# Dynamic Lip-Flip Application

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## Goals

Inspired by Lip-Flip sketch on Jimmy Fallon's *Tonight Show*

**Task: Create an entertaining Lip-Flip application using two webcams**

- Dynamically determine and track mouth locations
- Swap opposing mouths and apply realistic blending in real time
- Application should be both fast and robust

## Data Pipeline

**Raw Webcam Images**
- Capture independent webcam video streams

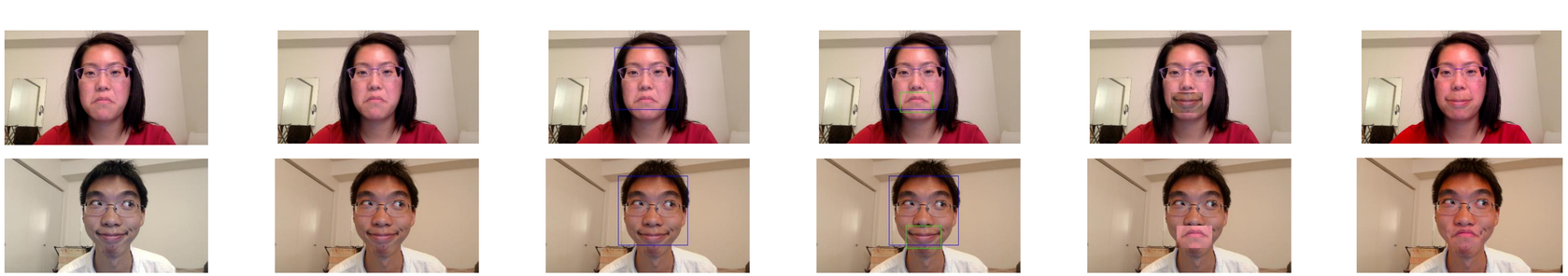
**Color Balancing / Gain Consistency**
- Find SURF Keypoints (matched with RANSAC)
- Find best transform for color and brightness

**Find Faces**
- Locate faces using Haar Face Cascade
- Choose largest face if multiple are present

**Find Mouth Within Faces**
- Search only within bottom half of face
- Locate mouth using Haar Mouth Cascade

**Swap Mouth Regions**
- Flip corresponding mouths
- Scale to correct size

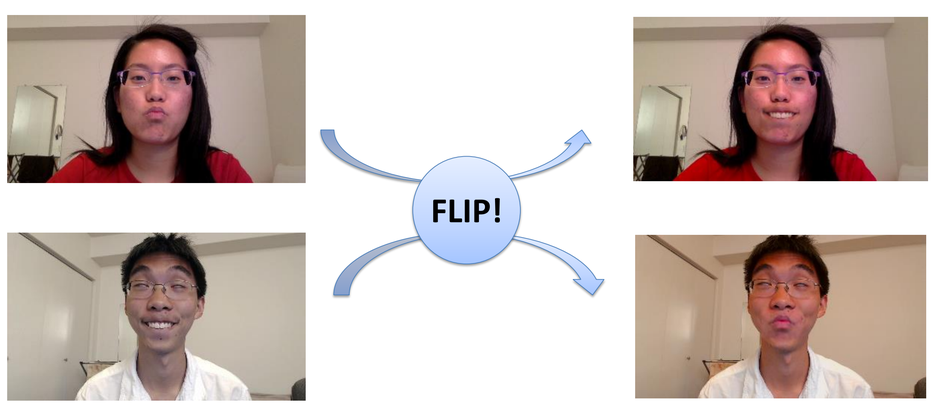
**Blend Images**
- Blend swapped mouths using Laplacian pyramid blending



## Future Work

- Adjust color balancing to improve blending for participants with differing skin colors
- Improve face recognition for participants not looking straight at the camera
- Further reduce pipeline latency for smoother video

## Experimental Results




## References

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[3] Adelson, Edward H., et al. "Pyramid methods in image processing." *RCA engineer* 29.6 (1984): 33-41.

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