Commercial poultry production
Real-time poultry health monitoring

At a glance

Commercial poultry producers are seeking more effective, accurate, and timely ways to monitor the health of their flocks. With early notification of illnesses, management teams that monitor thousands of birds could treat and minimize costly infections or help avoid them altogether. Advanced analytics software and hardware tools have the potential to play a central role in this effort. In 2020, SAS and Intel collaborated on a number of use cases with the goal of transforming poultry health monitoring. The use cases were built into an experimental design protocol using commercially raised chickens: "Treated" groups had a reduced health status, and were compared to health "control" groups.

Use case overview

Use case #1: Acoustical detection of physiological changes

Develop an analytic monitoring model in SAS using audio signal data that detects frequency changes and occurrence rates over time in treated and control groups.

Data source: Microphone audio data

Use case #2: Monitor activity level of chickens with computer vision

Develop a computer vision model to establish the number of chickens per group, measure flock activity levels, and track food and water consumption. The computer vision model to identify chickens was built in SAS®, while the inferencing technology reflects a collaboration in Intel OpenVino and SceneScape to monitor activity differences between the treated and control groups.

*Data source: Video camera data*
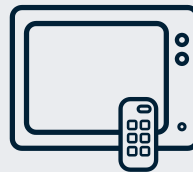
Use case #3: Monitor weights of chickens with computer vision

Develop a SAS computer vision model to relate remote images of birds obtained by cameras to the correlated ground true weights of chickens. The concept would enable continuous remote – rather than eyes-on/hands-on – monitoring of chicken weights. This use case also more broadly supports the overall health monitoring use case by helping to identify problems with diseased chickens ahead of time, as weight loss is a primary indicator of disease and poor health.

Data source: Video camera data
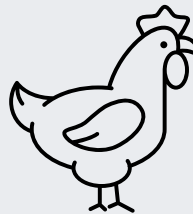
Use case #4: Monitor additional metrics of health with specificity for disease

Develop an analytical model that can utilize data taken from sensors for ammonia, moisture, temperature and observations of quality/ quantity of fecal output in bedding. The purpose is to support specific health monitoring tied to pathologies of known diseases that are critical in poultry management. The example use case, as employed in the experimental trial, is based on the intestinal disease known as coccidiosis. Supplementary data types (such as ammonia levels) can be specific for such a disease and would be expected to contribute to the overall analytic SAS model development for health monitoring.

Data source: LoRa sensors

Technology overview

Intel
- OpenVino
- SceneScape
- Intel RealSense Lidar Cameras
- Intel Stereo Camera

Other
- ONNX
- Microsoft Azure
- LoRa Sensors

SAS
- SAS Visual Data Mining and Machine Learning
- SAS Azure IoT Hub
- SAS Event Stream Processing
- SAS Analytics for IoT
- SAS Visual Analytics Dashboard

Progress to date

This is an ongoing project. The computer vision use cases have shown early promise in their ability to detect chickens in the pens and determine weights of chickens from video frames. The inferencing work with Intel OpenVino and SceneScape is ongoing. Additionally, we have preliminary results from the sensor data that suggests ways in which to modify the experimental setup for future experiments.

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