

Developing Robotic Approaches to Enhance Beef Carcass Grading

The ribbing of beef carcasses for grading, particularly identifying the precise location of the grading site has a profound impact on the accuracy of payments to producers, the ability to accurately sort carcasses for processors, and the predictability of the eating experience for consumers. The current approach of beef carcass ribbing entails the use of a manually operated motorized saw to cut through the backbone of the moving carcass. With the chronic labor shortage issue facing the Alberta agriculture industry particularly the meat processing sector, together with the risk of injury involved in manual carcass ribbing, automation and robotics are among the promising approaches. This project aims to develop computer vision algorithms together with a robotic arm to identify the grading site between the 12th and 13th rib of beef carcasses.

**RECIPIENT:**

AAFC

PI: Óscar López-
Campos**TOTAL BUDGET:**

\$571,152

**PROJECT DATES:**

JAN 2022 –

DEC 2023

**PARTNERS:**E+V Technology
Harmony Beef
Kuka Robotics Corp.**AI FUNDING:**

\$245,144

**PROJECT TRL:**

Start: 4

End: 6

APPLICATION

An automated, robotic approach to identifying the grading site between the 12th and 13th rib will offer the precision that is essential to maximizing carcass value and ensuring accuracy and consistency of grading assessments. Precision and accuracy will be judged through the ability of the computer vision algorithms to successfully locate the ribbing location, followed by successful deployment of the robotic arm to the precise carcass coordinates, targeting speeds of up to 400 carcasses per hour.

ALBERTA INNOVATES CLEAN RESOURCES

SMART AGRICULTURE AND FOOD
AGRI-FOOD INNOVATION – FOOD INNOVATION

PROJECT GOALS

- Develop a robotic approach to automate beef carcass ribbing between the 12th and 13th ribs.
- Analyze existing ribbing operations in participating commercial plants in Alberta to determine a successful implementation pathway for automation for secondary phases.
- Build Alberta capacity around robotic approaches for beef processing.

BENEFITS TO ALBERTA

- Creation of initial infrastructure, research, and highly skilled qualified personnel for further developments in other areas involving robotics and computer vision that support the Alberta beef processing sector.
- Supports one of the 2030 goals of the Canadian Beef Advisors to invest in technological solutions that reduce costs, improve competitiveness, and enable regulatory approvals and business functions that support trade and commerce.
- Potential to maximize the amount of higher value ribeye primal by delivering a more accurate and consistent cut when separated from the loin at the grading site.
- Will help address labor issues including challenges in recruiting and training personnel for the ribbing task.
- Reduced risk of injury to operators handling the ribbing saw.



2 Publications



1 Patent



1 Student Trained



10 Project Jobs



1 New
Product/Service

CURRENT STATUS

MAR 2022

Analysis of existing ribbing operations in participating packing plants in Alberta has begun, including the collection of 10,000 images. Analysis of research capacity and building capacity/commercialization pathways for robotics in beef processing has also started.