

Data Collection Protocol

UMI Notes

1. Before Starting Collection

1. Ensure the scene has enough distinct features (e.g., objects with sharp edges like boxes). If unsure, add objects from the surroundings to the scene.
2. Avoid overly dim lighting in the scene.
3. Check the lens for blurriness, fingerprints, etc., and clean it if necessary (you can use clothing).

2. Mapping (Important)

1. Record for about 1 minute and 30 seconds. The person may move slightly forward, backward, left, or right.
2. Ensure QR codes are visible in the field of view. However, some time without them visible is acceptable for scanning the entire scene.
3. QR codes should be flat, without wrinkles or bends.
4. Do not place objects to be manipulated later into the scene during this phase.
5. In addition to slow lateral movement, slow rotation, or mimicking task motions, you can:
 - Move back and forth in an S-shape to cover the entire scene.
 - Move around important feature objects for detailed scanning.
 - Mimic the XYZ axis rotation of a robotic arm.
6. Avoid capturing moving objects, such as:
 - People
 - Your own feet or hands
 - Collisions with objects

3. Gripper Calibration

- Perform calibration before all demo videos. If some demos are recorded accidentally first:
- If there are few demos, delete them and record calibration videos first.
- If there are many demos, finish recording all demos, then record calibration last. Remember the calibration video is at the end for later adjustments in code.

4. General Notes for Each Demonstration

1. Remove mapping QR codes from the field of view.
2. Do not move non-target objects in the scene.
3. Perform actions slowly; avoid excessive speed.

4. Ensure each step's movement is clear and planned based on the object's initial position:
 - For example, when picking up a mouse, ensure the mouse pad remains visible.
 - After picking up a bottle, ensure the cup remains visible; when pouring water, ensure the coaster is visible.
5. Reposition objects before each session to maximize the robotic arm's reachability range.
 - Follow a fixed pattern, e.g., for the first 100 demos, position from left to right; for the next 100, position from right to left.
6. Ensure tight gripper closure.
7. Vary the gripper's starting positions; avoid always facing directly towards objects.
8. It is acceptable for people to appear briefly outside the central field of view.
9. Delete videos with mistakes.
10. Due to the GoPro's wide-angle lens, avoid fingers appearing in the camera's view during manual start and stop operations (occasional mistakes are fine).

Task-Specific Notes

1. Pour Water

1. Avoid reaching extreme robotic arm joint positions; hold the bottle horizontally if possible.
2. Lift the bottle slightly after gripping to avoid hitting the mug.
3. The initial distance between the bottle and mug should vary between 10 cm and 50 cm.
4. Ensure sufficient initial positions:
 - Start with the gripper slightly away from the bottle (near and far positions).
 - Move back and forth during collection. Do not stay stationary; step back before starting, move forward during the demo, and step back again after finishing.
 - Vary the gripper's height.
 - Adjust grip depth.
5. Pause briefly before closing the gripper; pause when placing the bottle to ensure stability. Pouring should have a short pause at the start but not during the process.
6. Align with the bottle gradually as you approach (do not align fully first and then approach).
7. Each demo should be around 5 seconds.

2. Mouse Arrangement

1. Ensure the mouse pad is correctly placed.

2. The mouse orientation should vary continuously between “facing directly left” and “facing directly right” (within 180 degrees).
3. The initial distance between the mouse and mouse pad should vary between 10 cm and 50 cm.
4. Ensure sufficient initial positions:
 - Move around during collection. Do not stay stationary; step back before starting, move forward during the demo, and step back again after finishing.
 - Start with the gripper facing various directions; it may face directly towards the mouse or not.
 - Vary the gripper’s height.
5. Each demo should be about 4 seconds.
6. Perform direct-facing collection, including both gripper-to-mouse and mouse-to-front-facing alignment.

3. Fold Towels

1. Fold into a rectangular strip; align neatly after folding.
2. Limit rotation to within 15 degrees.
3. Use various folding methods.
4. Ensure the gripper is level; avoid tilting.
5. Release the gripper when pausing.
6. The overall time should be 3-4 seconds.

4. Unplug Charger

1. Face the power strip directly.
2. Use at least eight initial positions.
3. Ensure the gripper is level.
4. Unplug quickly and lift about 20 cm.
5. Place to the right.
6. The overall time should be 3-4 seconds.