

## 2004 Undergraduate Student Project Description

### Department of Bioresources Engineering

**Project Title:** Machine Vision Based Poultry Behavior Analysis

**Faculty/Staff Sponsor:** Eric Benson, Gary Van Wicklen and Nick Gedamu

**Area of Study:** Poultry/Machine Vision

#### **Project Description:**

Background: Poultry is an important component of the state and regional economy, representing a \$1.6 billion industry that employs approximately 14,000 employees across the Delmarva Peninsula (DPI, 2002). Poultry house ventilation controllers are becoming increasingly common on the Delmarva Peninsula, with several integrators requiring controllers be included for new housing or suggesting integration into existing houses. The controllers control the fans, air inlets and cooling pads for ventilation control and activate the lighting and feeding systems. The lighting programs influence the bird activity level, while the feeding programs are matched to try to ensure maximum weight gain in the shortest period of time. In order to maximize weight gain, optimization of feed, feed amounts and the associated schedules is required. One approach to manage the feeding of the birds is to supply feed as long as the birds are actively trying to feed. An image based system could be used to monitor bird feeding and activity. Bird feeding is one of several behaviors, including huddling and dispersion, that could be observed with a vision based system.

From a research point of view, a reliable vision based processing system could be used to better analyze bird feeding behavior. Human presence is known to influence bird behavior. Image based bird behavior has other research implications as well. Images can be used to develop time profiles of bird activity (movement, response to ventilation, huddling, etc.) as well as to compare activity levels in different portions of the house. Time profiles of bird activity can contribute to improved feeder and waterer design, and enhanced distribution of ventilation air to provide more uniform bird comfort.

Proposed Research: Cameras have been installed in a poultry research facility in Georgetown, DE. Video images have been collected over four flocks. An initial algorithm has been developed and tested. Ambient light, in particular night operation remains a challenge. An infrared light would need to be tested with the camera and camera calibration would need to be developed in the lab. After installation of the infrared sensor, existing software would have to be modified to work with the light. The student researcher would be responsible for fabrication of any support structure for the light, installation, testing, software modification and analysis of the results.

Students can work for credit or pay.

**Student Qualifications:** completion of EGTE 115 (programming) and EGTE 244 (wiring)