



# Baby Face Generator

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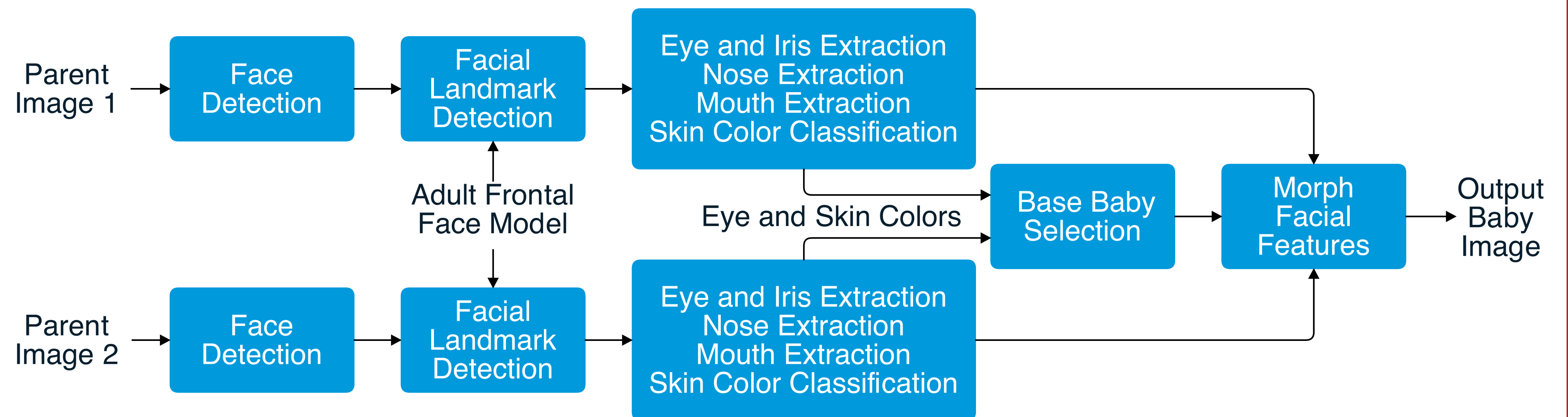
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## Introduction

Detecting faces and extracting key facial features remains an active research area with a wide range of applications. This project seeks to leverage this research for an entertaining application: to intelligently combine the faces of two individuals to form a composite baby image.

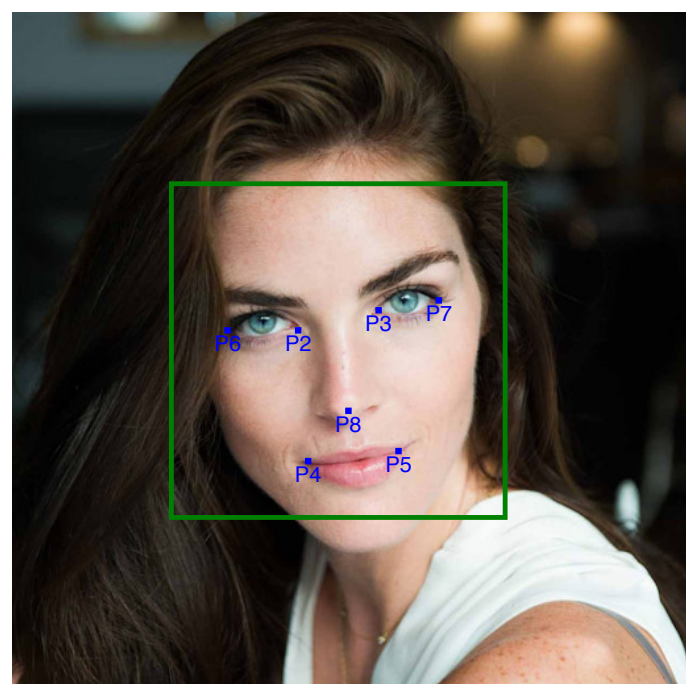
Implementing this project involves two major steps: (1) Facial detection and feature detection of the eyes, nose, mouth, and skin color and (2) morphing the detected features together to form a baby face.

## Face Feature Detection and Morphing Method



## Feature Detection

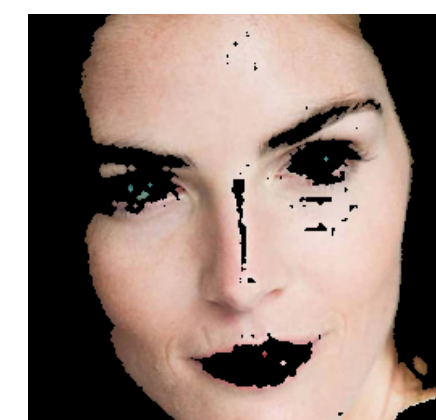
1. Face detection using Viola-Jones object detection and facial keypoint detection using trained model [1]



2. Feature extraction using keypoints, edge detection, and face geometry



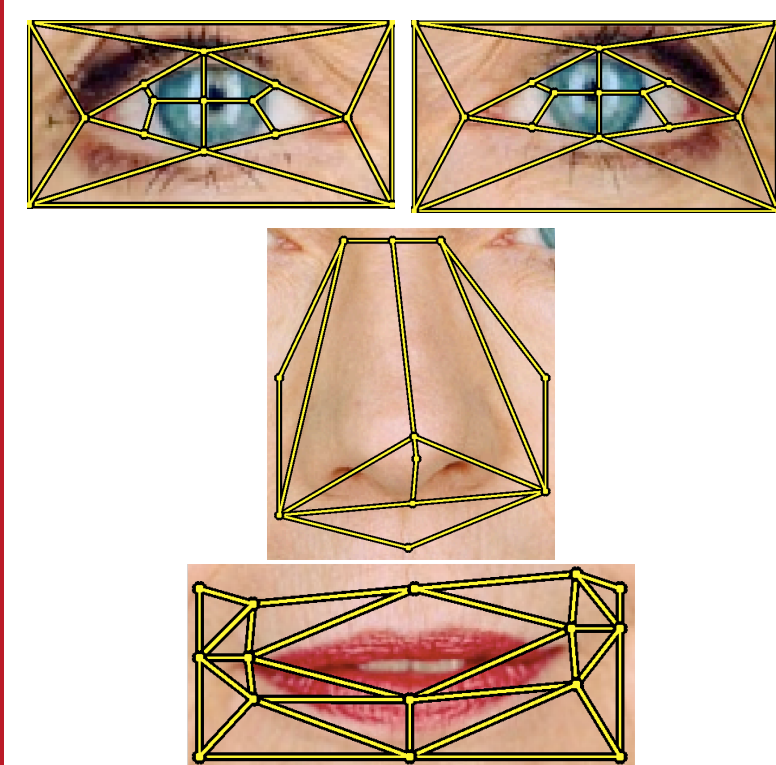
3. Skin classification using mask in HSV color space [2]



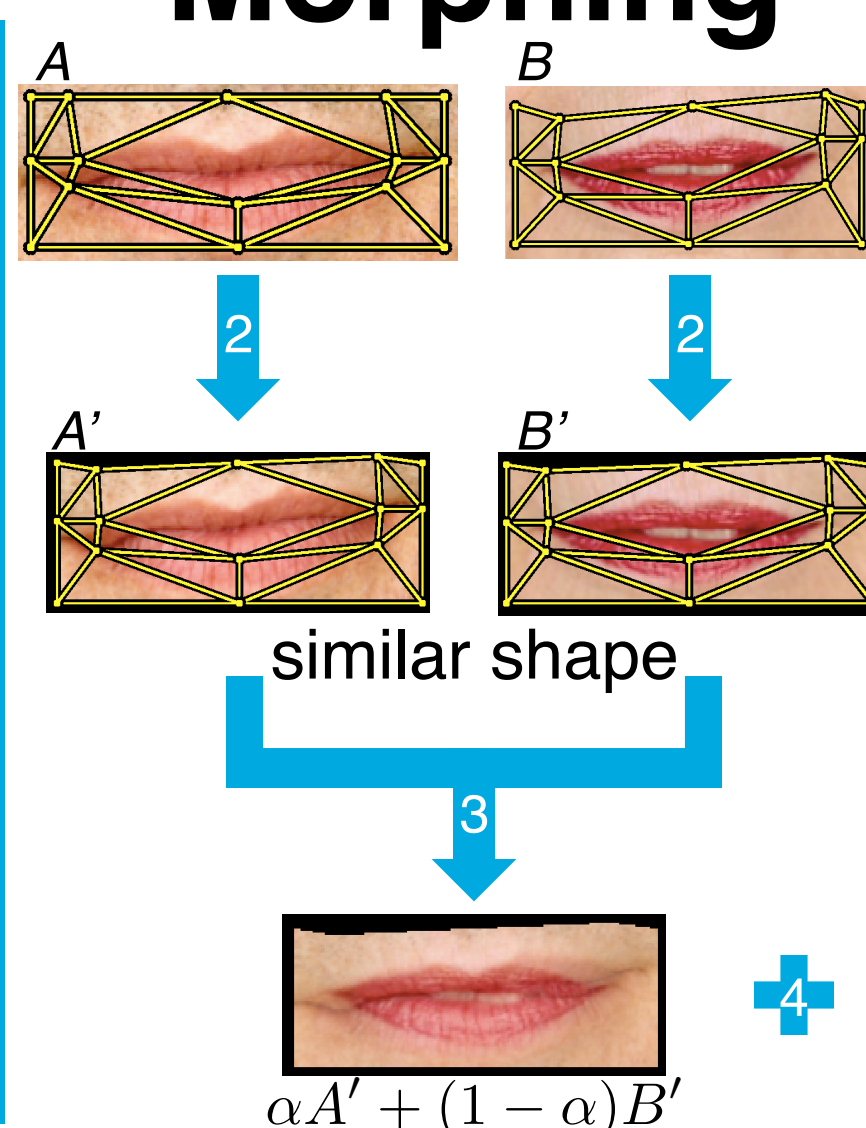
4. Iris detection using Circle Hough Transform



## Morphing



1. Partition features into triangles and quadrilaterals using facial landmarks



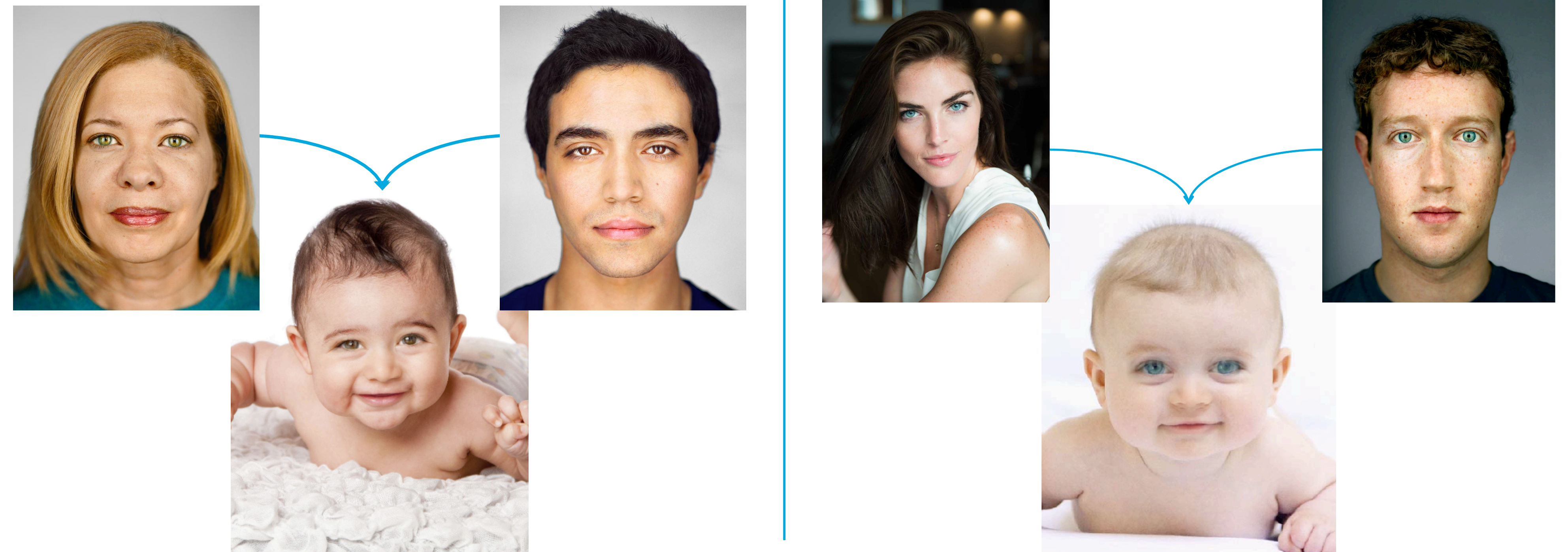
2. Warp using affine transformation for triangles and homography for quadrilaterals [3]

3. Cross-dissolve [3]

4. Repeat steps 2 to 3 using the composite adult and the baby



## Experimental Results



## References

- [1] M. Uříčár, V. Franc, and V. Hlavác, "Detector of facial landmarks learned by the structured output SVM," in *VISAPP '12: Proceedings of the 7th International Conference on Computer Vision Theory and Applications*, G. Csurka and J. Braz, Eds., vol. 1. Portugal: SciTePress — Science and Technology Publications, February 2012, pp. 547–556.
- [2] C. Garcia and G. Tziritas, "Face detection using quantized skin color regions merging and wavelet packet analysis," *Trans. Multi.*, vol. 1, no. 3, pp. 264–277, Sep. 1999.
- [3] G. Wolberg, "Image Morphing Survey," *The Visual Computer*, 14 (8/9), pp. 360-372, 1998.