

Mixed Reality Object Detection Project

April McMahon
Department of Business and
Digital Technologies
april.lgm1@gmail.com

Arifah Addison
(Academic Supervisor)
Department of Business and
Digital Technologies
arifah.addison@ara.ac.nz

Josh Hobbs
(Industry Supervisor)
Computer Concepts Limited

ABSTRACT

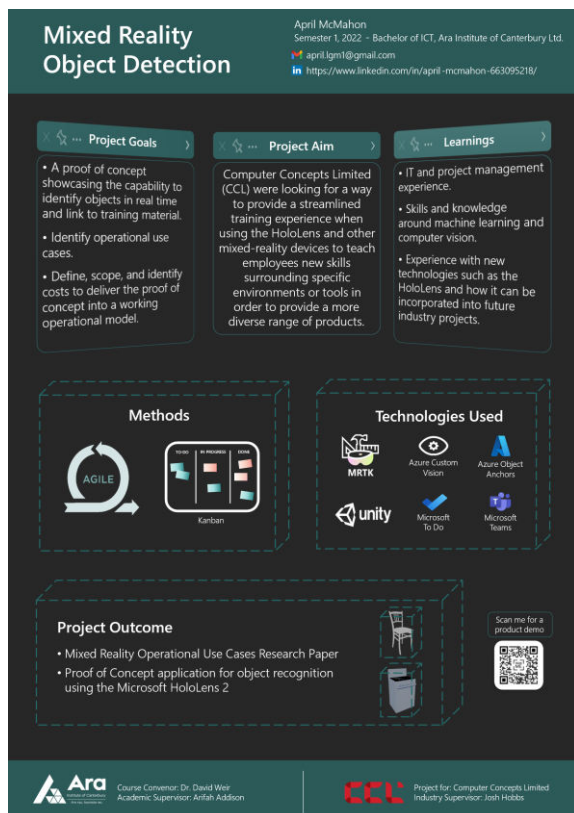
Computer Concepts Limited (CCL) is a part of the wider Spark business group and are a multi-cloud and Information Technology (IT) services provider. They wanted to investigate how computer vision and object detection could be integrated with mixed reality devices such as the Microsoft HoloLens. A research report with potential Mixed Reality use-cases was created, along with an application which utilises object detection in order for the user to automatically view information or guides on a physical object within their environment.

Keywords: Mixed Reality, Object Detection, Microsoft HoloLens, Agile

1. INTRODUCTION

Computer Concepts Limited (CCL) was founded in 1990 by Darryl Swann in Christchurch New Zealand. Over 600 employees in 11 offices across the country provide end-to-end IT management, cloud platforms and technology services. They are part of Spark Business Group, New Zealand's largest digital services provider, which includes Spark, Leaven, Qrious and Digital Island (CCL, n.d.). Clients have included the Auckland Council, New Zealand Rugby League, Genesis, and the Canterbury District Health Board.

Figure 1. Poster



2. BACKGROUND

The Microsoft HoloLens is a wearable device similar to VR headsets that provides a mixed-reality experience to the user. Unlike VR headsets, the user can still see their physical environment through the goggles, along with holographic media that can either be fixed in place or follow the user's movements. CCL were looking for a way to provide a streamlined training experience when using the HoloLens and other mixed-reality devices to teach employees new skills surrounding specific environments or tools in order to provide a more diverse range of products.

The problem that needed solving was that the HoloLens is able to invoke prompts or labels for the user when they scan a QR code and then provide access for them to focus on a 3D rendered object, but not a physical object within their environment. If a client is using the HoloLens in their workplace, they cannot find guides or safety information readily accessible to them around a physical object. This provides a way for CCL's industry clients to readily access training or safety guides when wearing the HoloLens in their workplace by simply looking around their environment. By utilising computer vision with object detection, the HoloLens will allow the user to access more information for physical tools or pieces of equipment.

3. PROCESS

3.1 Methodology

The methodology chosen for this project was Agile, along with the use of a Kanban board. Agile is an iterative, collaborative approach to project management and focusses on continuous feedback and improvement rather than a rigid structure of completing one phase and handing it over to separate teams to handle the next steps. The Agile process included closely communicating on progress and any issues that arose with the Industry Supervisor and other industry team members involved. This occurred by planning meetings with the Industry Supervisor where possible to report completed work and gain feedback to progress the project in a way that meets all initial requirements.

3.2 Risk Management

The Microsoft Risk Template Tool is the risk management framework used for this project. This framework was chosen because it is effective and easy to understand. Risk assessments were performed for both industry and academic situations using the Microsoft Risk Assessment Table template.

3.3 Quality Assurance

The Quality Assurance (QA) model used for this project was provided by Virginia Tech due to the simple but effective quality assurance method it offers. The QA document was reviewed after each deliverable completed to ensure that a high quality of work was maintained. Quality Assurance is an important step in this project life cycle because it provides a systematic way of determining whether deliverables are meeting the specified requirements.

4. CONCLUSION

The project goals, requirements, and deliverables were all successfully achieved for this project. The BCIS309 WIL project has been the most challenging, yet exciting experience in the BCIT degree. Being given the opportunity to work with

such a leading-edge technology like the HoloLens was the highlight of this project, and the skills I have gained around the Azure Cloud, Unity platform, and Machine Learning have given me confidence in my capabilities that would not have been present if I did not take on this challenge.

5. REFERENCES

- American Psychological Association. (2019). Publication manual of the American Psychological Association (7th ed.). <https://doi.org/10.1037/0000165-000>
- W3C consortium. (2018). *Web Content Accessibility Guidelines (WCAG)*. Web Accessibility Initiative. <http://www.w3.org/WAI/intro/wcag.php>