

Amazon Remote Manipulation System

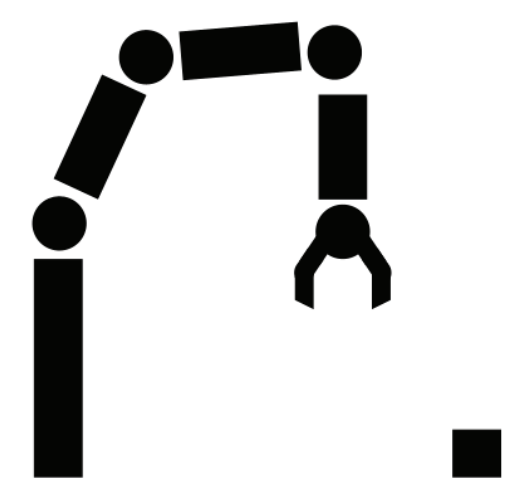
Developing a user experience to allow people to control robotic arms from a distance



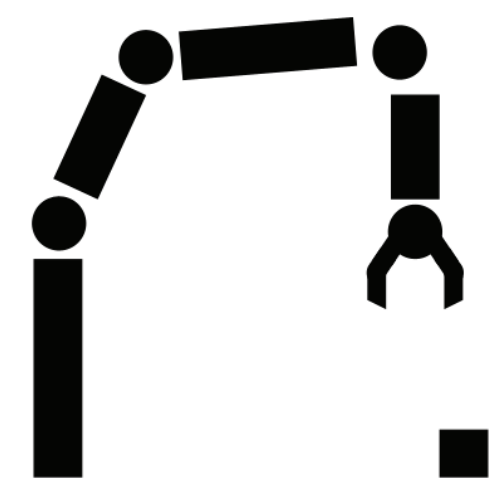
Check out our video!

The Challenge

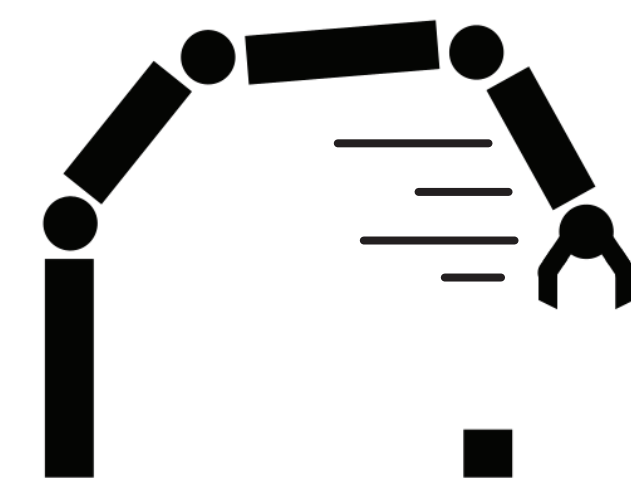
It takes time to send data from one place to another. This data latency can cause difficulties interacting with the system, since the user has a delayed idea of what is happening. This confusion can cause the user to over-correct with their movements



User moves virtual gripper right towards the box



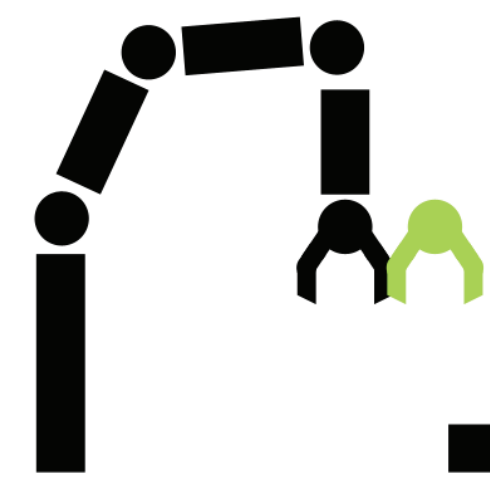
User sees that the arm is not at the box yet, so moves the arm right again.



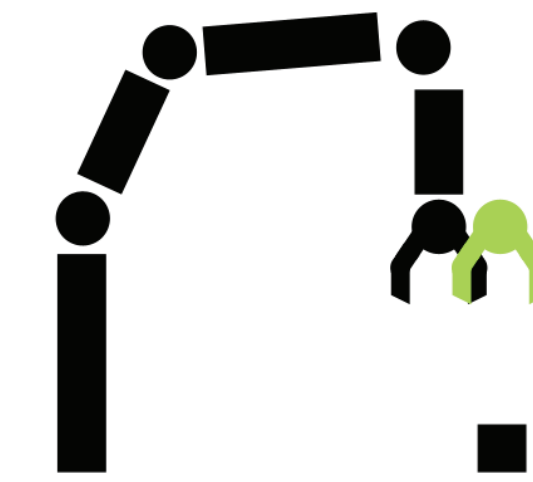
Arm catches up to user commands and overshoots.

Our Solution

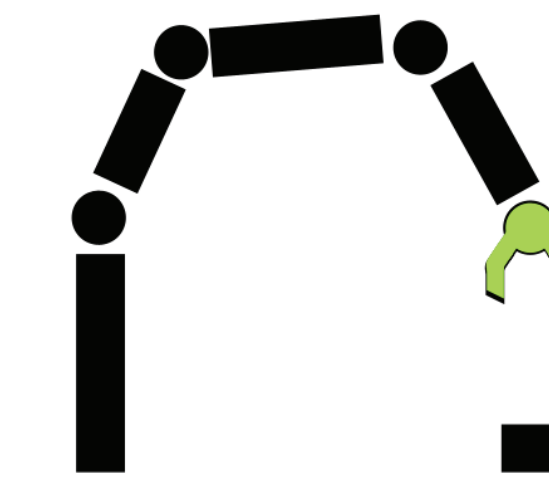
A remote system in the form of a desktop game that takes user input to manipulate robotic arms in real-time.



User moves virtual gripper right towards the box

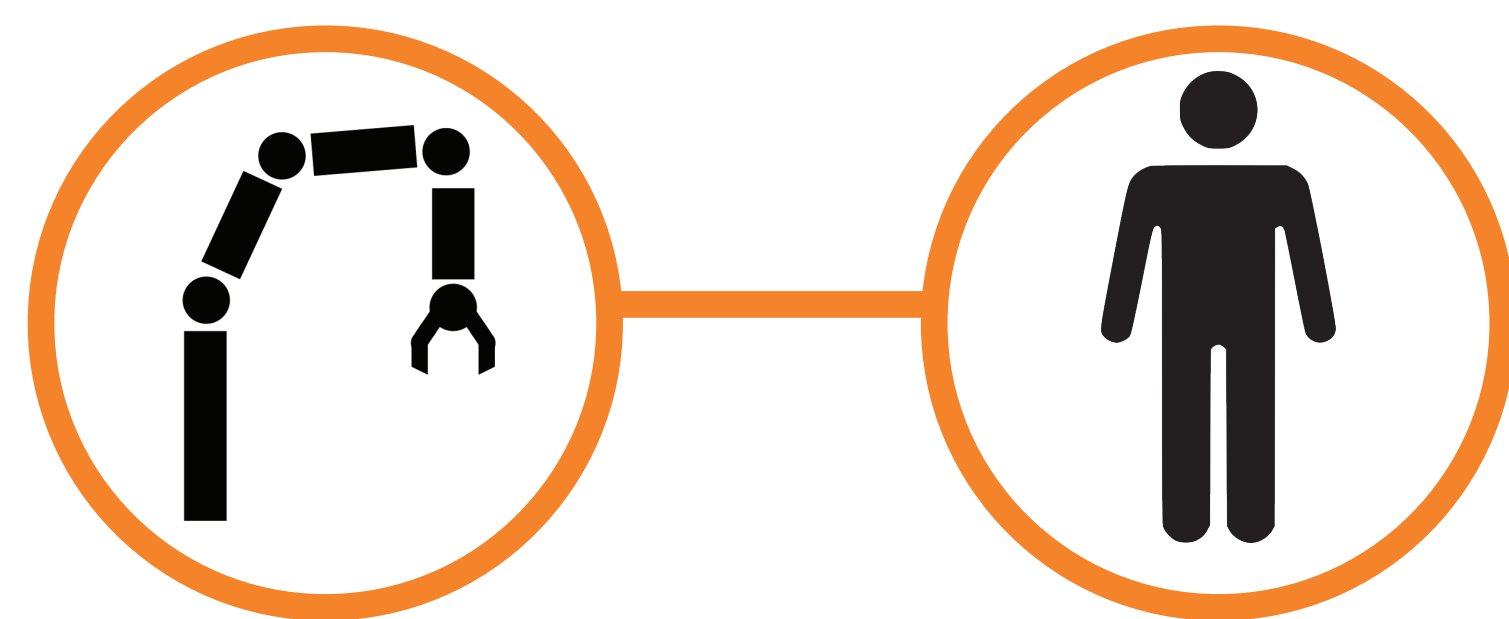


User sees that the virtual gripper is at the box so does not move more



Arm catches up to user commands and correctly moves above the box.

Why Humans and Robots?



Robots

Strengths

- Safely lift large payloads
- Consistency with repetitive tasks

Weaknesses

- Not foolproof! They can get stuck or confused

Humans

- Can come up with creative solutions to a variety of problems
- Excellent visual processing

Humans and robots can work together to achieve the best of both worlds.

The Whole System

Camera Feed

The cameras on each end of each arm provide the human with a real world view of the scene, and inform the placement of objects in the virtual scene.

Virtual Gripper

The human uses it like a cursor, so they know where they are telling the robot to go. The robot uses it as a target, and moves its real gripper towards the virtual one.



Virtual Scene

The virtual scene shows the position of the arms and boxes in the real world.

User Control

The human uses all of these sources of information to move the Virtual Gripper using an Xbox controller.



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