

Sprint 3 Planning

Sprint team members

| Name | Role |
|-----------------------------|------------------------------|
| Sicheng NIE | Scrum Master |
| Renwei Hu | Product Owner |
| George Wang | Architecture Lead |
| Siyi Liu | Development Environment Lead |
| | Deployment Lead |

Objectives

1. Integration of Openpose for gesture and face detection.
2. Implementation of 3D object detection using a depth camera.
3. Attach depth camera on the robotic arm with customised mounting model.
4. Addition of a function to capture descriptive information about objects and actions.
5. Development and integration of an automated script to optimize specific processes.
6. Complete project demo.

Sprint 3 backlog

| Epic | Epic ID | Task | Sub Task | Task ID | Story Point (1-10) | Assignee | Priority | Status |
|---|---------|----------------------|---|---------|--------------------|---|----------|-------------|
| General Admin | GA | Documentation Update | Finish Sprint 3 planning | GA 2.13 | 4 pt | All | HIGH | DONE |
| | | | Sync Sprint 3 tasks to Trello | GA 2.14 | 2 pt | All | HIGH | DONE |
| | | | Weekly Trello screenshot | GA 2.15 | 1 pt | Renwei Hu | MEDIUM | DONE |
| | | | Check sprint checklist | GA 2.16 | 2 pt | All | HIGH | DONE |
| | | | Plan for Sprint 4 | GA 2.17 | 2 pt | Siyi Liu | MEDIUM | DONE |
| | | | Sprint 2 review | GA 2.18 | 2 pt | Renwei Hu | HIGH | DONE |
| | | | Sprint 2 supervisor feedback | GA 2.19 | 2 pt | Renwei Hu | HIGH | DONE |
| | | | Deployment and release | GA 2.20 | 2 pt | Siyi Liu | MEDIUM | IN PROGRESS |
| | | | Sprint 3 code review | GA 2.21 | 2 pt | All | HIGH | DONE |
| | | Meetings | Meeting minutes | GA 3.5 | 3 pt | George Wang Renwei Hu | MEDIUM | DONE |
| | | | Book time with the client for camera mounting tests | GA 3.6 | 1 pt | Renwei Hu | HIGH | DONE |
| | | GitHub | Upload relevant sprint docs | GA 4.5 | 3 pt | All | HIGH | IN PROGRESS |
| | | Tools documentation | Official guide (link) | GA 5.3 | 1 pt | | LOW | TO DO |
| | | | Deprecated tools justification | GA 5.5 | 3 pt | Renwei Hu George Wang | MEDIUM | DONE |
| | | Development related | Architecture explanation | GA 9.2 | 3 pt | | LOW | TO DO |
| | | | Project demo | GA 9.7 | 4 pt | Renwei Hu Sicheng NIE George Wang | HIGH | DONE |
| | | Presentation | Presentation slides | GA 10.1 | 3 pt | All | MEDIUM | DONE |
| Detect objects visually (Computer Vision) | CV | Human gesture | Download openpose | CV 3.2 | 4 pt | George Wang | HIGH | DONE |
| | | | Install CUDA and CUDNN for GPU acceleration | CV 3.3 | 4 pt | George Wang | MEDIUM | IN PROGRESS |

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|--|----|----------------------|--|--------|------|--------------------------------------|--------|---------|
| | | | Activate Openpose python API | CV 3.4 | 1 pt | George Wang | HIGH | DONE |
| | | | Extract hand and posture keypoints from openpose | CV 3.5 | 1 pt | George Wang | HIGH | DONE |
| | | | Integrate gestures into a ROS2 node | CV 3.6 | 3 pt | George Wang | HIGH | DONE |
| | | Face detection | Extract facial keypoints from openpose | CV 4.2 | 1 pt | George Wang | MEDIUM | DONE |
| | | | Integrate facial detection into a ROS2 node | CV 4.3 | 3 pt | George Wang | MEDIUM | DONE |
| | | 3D Object detection | Set up depth camera | CV 5.2 | 5 pt | Renwei Hu | HIGH | DONE |
| | | | Modify 3D print CAD model | CV 5.3 | 6 pt | Renwei Hu | HIGH | DONE |
| | | | Build 3D printed camera mount | CV 5.4 | 4 pt | Renwei Hu | HIGH | DONE |
| | | | Attach camera mount model on the robotic arm | CV 5.5 | 4 pt | Renwei Hu | HIGH | DONE |
| | | | Configure RealSense package | CV 5.6 | 3 pt | Renwei Hu | HIGH | DONE |
| | | | Depth data capturing scripts | CV 5.7 | 5 pt | Renwei Hu | HIGH | DONE |
| | | | Depth camera ROS2 node | CV 5.8 | 8 pt | Renwei Hu | HIGH | DONE |
| | | | | | | | | |
| Interact with the environment naturally (Voice Recognition) | VR | Background research | Create a separate account for a refund | VR 1.4 | 1 pt | All | LOW | BLOCKED |
| | | Add function | Add capturing additional descriptive information (object, action). | VR 1.7 | 4 pt | Sicheng NIE Siyi Liu | HIGH | DONE |
| | | Script | Automated script | VR 1.8 | 3 pt | Sicheng NIE | HIGH | DONE |
| | | Document | Add VR document | VR 1.9 | 4 pt | Sicheng NIE Siyi Liu | HIGH | DONE |
| | | Update github readme | Update readme file | VR 2.0 | 4 pt | Sicheng NIE | HIGH | DONE |

Potential risks

| Risk | Mitigation |
|--|---|
| Code Integration Challenges: Integrating tools like YOLO, Openpose, and ROS2 might lead to unexpected compatibility issues. | Have regular integration tests. Ensure team members are trained or familiar with ROS2 integration |
| Voice Recognition Inaccuracy: Voice recognition systems might misinterpret commands, leading to unintended actions. | Test in various environments and with different accents. Consider using established voice recognition tools or platforms. |
| Scope Creep: New features or changes might be introduced mid-sprint, leading to delays and resource overruns. | Implement a strict change management process. Any changes to the sprint should be evaluated for impact and feasibility. |
| VR Auto Script: If the node is not shut down following the proper procedure, it might result in the node not being released properly. | After the execution finishes, please manually terminate the process (Ctrl+C) and avoid force-quitting. |
| VR text analysis format: In rare cases, the format of the parsing results may change. | Optimized the output format of text analysis. Please follow the paradigm for voice input. |
| RealSense Package Compatibility: Official RealSense packages including librealse2-dkms & librealsense2-utils are not compatible with ARM architecture | Configure those packages in VM with x86 architecture, find 3rd party SDK wrapper as alternative. |

Sprint planning resources

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