Automatic Generation of Action Sequence Images from Burst Shots

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Many sports enthusiasts, from novice photographers to professional publications, rely on manual image segmentation with tools like Photoshop to combine multiple images of a bike trick or basketball dunk into a single image by cutting out the foreground of each image and overlaying it onto the background of one image. The goal of this project is to develop an algorithm that can automatically combine multiple images generated from burst shots of an action into a single image that clearly shows the full action. This will require three main tasks for each set of images, including background alignment between images in the cases when the camera is moving (using feature detection and matching), segmentation of the foreground and background components of each image even in cases when portions of the background might be moving, and finally cleanly combining the foreground image segments all of the images onto a single background image.

Our primary goal is to develop a robust algorithm that can run on a computer in either MATLAB or C++ with OpenCV. We will first focus on image sequences in which only one foreground object is present and moving, but will attempt to expand the algorithm to multiple moving objects if time permits. If we are successful in these main goals, we will move to a mobile platform with the hope of optimizing the algorithm so it is capable of running on Android and/or iOS, or by working through the mobile network to have a computer receive the image sequence and quickly return the processed image to the phone. If we still have extra time, we will add parameters that the user of the app can tweak before saving the processed image, like the transparency of the foreground object in each frame or selection of certain images from a longer sequence.

We do not plan on using one of the class’s DROID cameras for this project.
References:

