AMPC
AUSTRALIAN MEAT PROCESSOR CORPORATION

Gamification of Beef Scribing

Remote Operations (Gamification) – Stage I

Project Code	Prepared by	Date Submitted
2021-1137	Sean Cunial	21/05/21

Project Description

The **Remote Operations (Gamification) – Stage I Project** ('The Project') involved the design and development of a fully immersive virtual reality training module that taught participants the basic skills required for beef scribing.

The objectives of project were to drive public engagement around potential careers in the meat processing industry; provide immediate benefits to industry through innovative training aimed at improving skills and worker health and safety; and to contribute to the future development of semi and full automation solutions for the meat processing industry.

The specific deliverables of the program were as follows:

- Develop a training and assessment interface for beef scribing and demonstrate the operational system to AMPC staff.

- Develop a 'gamer' option for the interface that enables competitions to be undertaken within the interface.

- Recommendations on Stage 2 developments, timeframe, budget, third party inputs, expected interface using resulting accuracy and carcass marking cycle times.Project Objectives

Project Content

The Project involved four phases:

Design phase:

- Map the scoring process based on agreed video footage, interviews with operators and observation of actual plant (if possible)

- AMPC sign off on environment outline to be built

Build phase:

- Build 'carcass scoring training module' broken down into 3 stages

  - Briefing: display 3-5 carcasses of different sizes showing where 4 score lines should be placed

  - Training: repeat display of those 3-5 carcasses and allow participant to trace over score lines

  - Practice: randomly present different carcasses and have the operator practice cutting

- Build 'carcass scoring gaming module'

  - Take practice stage from the training module and build a gaming module that incorporates a series of time based execution challenges for carcass scoring

  - The first task will be to execute the required 4 score cuts on a random carcass in 30 sec (First round 3min = 6 carcasses x 30 sec each). Carcasses will be presented one at a time

  - If the participant accurately executes the required 5 score cuts at an accuracy of +/- 10mm then they move to next round

  - Each subsequent round is another series of random sized carcasses with 5 secs less time to execute the task

  - Respondents can progress through rounds until they have a maximum time of 6 seconds to execute the task on each carcass

    Timing, accuracy mapping & scribe sreenshot will be incorporated in the training, practice and gaming stages, enabling people to get feedback on their performance and show them where they can improve

    Virtually There will develop a library of approximately 30 carcasses to execute the modules

Virtually There will explore the integration of biometric measurement / tracking through the use of wearables to capture trainee reaction / stressors and that assists in development of additional support approaches.

Virtually There strongly recommend the use of immersive VR and / or PC based flat screen 3 dimensional images as 2D images will not give the right visual / cut line perspective to enable accurate measurement

Modules will be built for execution on Oculus Quest 2 for VR experience

Training and operator manuals will be provided at the deployment phase

Deployment phase

- Work with AMPC to demonstrate the technology at Beef Week in Queensland in April: Data from the public gaming event will be processed and a report prepared on key learnings such as average time to complete, average accuracy rate, best time / accuracy, worst time / accuracy, improvement rates time / accuracy, Top 10 performing participants
- Work with AMPC to market and deploy the training and gaming modules in partner processing plants

Integration phase

- Work with other technology partners to prepare for phase II incorporating other technical elements and automation technologies required to deliver future project phases.

Project Outcome

The following outcomes were delivered at the end of the project:

1. Virtual reality beef rib scribing training module: a fully immersive and interactive training module delivered on portable, low cost, virtual reality devices, incorporatinig the following elements:
   a. Task briefing
   b. Carcass marking (with and without guide lines)
   c. Scribing practice with saw (with and without guide lines)
   d. Scribing task (gamification): 5 carcasses, 30 seconds per carcass, scored based on acccuracy against guide lines within +/- 10mm and time take.

https://www.dropbox.com/s/07ctues9tq9qsrt/AMPC-BeefWeek-WithAudio.mp4?dl=0
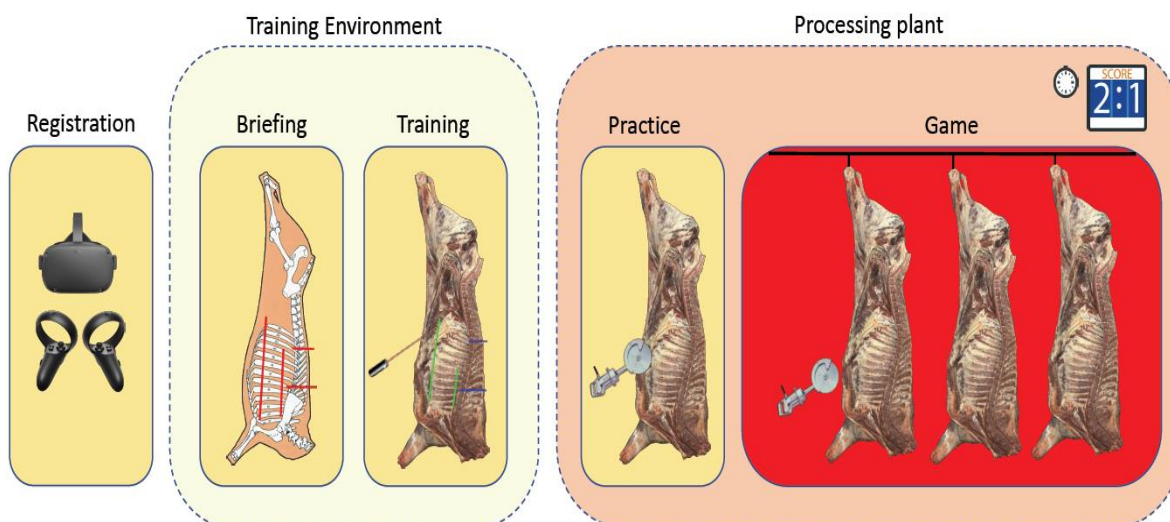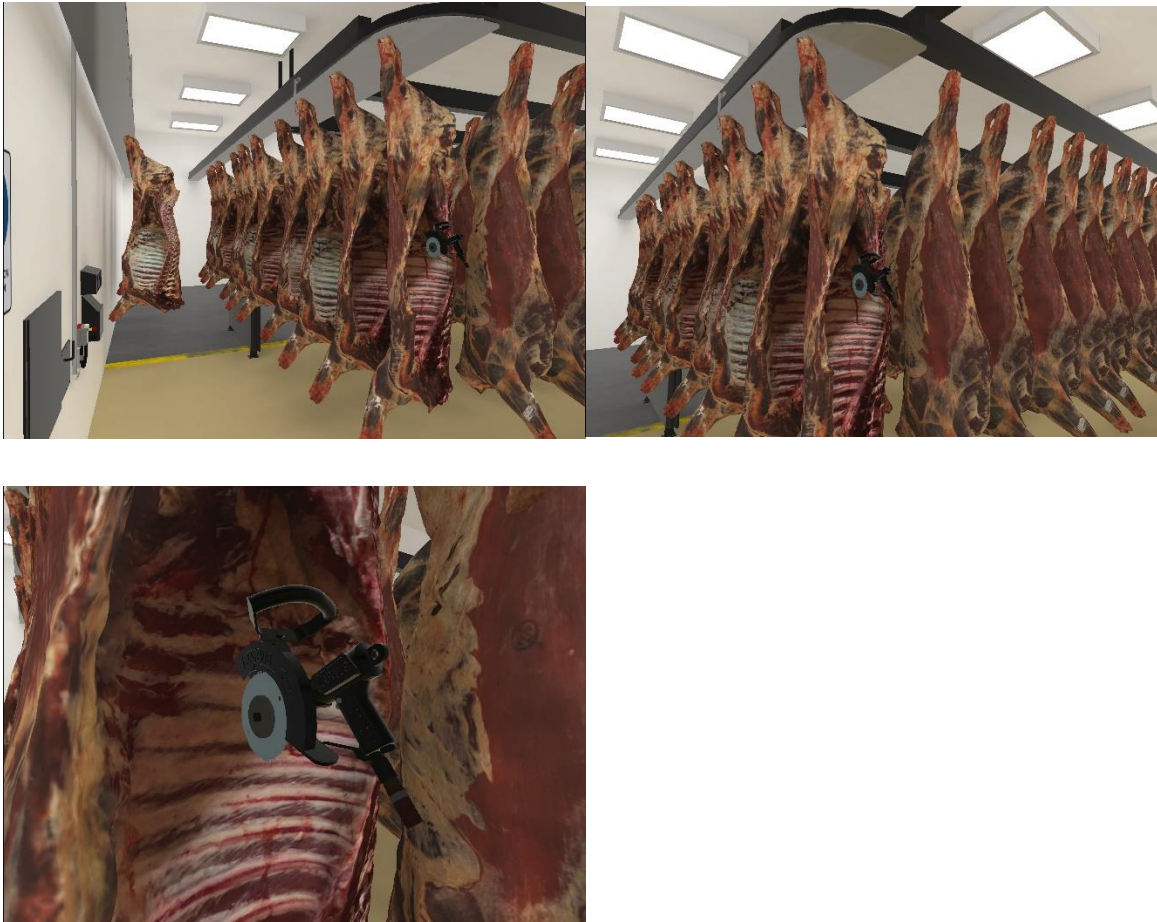
(hold down ctrl button and click on link to see video)

2. Exhibited at BEEF2021 in Rockhampton
   a. One of 7 exhibitors on the AMPC stand at BEEF2021
   b. Delivered the objectives set by AMPC management for exhibitors on the stand
      i. Positive engagement from the general public around The Project and potential careers in the meat processing industry as shown by:
         - Demonstrations made to approximately 12 school groups over the five days
         - Direct participation of approximately 308 people in the VR training module

ii. Positive engagement from industry participants in the project as demonstrated by:

- Demonstrations made to representatives from JBW, Kilcoy, Teys and Nippon Meats
- Commitment to participate in future development of interactive training modules to ensure they meet the specific needs of industry to ensure maximum uptake.

iii. Stakeholder engagement to support Phase II as demonstrated by:

- Compilation of a list of approximately 28 potential projects identified through discussions with industry participants during the BEEF2021 exhibition

3. Preliminary data from participants at BEEF2021:

   a. Total number of people who tried the VR: 308

   b. Avg number of turns per person: 3.2

   c. Avg time per turn: 50 sec (158.5s across 3.2 turns)

   d. Score ranges

      i. High: 87.5

      ii. Low: 0

      iii. Avg: 27.1

Benefit for Industry

Three primary benefits have been identified for the meat processing industry from this project:

Immediate development and deployment of a comprehensive suite of training modules

AMPC's 2020-2025 Strategic Plan identifies both within the Advance Manufacturing and People and Culture programs that:

- Removing staff from dangerous operations, via Hands-Off processing (Adv. Mft.),
- Carcase Primal Profitability Optimisation, via accurate processing (Adv. Mft.)
- Digitisation, via acquiring product information and leveraging data insights (Adv. Mft.),
- Attraction, via demonstration and developing a wide range of operations (People & Culture),
- Retention, via improving working conditions and making tasks exciting (People & Culture),
- Development, via developing tasks that require higher skills and intellect – operational & technical (People & Culture),

- Safety and Wellbeing, via reducing the high-risk nature of processing operations (People & Culture), are all foci of AMPC, and that this one innovation theme will aim to make a significant impact upon all seven.

Of these, the ***Remote Operations (Gamification) – Stage I Project*** has demonstrated it relevance and ability to deliver immediate benefits to industry around Attraction, Retention, Development and Safety. This is clearly supported by the level of interest and inquiry across stakeholder groups at beef 2021, including:

- High Schools and TAFE colleges: interest in gaining access to training modules as part of their course work. (Attraction)
- Processors: interest in developing a range of modules to train exisiting and future workforce (Retention, Development, Safety). A date has been set for the first planning meeting with JBW in Toowoombs for 8 June 2021.
- Government: interest in accessing training modules as part of their skilling up of remote workforce (meat safety)
- Community: interest from disabled workforce providers and indigenous communities to provide more flexible, engaging and intuitive training modules

Future benefits in contributing to the path to automation

Strategic alliances with other technology and industry providers have been identified to work on the potential integration of different technologies (e.g. robotics with visualisation modules)

Useful resources

NA