

ECEN 631 – Robotic Vision

Visual Inspection Project Guide

January 8, 2013

Project Scope:

This project is the last part of the three focuses of this robotic vision course. It is designed to introduce machine vision application to students through a simple real-time visual inspection project. Machine vision technology has been used for many industrial factory automation applications in the past 30 years. Through this project, students learn to design real-time vision algorithms and to use machine vision technology for visual inspection applications.

Project Requirements:

- Students will work as a team to complete this project.
- The team has to select a product and prepare product samples for inspection.
- A Firewire color camera is mounted on the conveyor for capturing the image for processing.
- The camera field of view is 6"×4.5".
- Product samples should be smaller than 5"×4".
- Samples should include both good, acceptable (ugly), and defective (bad) products.
- The team has to define inspection criteria.
- The system will capture and process image and report inspection result.
- The system must display "Good", "Bad", or "Ugly" on the screen to demonstrate the function of the system.
- A conveyor belt with speed control function will be used for this project.

Software:

A Visual Studio 2010 project (called VisualInspection) using OpenCV 2.3.1 C++ functions for Windows 7 32-bit has been prepared for students to implement their algorithms. Image acquisition porting is included in this project. The team is responsible for the development and implementation of the visual inspection algorithms and the display of the inspection result. Follow the following steps to use this software.

- The zip file of this project is posted on the class website. Students can download a copy and get familiar with the project
- Students can login the computer using account: "eceshop" and password : "gogogadget"
- A project folder (C:\Projects\VisualInspection - #) has been created for each team according to your team number.
- Change the application folder in the Hardware.h file to the folder the project is copied into. Below is an example of using C:\Projects\VisualInspection - 1 for Team #1

```
#define APP_DIRECTORY "C:\\Projects\\VisualInspection - 1\\"
```
- Only three files need to be modified.
 - Hardware.h is a header file for a class called CTCSystem. CTCSystem is a base class of the main class VisualInspectionDlg.
 - Hardware.cpp implements all member functions of the CTCSystem class.
 - VisualInspectionDlg.cpp is the main program that handles Windows messages.

Other teams may change the lens aperture and focus and the ambient light in 496 CB. Please make sure you have a quick way to calibrate and set up your parameters.