

Beautify Dog Faces

Abstract

While it is easy and popular to beautify a human being in photos, such as making the eyes larger or the body slimmer, none of those tools are applicable to dogs, because of the inability to recognize facial features of dogs. In this project, we want to make it possible for dog-lovers to exaggerate facial features on our favorite dog pictures. We accomplish the task by fine-tuning the YOLO object detection model to identify dog eyes as well as the nose-mouth region using the Columbia Dog Dataset. Then we apply image warping to make changes to dog photos based on user controls in real time.

Problem

When we talk about machine learning and dogs, many research have centered around breed classification. However, many cool tools which are accessible to humans (Fig 3 and Fig 4) are not yet made available to dogs, such as dog image beautification. Fig 5 shows the inability to recognize dog faces in a popular human photo editing platform (BeautyCam). After some research, I found that the inability to recognize facial features of dogs is exactly the problem.

My solution includes two steps. First, we need to be able to automatically detect important dog facial features, such as the eyes as well as the nose-mouth region, which we want to enable users to make

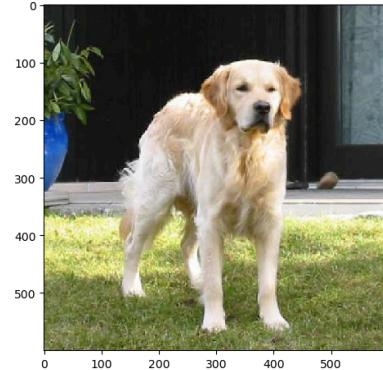


Fig.1 Example Dog (original)

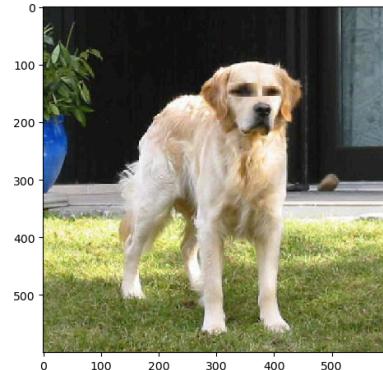


Fig.2 Example Dog (expected output)

changes to (Fig 1 and Fig 2). To do so, we fine-tune the powerful YOLO model using the Columbia Dog Dataset. Our data has human-labelled facial correspondence points (Fig 6), which makes it easier to fine-tune the eye detection model. For the nose-face region, we need to manually label roughly 300 images. Second, we expand or contract the bounding boxes from our fine-tuned models to perform image warping. We provide users a scrolling bar to control how much changes they want to apply. The entire workflow is done in real time.

The visual output effect shall be fun!



Fig.3 Me (original)



Fig.4 Me (eyes larger, mouth smaller)

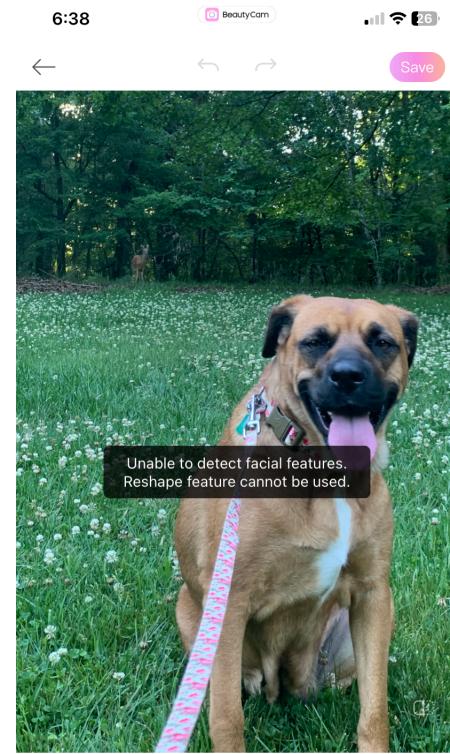


Fig.5 Dog (unable to recognize)

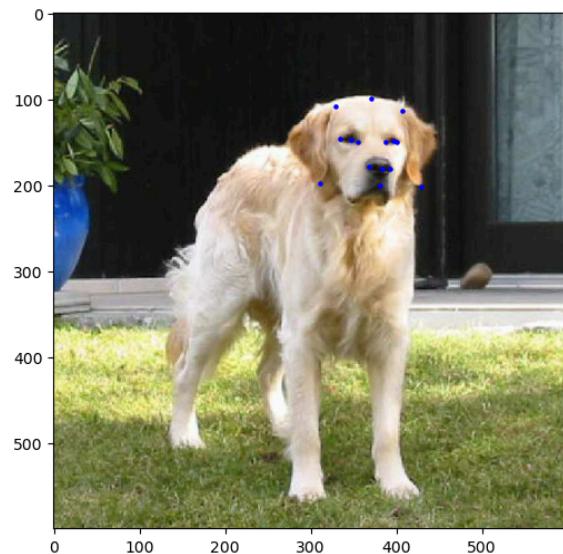


Fig.6 Example Dog Correspondences from Dataset