Potential sequence for video

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| 1. Open the video with a description of the problem, ie hospitality shortages “JSA has projected that Australia will need an extra 21,400 hospitality workers, including waiters, baristas and bar attendants, in the five years from May 2023 to May 2028 to fill the skills shortage.” Ref: <https://www.abc.net.au/news/2024-09-09/hospitality-sector-skills-shortage-cost-of-living-support/104262070> 2. Include a potential snippet of a person assembling a burger 3. Compare this to the simulation of our burger being created whilst simulation is running you could explain the integration of a POS system being linked to help automate the process 4. Compare the simulation with footage of the actual dobot being used (if this is achievable in time) 5. Illustrate how RGB-D camera could also be used to automate quality control 6. Describe how the robot was modelled and how it reflects the learning outcomes as described in task 4 7. Describe how other sensors could be used to assist in the capability of the robot as well as the safety features as per task 5 8. Close off the video with how automation of the basic fast food industry could aid in the hospitality shortage by allowing more skilled workers to focus on the more complicated tasks involved with the preparation of food and link back to task 6 |

Mark breakdown for 3 min video

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| **Task** | **Mark** | **How we are going to achieve it** |
| 1. Demonstrate development and learning to solve a problem with a novel robotic solution | 1.5 | Solving the shortage of hospitality jobs by using 2 robots to assemble and serve a burger as this is a simple and repetitive task that could be automated through a point of sale system |
| 2. Footage of your real robot controlled via MATLAB/Python to ROS and integrated with your system | 1 | Footage of dobot being controlled by our MATLAB code if possible (worst case this is only worth one mark) |
| 3. Video has professional presentation and is interesting to watch | 2 | Set up the video in stages;   1. Open the video with a description of the problem, ie hospitality shortages “JSA has projected that Australia will need an extra 21,400 hospitality workers, including waiters, baristas and bar attendants, in the five years from May 2023 to May 2028 to fill the skills shortage.” Ref: <https://www.abc.net.au/news/2024-09-09/hospitality-sector-skills-shortage-cost-of-living-support/104262070> 2. Include a potential snippet of a person assembling a burger 3. Compare this to the simulation of our burger being created 4. Illustrate how RGB-D camera could also be used to automate quality control 5. Describe how the robot was modelled and how it reflects the learning outcomes as described in task 4 6. Close off the video with how automation of the basic fast food industry could aid in the hospitality shortage by allowing more skilled workers to focus on the more complicated tasks involved with the preparation of food |
| 4. Includes details of 41013 Robotics learning outcomes such as robot modelling, planning and safety, and user interaction with the system. | 4 | 1. Robotic modelling: we modelled our robot being the CRX5 based off a modified version of the CRX10. It was done this way as it allowed for us to accurately and quickly model the robot. We used SolidWorks to cut out sections of each link and then fused them together, painted them and exporting as ply files using Blender. Based on these files as well as the qlims found on the internet we were able to accurately determine the dh parameters of the robot 2. Planning: the robot movements and patterns were developed through chronologically going through the process of constructing a burger and we then optimised the movement of each robot so that it would remain safely out of the path of anything else whilst still being able to rapidly assemble the burger. 3. Safety: to account for safety we have elevated the robots on top of a table so that they are within everyone’s line of site, we have also then created an exclusion zone around these tables using fences, these fences ensure that it is not possible for anyone to get within the robots arcs apart from the drop off and collection point which is right and the extremity of the CRX5’s arc. Next to this pick up and drop off location is also an emergency stop that can be pressed at any time if it is required. There has also been collision detection as well as a RGB-D camera integrated into the system to ensure that if something did somehow enter the arcs of the robots they would be able to recognise this and stop their processes 4. User interaction: user interaction for this system has been intentionally limited this is to ensure the safety of those around the robots. The main time that individuals will need to interact with the robot is when they are dropping off a fresh plate or collecting their constructed burgers. This has been established so that even the consumer could potentially come grab their own burgers through the integration of a notification system in the future. The only other user interaction required would be the replenishment of ingredients as required. |
| 5. Robotics sensing: Ideas for applicable sensors that would (1) give the robot more capability; and (2) Improve the system’s safety | 1 | More capability: a notification system to alert consumers once their burgers are ready for collection, another robot that could be used for the preparation and resupply of the ingredients as this component of the process is currently not automated  Improve safety: could have motion detectors in the form of PIR or RGB-D cameras to detect in advance if anything was going to breach the exclusion zone and this could act as an alternate emergency stop. |
| 6. Evidence-based future predictions for robotics in the given scenario | 0.5 | “According to the latest McKinsey Global Institute Report, “half of today's working activities could be automated by 2055”. The report also claimed that 73 per cent of jobs within food service and hospitality can, and will, be replaced by robotics in the future.”  Ref: <https://www.gffoodservice.com.au/resource/robots-will-affect-hospitality-industry/#:~:text=According%20to%20the%20latest%20McKinsey,by%20robotics%20in%20the%20future>. |