Mobile Vision App Google Summer of Code 2012

Mid Term Report

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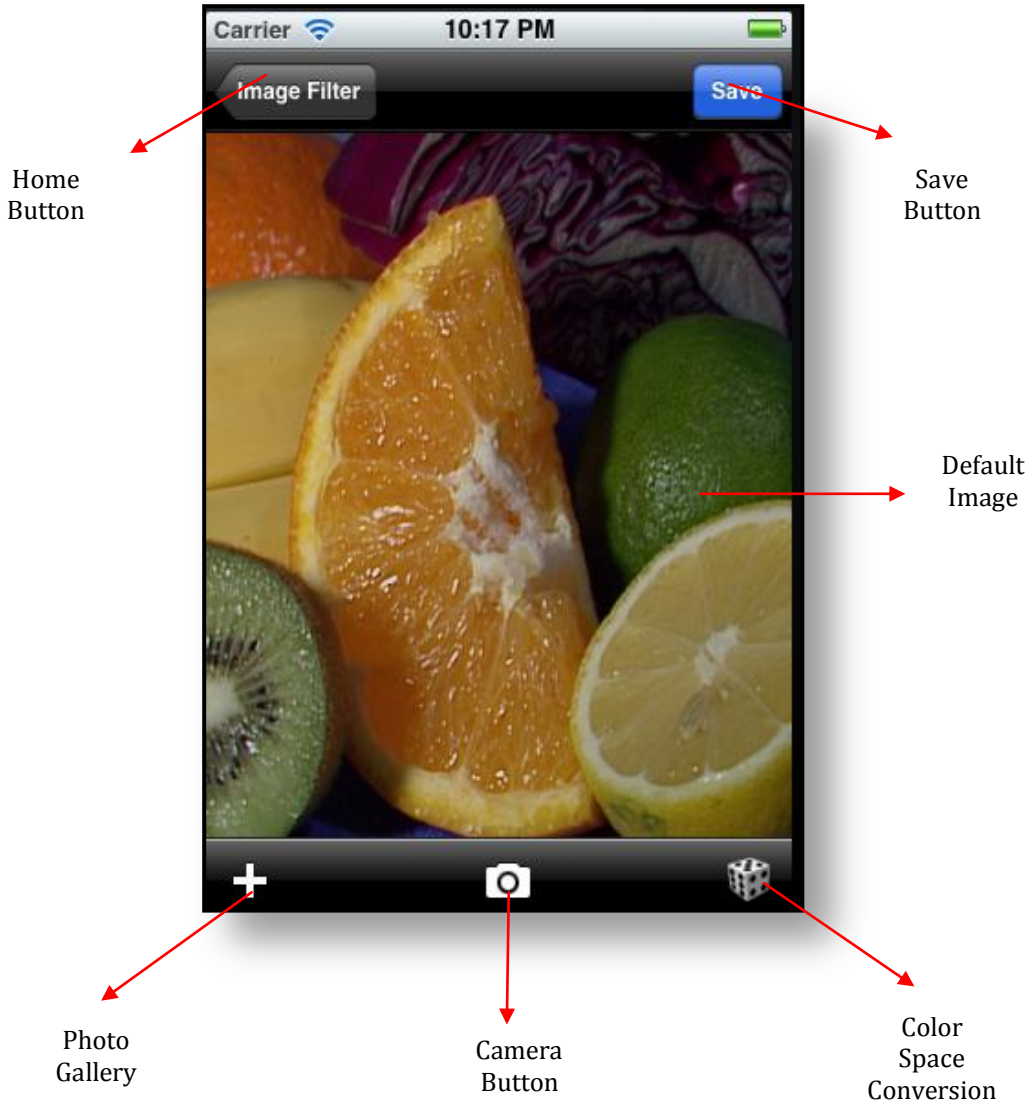
ABSTRACT

This is an exciting era for Computer Vision. Combination of OpenCV and iOS opens new opportunities for Computer Vision. Computer Vision research is useful for many consumer product. iPhone provides an opportunity to deliver this research to consumer as Native Application.
This document describes the progress made, future plans and issues.

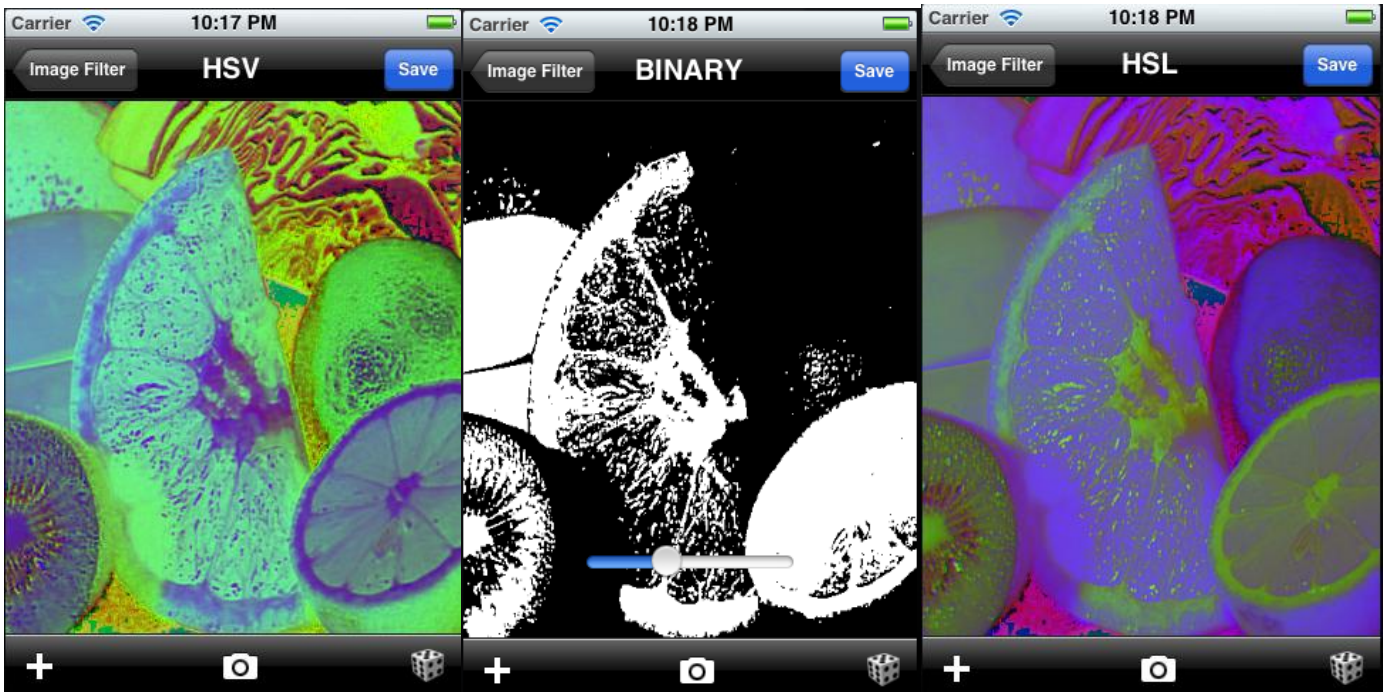
Progress Made

1. Conversion of UIImage to cvMat and vice versa.

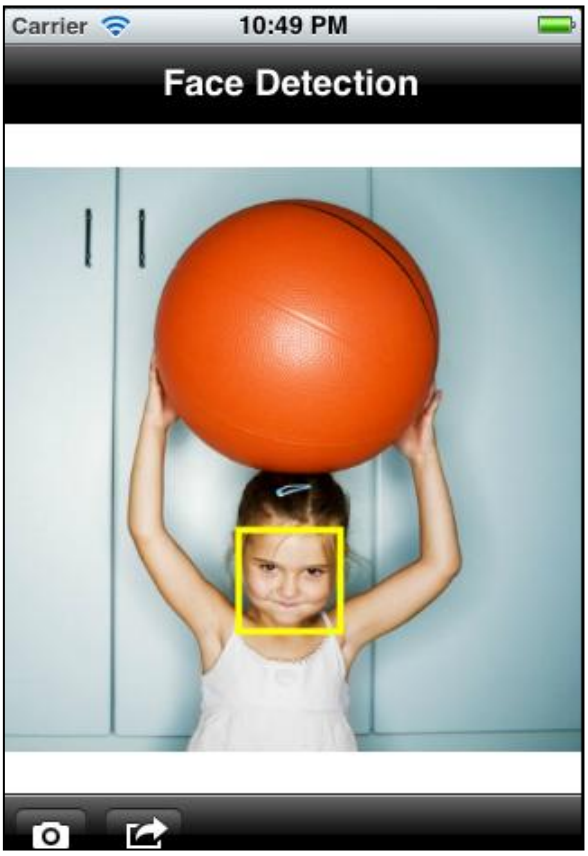
2. Demo for image conversion: This program loads the image from camera and photo gallery, as well as user can use default image that comes with this application.

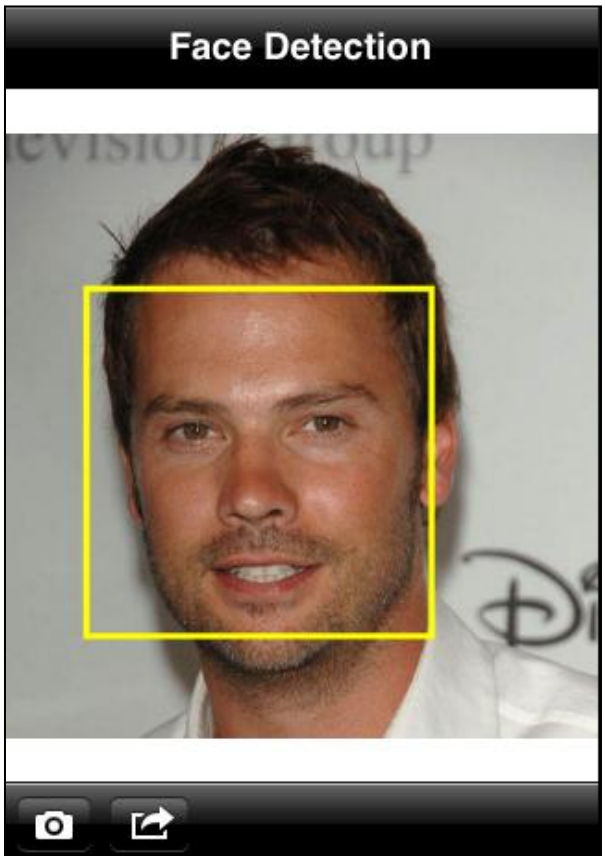


Each time user rolls a dice, random color space conversions are applied to image. User can save multiple copies of each effect. Some of the effects examples are shown below.

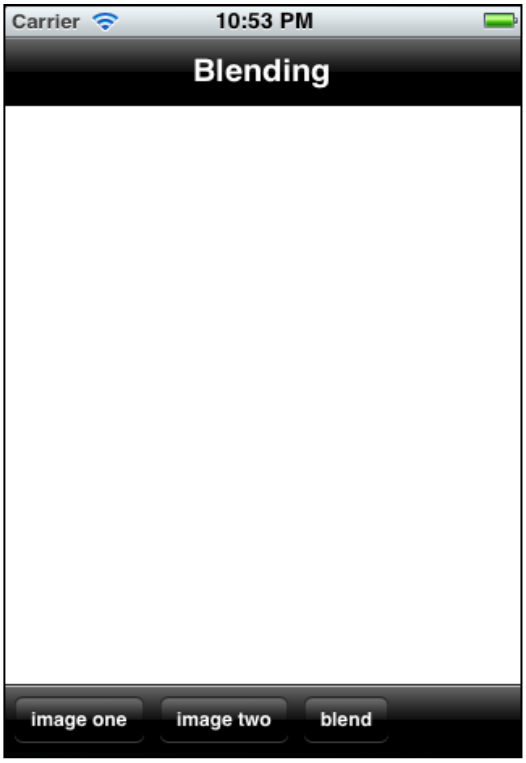


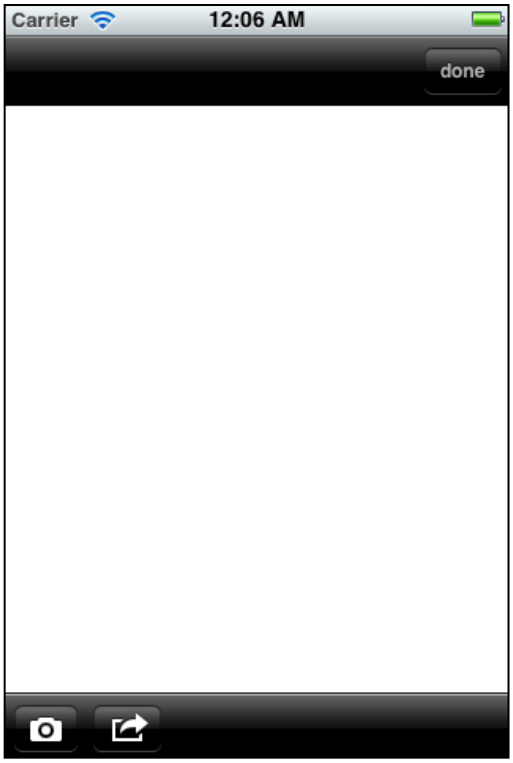
3. Face Detection: This application does face detection on images taken from camera and photo library. Face detection is method is based on Haar Cascade Classifier. We were able to successfully detect more than one faces in an image.



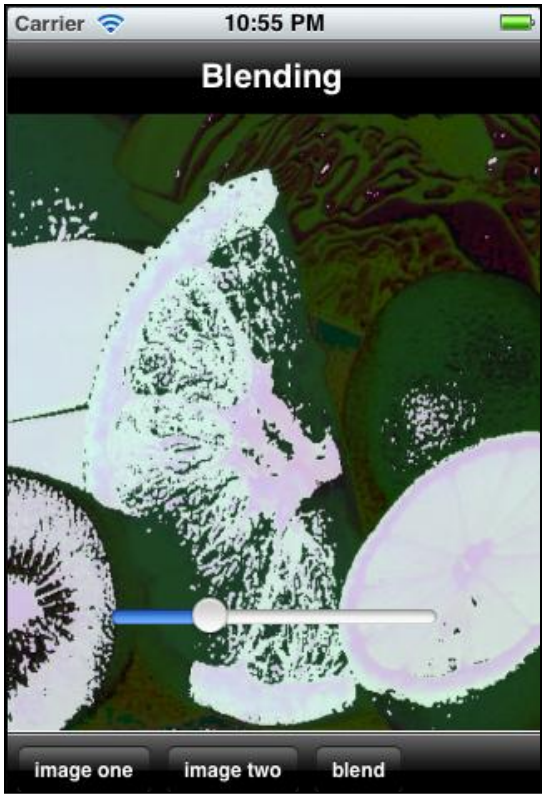


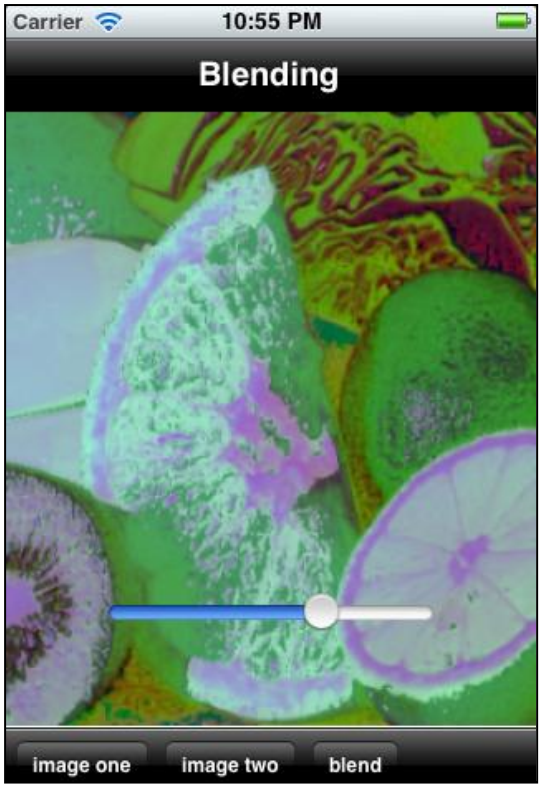
4. Blending images: This algorithm blends two images. Again images can be accessed from camera or photo library.



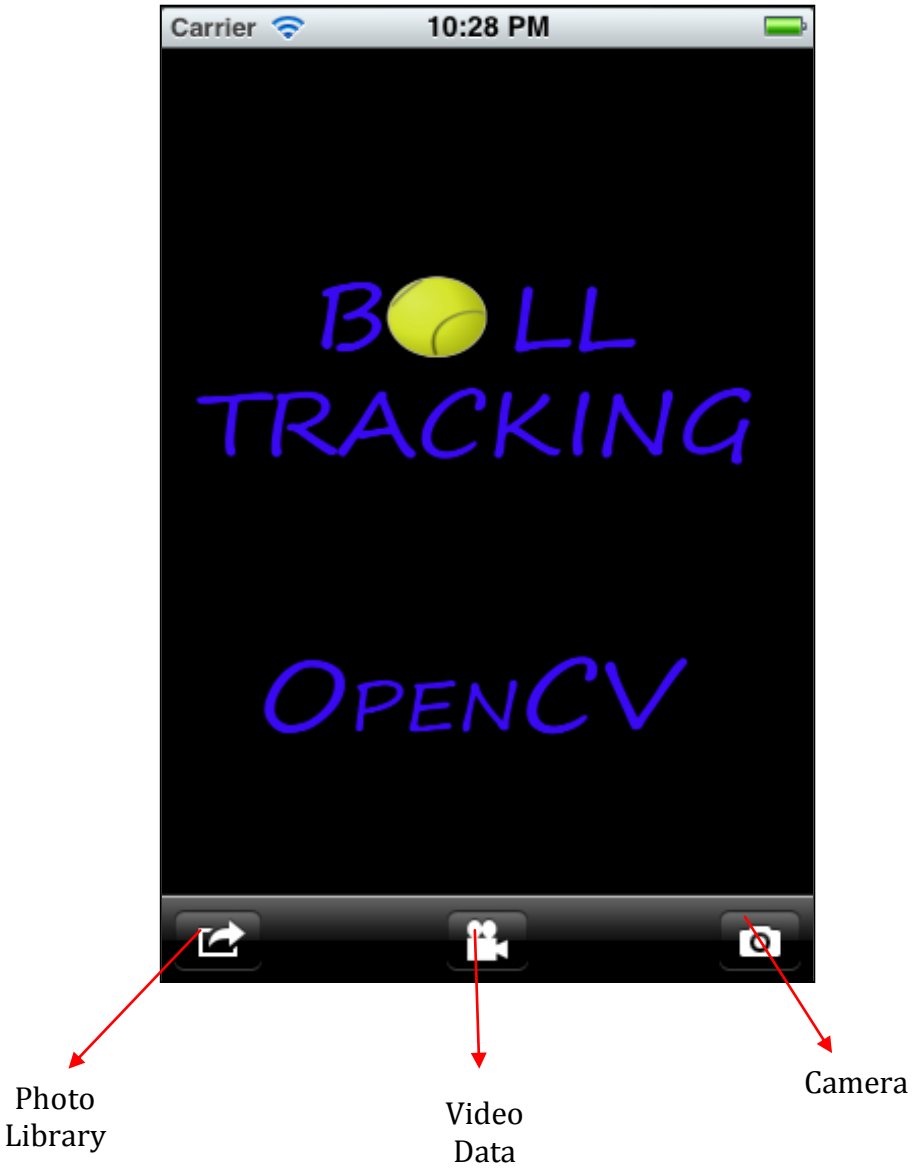


Blending images is only successful on images of same size. Special care has been taken to resize image, before blending.

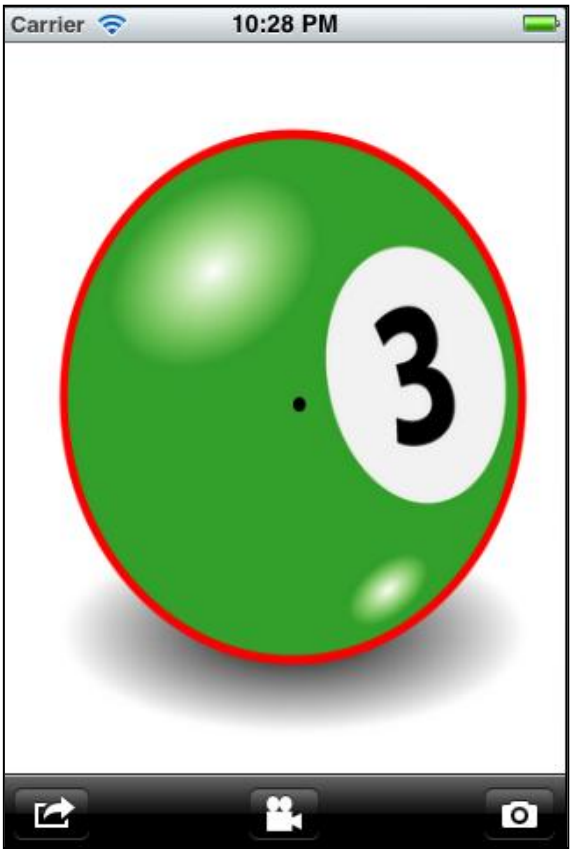




5. Real Time Tennis Ball Tracking: This Application demonstrates the color processing of video data. It tracks the tennis ball in real time. AVFoundation framework from apple provides us access to raw pixel data. This raw data is used to create cvMat.



This application is based on conversion of RGB to HSV followed by thresholding. Finally, Hough Circle is used to track tennis ball in real time. Below is the result of tracking.



Future Plans

1. Extend color space conversion into full scale photography application. Displaying random effect on images, such as grain, glowing blur etc.

2. Extend photography application to iPad.

3. Simple Augmented reality application using camera calibration.(if time permits)

4. Accessing RGBA pixel format directly from video slows thing down. We can access YCbCr, use arm7 NEON to convert RGB to grayscale

5. Documentation.

Issues

1. Initial phase of project was bit challenging due to lack of documentation on compiling OpenCV with iOS.

2. From user perspective, there is a need of step by step instruction with screens, on how to integrate OpenCV with iOS. OpenCV and iOS together have great potential considering a fact number of iPhone users are increasing day by day. Having a simple, easy to process documentation can encourage many users.

Conclusion

I feel this project has lot of potential. So far, we have made very reasonable progress.
I am very thankful to OpenCV and Google for giving me this opportunity. I always wanted to contribute to Open Source, and OpenCV has provided given me an excellent platform.

Vadim has been an excellent advisor. He has responded in timely manner, with great encouragement and enthusiasm. I must say, he is full of great ideas.
I have also learnt a lot from my fellow worker Eduard. I really appreciate his contribution.
I wish to continue my contribution with this project even after GOSC is over.