Automatic Generation of Action Sequence Images from Burst Shots

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Motivation
Many sports enthusiasts 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 do this automatically.

Related Work

Action Sequencing Technique
1. Image Alignment
   - Convert to Grayscale
   - Feature Detection
   - Feature Extraction

2. Background Extraction
   - FLANN Feature Matching
   - Homeography via RANSAC
   - Apply perspective transforms

3. Foreground Masks
   - Convert to HSV
   - Subtract by Mask
   - Difference from Background
   - Threshold
   - Largest Region

4. Composite
   - Dilate to Adjacent Mask

Background Extraction
Edge detection based approach allows background extraction from just two images

\[
\text{Difference Region X} + \text{Canny A} + \text{Canny B} = \text{Foreground object in image A}
\]

This doesn't always work, for example if the foreground object is blurred

Conclusions
Choosing a good threshold can be hard. Too high risks loss of features and too low will pick up minor background changes.

But when it works, it looks great!