**Homework #5: Advanced Image Capture and Processing**

Design a Windows Phone to fulfill the following specifications. There are two separate applications requested, please submit both applications as part of the same solution.

**Application 1**: Develop a Windows Phone application that reads in an image stream from the camera, and outputs it to the user in real time. Analyze the image stream to find the location of a simple marker (in this case, a red square). Superimpose an image bundled with your application over this marker, effectively creating a simple augmented reality application. The choice of tracking algorithm is yours; this is meant to be a creative endeavor to obtain some familiarity with the challenges involved in tracking a complex object such as a face. Feel free to bounce ideas off of other students, and don’t be afraid to just try things to see if they will work. There are many attributes a tracking algorithm may strive for, some ones to keep in mind are rotation invariance, scaling invariance, efficiency and false positive rate.

**Application 2**: Develop a Windows Phone application that communicates with the Arduino board to perform as a remote Morse code transmitter. Because we do not have the USB to Serial converters yet, this week we will focus on Bluetooth communication, as opposed to Arduino programming. Setup Bluetooth communication with the Arduino, and transmit a series of “.” and “-“ characters to the device to cause it to emit a short or long tone, respectively. Sending a space character will cause it to pause, which can be useful for separating characters or words.

Your application should support inputting English characters, and transmitting the corresponding “.” and “-“ sequences. Be aware that there may be issues when sending very long sentences, you should test your application to detect any potential issues.

Note that this homework is due two weeks from being assigned, on May 12th.