Snapshot Report

Shadow Robotics

Remote Operations- Shadow Robots

Project Code
2021-1146

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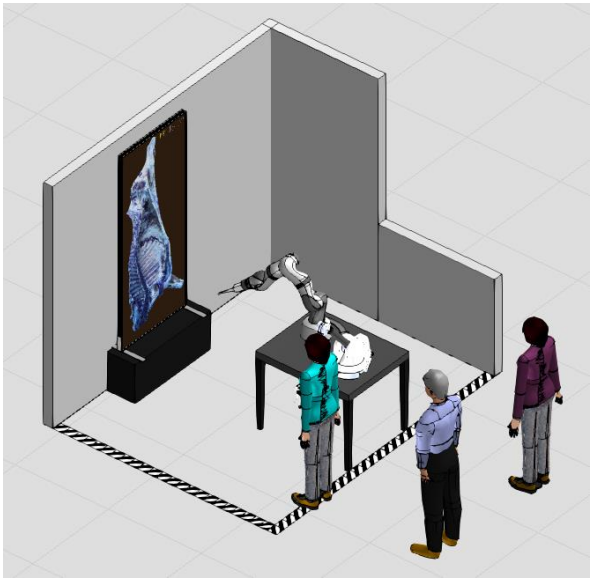
Project Description



AMPC (and the industry) have an innovation vision, and support R&D program, to eliminate all WHS incidents from processing operations. Where possible dangerous tasks will be fully automated. Where automation is not currently viable (either due to technology limitations or ROI), semi-automated/remote solutions will be developed that will remove the operator from dangerous tools and implements. As a result of this innovation vision, research and development into the concept of Shadow Robotics was conceived.

One way of removing operators from dangerous environments, is through the use of a tele-remote operated robot. Utilisation of a controller with a handle allows for more anthropomorphic control of a robot arm, to perform operations normally carried out by humans on a processing line. This is the enabler for a much larger range of tasks on the processing line to be carried out, rather than building assistive devices for each task individually, which allows for redundant uses of the technology on multiple operations.

In addition to removal of personnel from dangerous environments, there are a range of secondary benefits to the technology. These include:

- Providing a wider labour pool for the task, including those otherwise abled.
- Providing possible yield benefits through carcase optimisation by less fatigue or assistive programming.
- Retention of people within the industry, through better working conditions.
- Digitisation of processes to allow for leveraging data insights for efficiency increases.

The purpose of this research project, is to provide technology that could be used for tele-remote robot operation, and present the technology to industry at Beef Week 2021.

Project Content

This project focuses on further developing solutions, and approaches, for semi-automated / remote solutions, with the goal of putting together a trade show demonstration of the technology. This will include a haptic controller being used by an operator to remotely control a robot which is performing some form of task for demonstration. The display will be able to demonstrate not only the ability to tele-remotely operate a robot, but ideally also the force feedback which is able to be provided.

The objectives of the project are as follows:

1. Obtain haptic controller and robot.
2. Perform programming to allow haptic controller to move robot.
3. Create Trade-Show suitable display from equipment, including ‘props’.
4. Attend Beef Week to support demonstration.

Project Outcome

At the completion of this project, the first step to tele-remote operated robots within the red meat industry was completed. This involved the design, setup and commissioning of a robot being controlled through a haptic feedback device. There were some valuable learnings attained through discussions with a range of diversely skilled people. Concurrently, the trade show was a success with the AMPC exhibits being one of the most popular stands at Beef Week 2021. The next stage in the development of this technology is to:

1) Discuss with processors where they see the technology being applied in their plant
2) To further investigate use-cases and determine the achieve yield gains with the assistive technology
3) Find a robot suitable for future applications within the red meat industry.
4) Perform trials of the unit on some deboning tasks in order to validate its usefulness as a tele-remote deboning tool within red meat processing.

These steps above will allow for the further development of the technology with a greater chance of adoption within industry.

Benefit for Industry

The discussion with the various possible stakeholders during the exhibition brought up new benefits to industry, and further cemented the initial thoughts of benefits to the industry as a whole. These benefits included:

- Ability to remove staff from dangerous operations.
- Attraction to adoption of the technology based on wide number of uses.
- Retention of people, by improving working conditions and reducing stress to the body.
- Carcase primal profitability optimisation, through potential yield benefits due to assistive technology and reduction of fatigue and forces required.
- Digitisation, by acquiring product information and leveraging data insights.
- Increased labour pool due to ease of access of technology location and reduced strength required.

The dexterity, strength and force feedback sensitivity of the Shadow Robotic system allow for a large number of deboning tasks to be undertaken with possible yield benefits. The next stage in the development of this technology will be to begin to trial a number of meat processing operations in order to determine which tasks should be carried out with the current technology, and what it could be used for in the future.