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Abstract:
We revisit the well-known problem of gaze correction and present a solution based on supervised machine learning. At training time, our system observes pairs of images, where each pair contains the face of the same person with a fixed angular difference in gaze direction. It then learns to synthesize the second image of a pair from the first one. After learning, the system gets the ability to redirect the gaze of a previously unseen person by the same angular difference as in the training set. Unlike many previous solutions to gaze problem in videoconferencing, ours is purely monocular, i.e. it does not require any hardware apart from an in-built web-camera of a laptop. Being based on efficient machine learning predictors such as decision forests, the system is fast (runs in real-time on a single core of a modern laptop). In the paper, we demonstrate results on a variety of videoconferencing frames and evaluate the method quantitatively on the hold-out set of registered images. The supplementary video shows example sessions of our system at work.

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1. Introduction

The problem of gaze in videoconferencing has been attracting researchers and engineers for a long time. The problem manifests itself as the inability of the people engaged into a videoconferencing (the proverbial “Alice” and “Bob”) to maintain gaze contact. The lack of gaze contact is due to the disparity between Bob’s camera and the image of Alice’s face on Bob’s screen (and vice versa). As long as Bob is gazing towards the eyes of Alice on his screen, Alice perceives Bob’s gaze directed down (assuming the camera is located above the screen). Gaze correction then refers to the process of altering Bob’s videostream in a realistic and real-time way, so that the apparent Bob’s gaze direction is changed (e.g. redirected upwards) and the gaze contact can be established.

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