CIS 581 Project 4A README

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Running the Code

Run `$ python test_detect.py` to create a video from the test videos. Output videos are called `VideoMarques.mp4`, `VideoMartian.mp4`, `VideoTyrian.mp4`.

External Libraries

OpenCV3 was used for face detection, Numpy/Scipy was used to blur images and perform Harris corner detection. No other relevant steps were accomplished with 3rd-party code. Kodner's ANMS and RANSAC code were reused from Project 3C.

Implementation Details

The code was mostly implemented as discussed in the instructions:

- Bounding boxes for faces in were determined in frame 0 with OpenCV. Harris corner detection was performed within each bounding box individually, and ANMS was used to find 50 feature coordinates.

- for every subsequent frame, estimateFeatureTranslation was computed for each feature in each bounding box.

- Features that moved more than 4 pixels were removed. RANSAC was performed on the remaining pixels and a homography was computed from that

- Since RANSAC includes a random component, the bounding boxes occasionally came out hyper-distorted. When this happened, RANSAC and homography were performed up to 9 more times and the least transformed bounding box was kept.

- To correct for rapid movement, after every 30 iterations or when there were fewer than 10 features remaining, face detection and feature selection were repeated.

Output

Only one face is discovered in the Marques and Martian videos. OpenCV finds a second face in the Tyrion video but not at frame 0. The attached image is frame 100.

Below are the first frames of the Marques and Martian videos. Cyan features were lost sometime before frame 30. In the Marques video, this is when he turns his head.
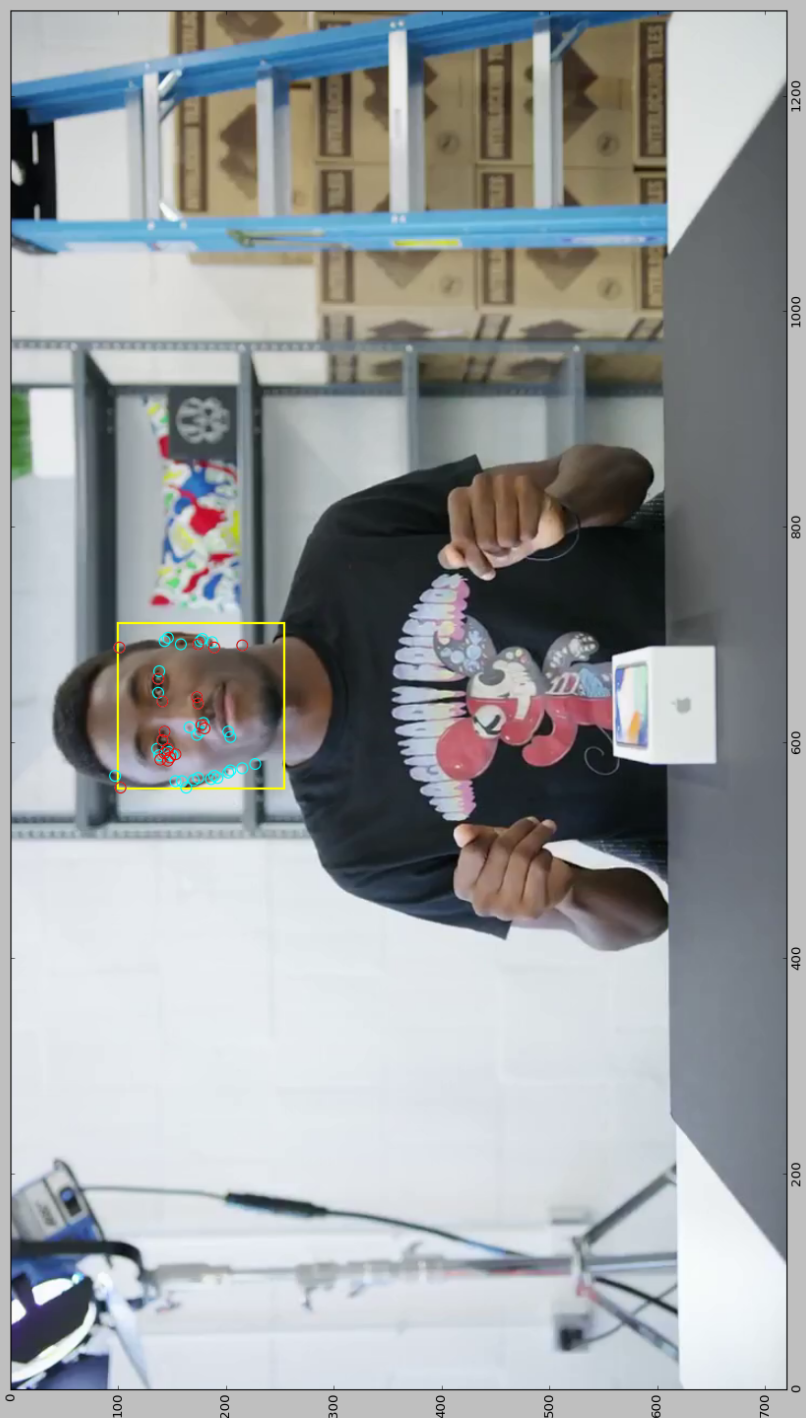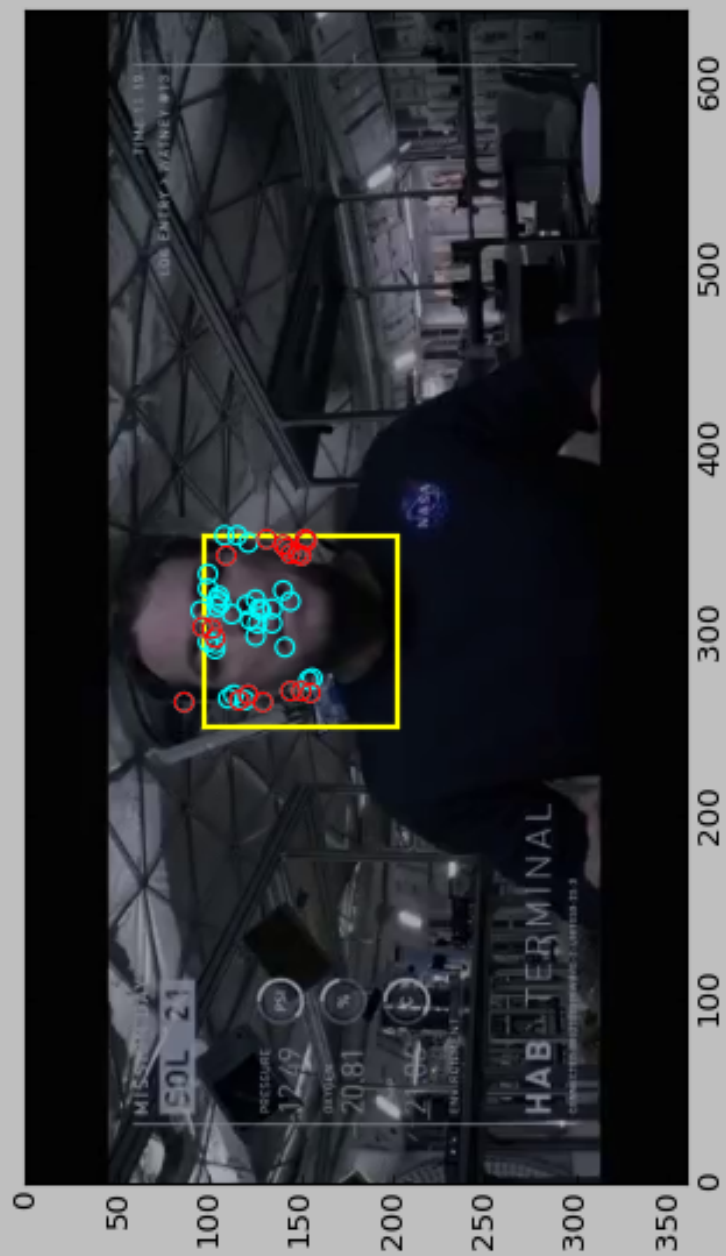
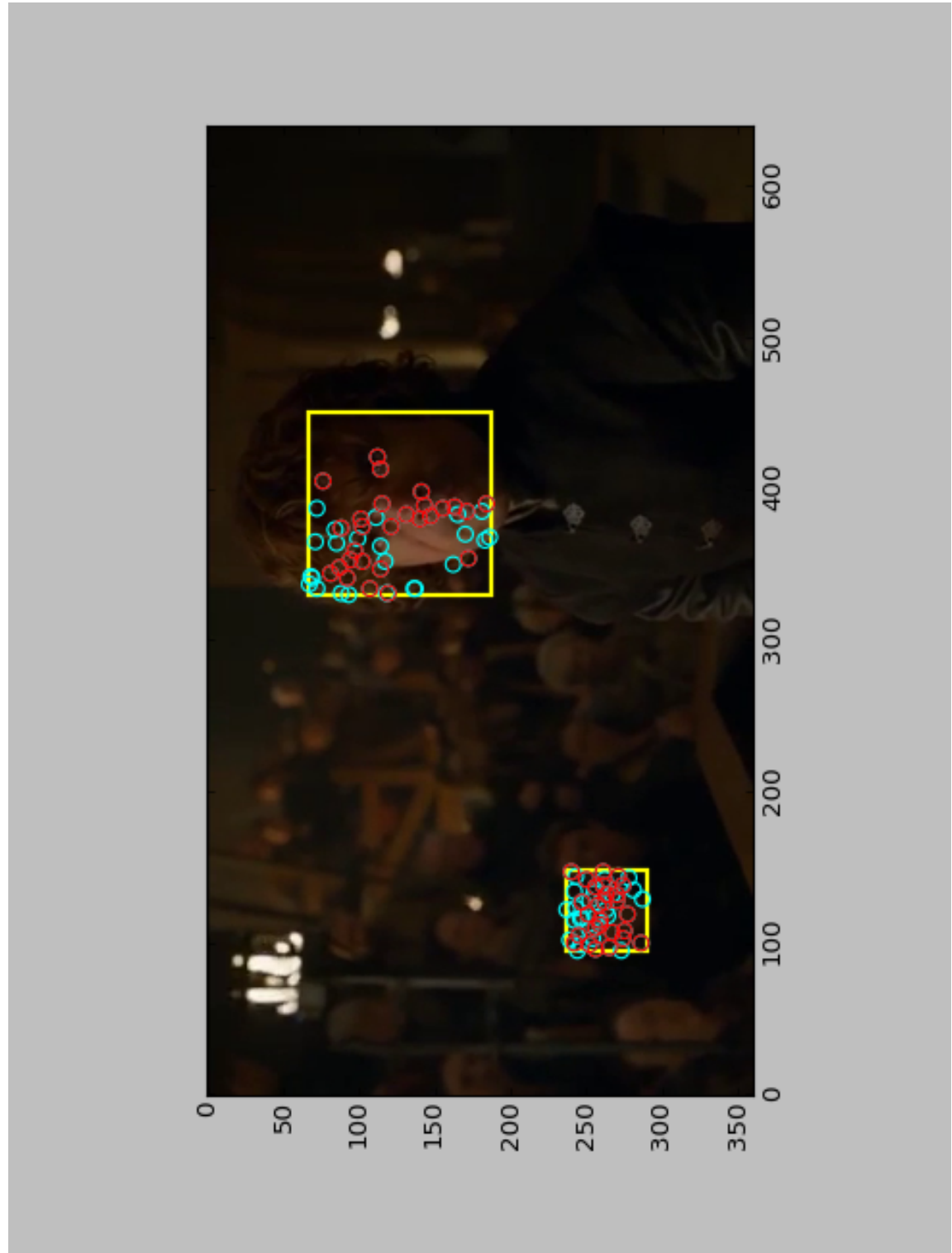Figure 1: Marques

Figure 2: Martian

Figure 3: Tyrion