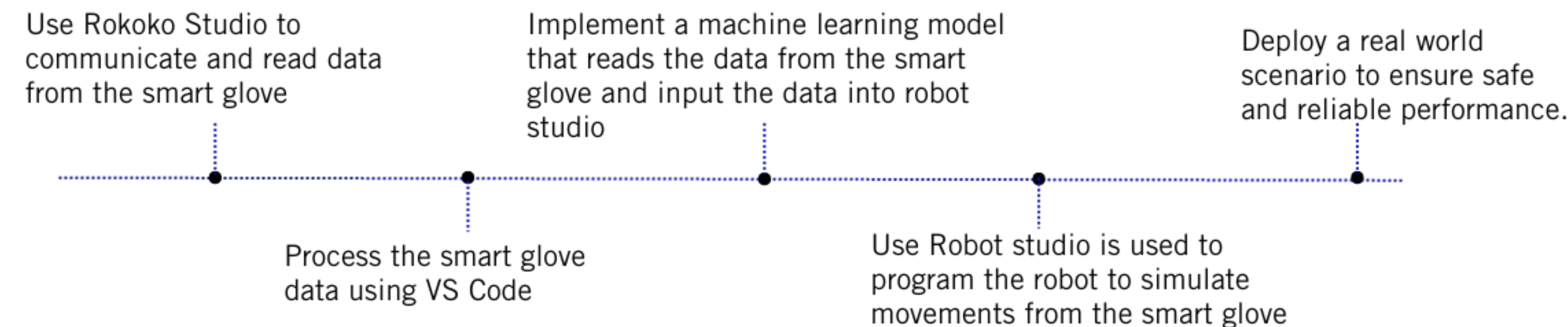# Safe Human-Robot Collaboration through AI-embedded Glove System

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OBJECTIVE

Using a Rokoko Smart Glove that has multiple sensors in each finger to train an AI model we implement to recognize various hand gestures. These gestures will then be used to control the robot's hand to perform a simple task: picking-up 3D shaped blocks and placing them into their corresponding shaped holes.

TECHNOLOGIES
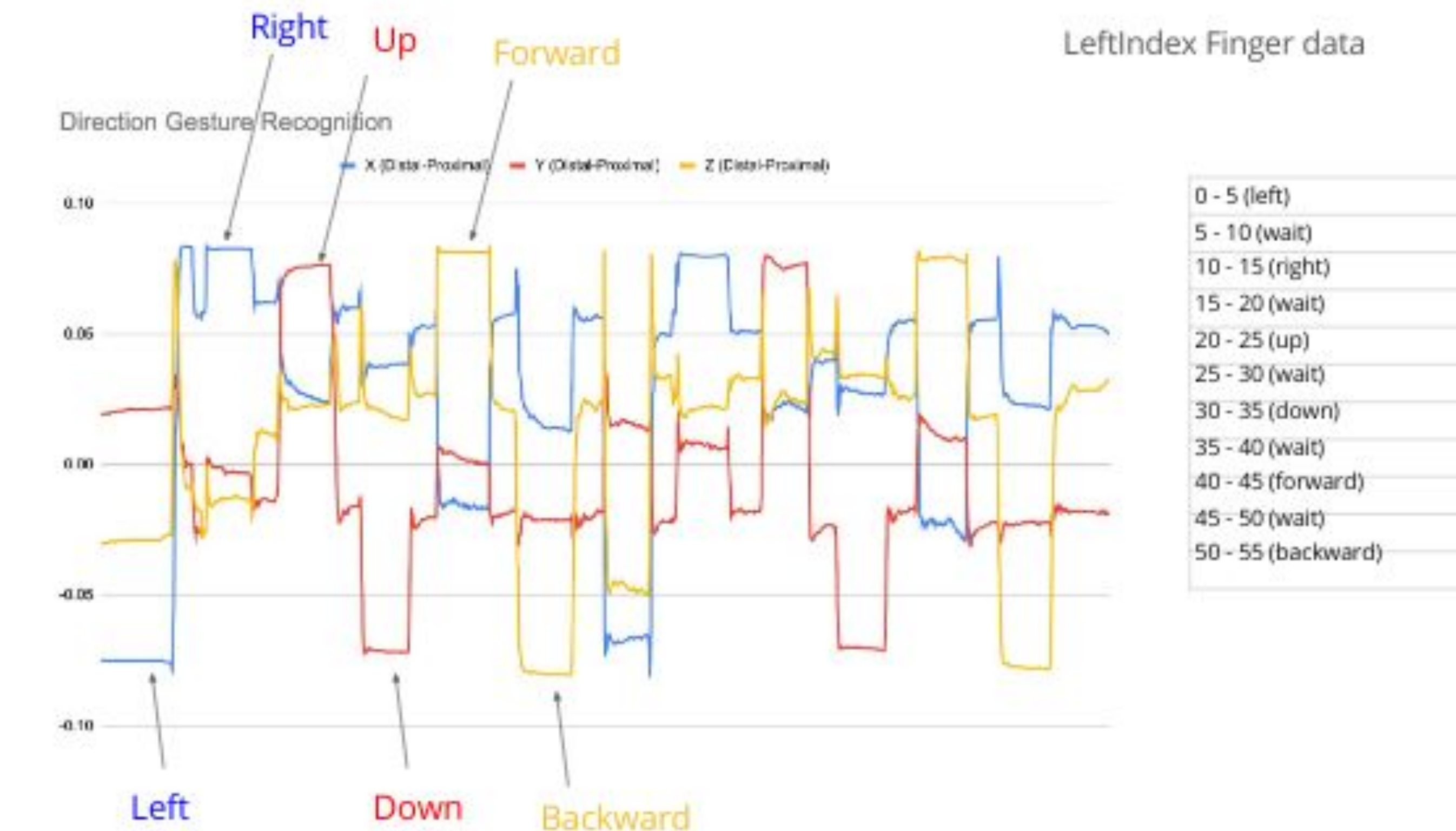
- Rokoko Studio
- Smart Glove
- CRB 15000 Robot
- RobotStudio
- VSCode
- Python

APPROACH

Use Rokoko Studio to communicate and read data from the smart glove

Process the smart glove data using VS Code

Implement a machine learning model that reads the data from the smart glove and input the data into robot studio

Use Robot studio is used to program the robot to simulate movements from the smart glove

Deploy a real world scenario to ensure safe and reliable performance.

LeftIndex Finger data — Direction Gesture Recognition

- 0 - 5 (left)
- 5 - 10 (wait)
- 10 - 15 (right)
- 15 - 20 (wait)
- 20 - 25 (up)
- 25 - 30 (wait)
- 30 - 35 (down)
- 35 - 40 (wait)
- 40 - 45 (forward)
- 45 - 50 (wait)
- 50 - 55 (backward)

REQUIREMENTS

- Design must operate within Rokoko Studio Live, Robot Studio, an AI model, and must use a Rokoko Smart Glove.
- Design must capture real-time data from the smart glove until the program is terminated.
- Design must use an AI model to interpret hand gestures with at least a 90% accuracy, them being a fist, an open hand, and hand direction.
- Design must be able to operate for at least 20 minutes, the more the better.
- Design must be cheaper than current technologies being used in human-robot collaboration (LIDAR, motion capture, etc.) of less than $1000.
- Design must have the Rokoko smart glove operate with the CRB 15000 robot.
- Design must have the robot be able to carry an object that is at least a pound and not be well over 5 pounds to be able to deliver the toy to a specific location users choose to put the object.
- Design must be able to connect using hotspots.

FUTURE IMPLICATIONS

- Increase productivity in industries like manufacturing, logistics, and healthcare
- Improve safety protocols
- perform tasks remotely
- Increase accessibility for people with disabilities
- Fostering environments where humans and robots work side by side more frequently

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