AMPC

SNAPSHOT

Development of Naked Primal Cut Recognition Software

Project Report Reference: 2017-1064 **Date: 3 October 2017**

Project Description
The development of a preliminary software suite capable of efficiently learning and identifying primal cuts with the use of a multilayer perceptron (MLP) neural network. Using identifying properties including dimensions, fat percentage and weight; seven (7) different types of primal cuts can be correctly identified.

Project Content
Meat processing facilities incur significant labour cost with the identification and manual bagging and labelling of primal cuts, and as such the implementation of a machine capable of learning to identify different primal cuts automatically and in 'real time' is crucial to be able to obtain significant economic savings.

The terms of references were to:

1. To integrate 3D vision system components capable of identifying and classifying a subset of naked primal cuts.
2. To develop a software package capable of determining primal cut type, dimensions, orientation and mass in real time.
3. To provide feedback to operators regarding profile parameters to refine and improve processing procedures.

The project focuses on the development of the vision recognition system as well as the mounting equipment for the vision hardware to fit in the tight confinements of a boning room.

Project Outcome
The development of a robust sensing network and software algorithm for rapid identification for seven (7) different red meat primal cuts was successful.

The subset of cuts used in this project are as listed below:

- Topside
- Chuck Roll
- Point End
- Striploin
- Knuckle
- Cube Roll
- Tenderloin

The primal cut recognition system frame was designed to use minimal space in the factory floor of a boning room as it can easily be modified to be installed over existing conveyors. The frame will house all the equipment necessary for the identification which includes the stereoscopic camera and LED lights (Figure 1).

The software algorithm using a machine learning MLP neural network to correctly identify the primal cut from the image data, and identify which cut has been produced. The outputs of the software algorithms are indicated to the operator via a graphical display and the compliance with an ideal primal cut (Figure 2).

Figure 1: Primal cut recognition system equipment frame positioned over the product conveyor with a striploin

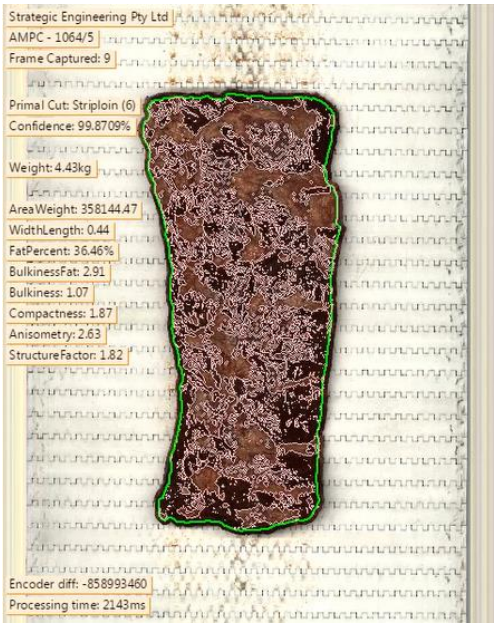

Figure 2: Graphical user display showing all the image data outputs and region outlines of a striploin that have been generated by the recognition system

Benefit for Industry

Meat processing facilities would be able to use automatic primal cut identification and grading to significantly reduce the amount of manual labour required in their plant needed for bagging and labelling. The implementation of the identification system will also potentially allow for 'real time' performance feedback of the boning and slicing operations upstream. Automation for downstream processes such as the picking and packing of primal cuts into cartons could be built using similar vision systems while incurring little cost for further software development.