Perfect Moments
Ayesha Khwaja, Pallabi Ghosh, Peter Vajda
Department of Electrical Engineering, Stanford University

Motivation
To build an algorithm to go back and forth between different frames of a sequence of images to let the user choose the best possible face for each person in the group photo.

Algorithm
User input and Face replacement in reference image
1. Capture multiple photos with multiple faces
2. Detect faces using Haar
3. Calitate technique
4. Merge the face image into the reference image using pyramid blending technique
5. Output Image stored into a file
6. Homography using Feature Detection and RANSAC
7. Out of the multiple faces of each person in all the photos, the user selects the one he wants in the final frame
8. These user selected faces replace the faces in the reference image (1st image) using two algorithms to find the location of replacement face
9. Template Matching
10. A/B Test : 100 random people chose between the output of the 2 algorithms

Intermediate results and explanation
Homography + Pyramid Blending
1. Input Images with faces detected
2. User selects which face of each person he wants in the final image
3. ORB feature correspondences for each person
4. Pyramid Blending the faces to the reference image

Template Matching
1. Input Images with faces detected
2. User selects which face of each person he wants in the final image
3. Finally the cropped faces replace the faces in the reference image using template matching of boundary pixels to get final output

Experimental Results
Input Images
1. Homography + Pyramid Blending
2. Template Matching
Output of Homography + Pyramid Blending
Output of Template Matching
Evaluation (A/B Testing)
The results of A/B testing does not show that any one of the algorithms is significantly better than the other but Homography + Pyramid Blending is slightly better.