facial Recognition and Photograph Manipulation.

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Abstract:

In this project, my team member and I want to accomplish auto facial detection and blurring tasks with neural network learning. This project can help detect strangers' faces, who accidentally walk into photo or video shooting and blur them to protect their privacy and save time for photo or video editing. This project would use Python and related libraries, with our own designed algorithms and models.

We plan to use CNN for facial detection. For a given image input, we crop it into different sizes and put each part into our model. Model detects if the given image has faces and finds out their position. Then we blur out these areas except where in the most front of the photo and output processed images.

Problem Background:

Machine learning and neural networks are usually used on images and videos for multiple purposes, such as object recognition, photo editing, image sharpening, etc. Although it is similar to other areas, not so many people use it for image blur process, which is as useful as other purposes in real life.

Previous Study:

Image blur process by machine learning is similar to object or human face detection and recognition, and image process. There are a lot of existing tools and resources that can be used to accomplish these. One such tool is CNN, which is widely used in deep neural networks for image processing. One library for face recognition, for instance, is OpenCV.

Many studies have also been made on image processing, such as instance segmentation. One tool that is useful for our project is image decompression, which downgrades the image resolution. Like object and face recognition, many resources are available for image processing by AI, such as filtering, and edge detection.

Motivation:

Our motivation is that when people are taking photos or recording videos, it is inevitable that some strangers can walk in front of the camera. It can also happen to stream, both from TV and the internet. It can be annoying sometimes because these strangers can catch attention. This project can help detect strangers' faces and blur them so that they are less attractive to viewers' eyes. Furthermore, this protects their privacy. If this is done manually, that can take a lot of time and effort. So this project can also save time for video and photo editors.

Tools and Technology:

Based on our experience, we choose to use Python and its related tools as our main development tool for this project. It has many already existed and free libraries for us to use and save our time and effort. Many online AI resources also use Python as their main language, and choosing Python for this project is much easier for us to find help online.

Possible libraries and tools that we would use:

Python, OpenCV, PyTorch, PIL