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February 9, 2013
EE 542

Scraptcha – Design Specification

System Description

This specification describes and defines the detailed design requirements for the Scraptcha image capture and message system. The system supports three different communications protocols in order to receive image data and send user feedback. It is operated via local inputs or via a user interface (UI) that is connected through the Internet to a Raspberry Pi that is communicating with this embedded device specified below. It is meant to provide a cheap and reliable remote solution to image capture and message notification and can be added to for future expansion.

Specification of External Environment

The counter is to operate in an commercial environment in a commercial grade temperature and lighting environment.

The embedded device will support line power operation only; The device that the UI operates on will support line power and battery operation..

Specific details are included under Operating Specifications.

System Input and Output Specification

System Inputs

The system shall be able to measure the following signals

JPEG Images via USB

- High Quality: 2584 x 1936 pixels (5 MP)
- Medium Quality: 1632 x 1224 pixels (2 MP)
- Low Quality: 576 x 432 pixels (0.5 MP)

Take Picture via GPIO

- Push Button: ON/OFF

All signal inputs will be

- Digital data
- Voltage Range: 0.0 to 5.0 VDC

System Outputs

The system shall measure and display the following signals using a 16x2 LCD display via SPI

System Status

- READY: Operating normally and waiting for command
- BUSY: Scrap prediction in progress or storing user input
- USER INPUT: Waiting for user input from button or UI
- COMM ERROR: Communication between the device and the server or UI has failed
- DEBUG: In test mode

Guessed Object

- String from Manager: Any valid word

Prediction

- String from Manager: TRASH, RECYCLING or COMPOST

Match Percent

- Integer from Manager: 0 – 100%

The system shall measure and display the following signals using an LED array via GPIOs

Match Percent

- Integer from Manager: Green LED if >= 75%, Red LED if < 75%