

VANGOBOT

An Assistive Drawing Device



Background

Art education is essential to giving students the ability to express themselves and be creative. Limited range of motion and other physical disabilities inhibit participation with traditional art utensils for students. Current methods such as hand-over-hand and tennis balls as adaptable grips are not always successful and offer limited independence to the student. VanGoBOT aims to help students with varying physical abilities engage and be more independent in their art expression.



P2 1068 from Left to Right:
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Mechanical System

Gripper

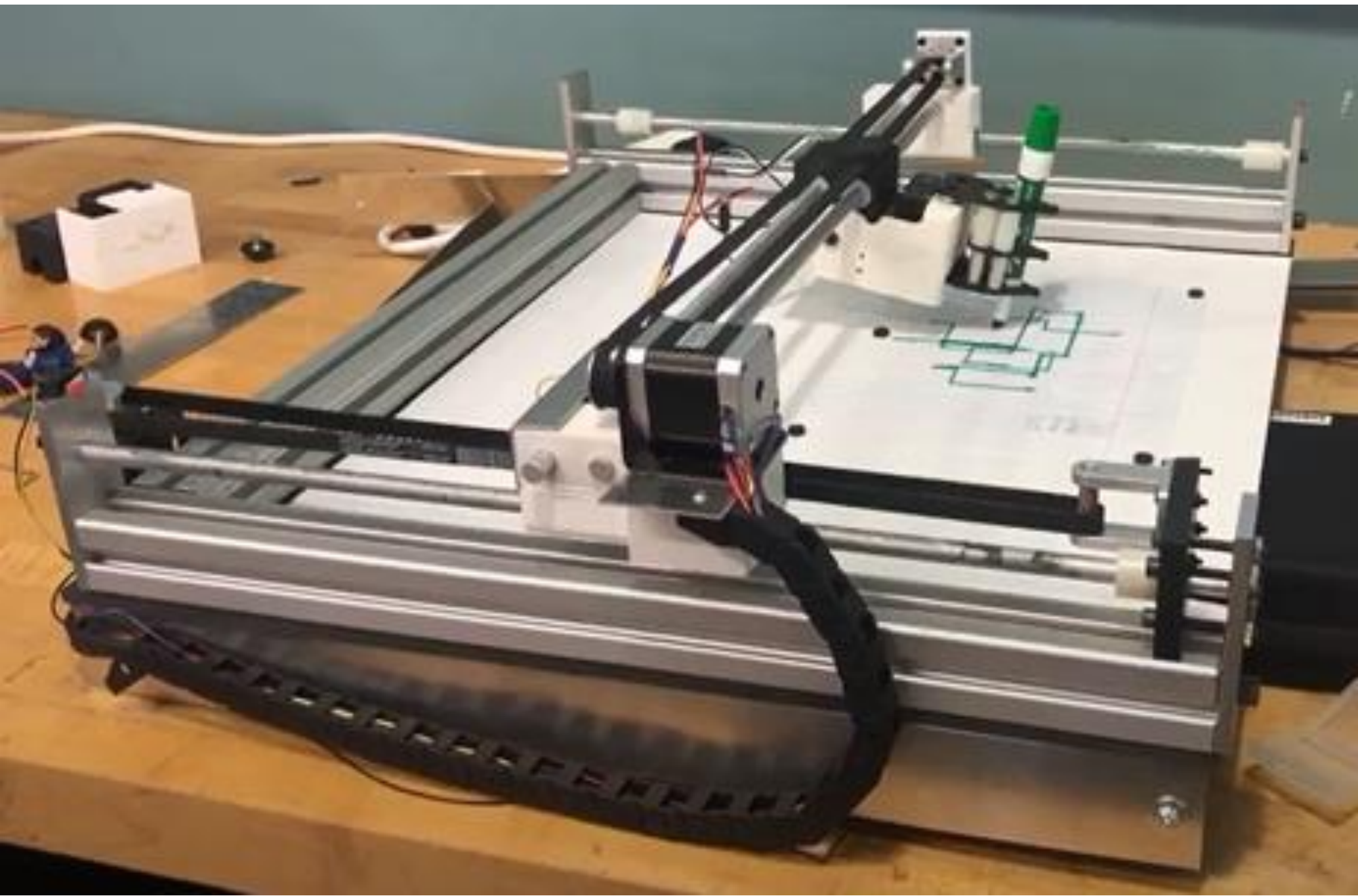
- 3D Printed Design
- Servos open/close and raise/lower jaws
- Accommodates different tool sizes

Belts/Motors

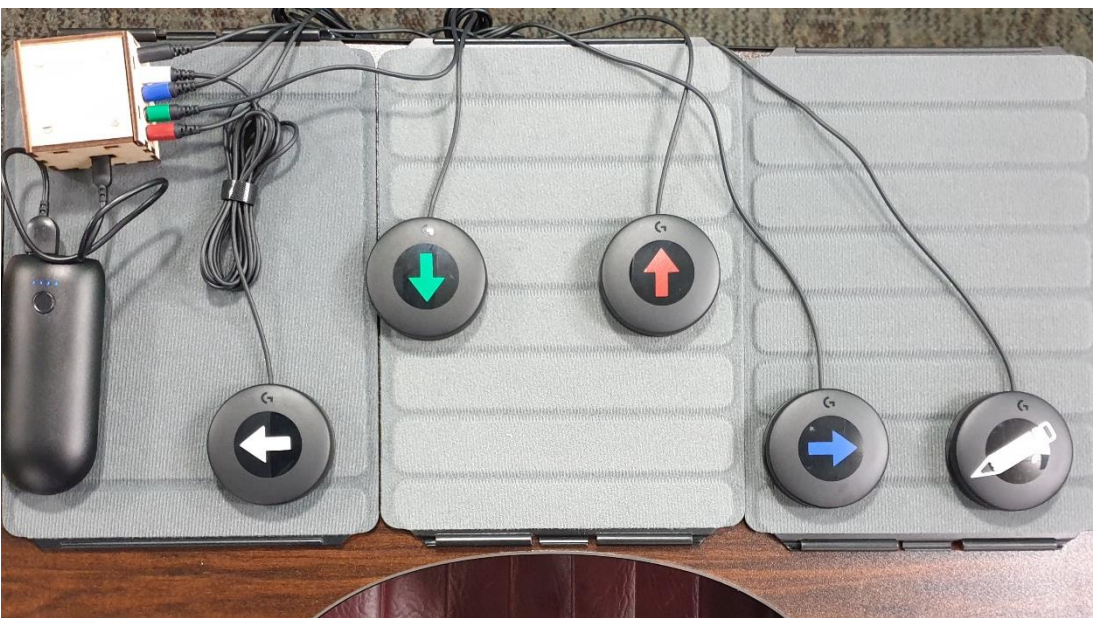
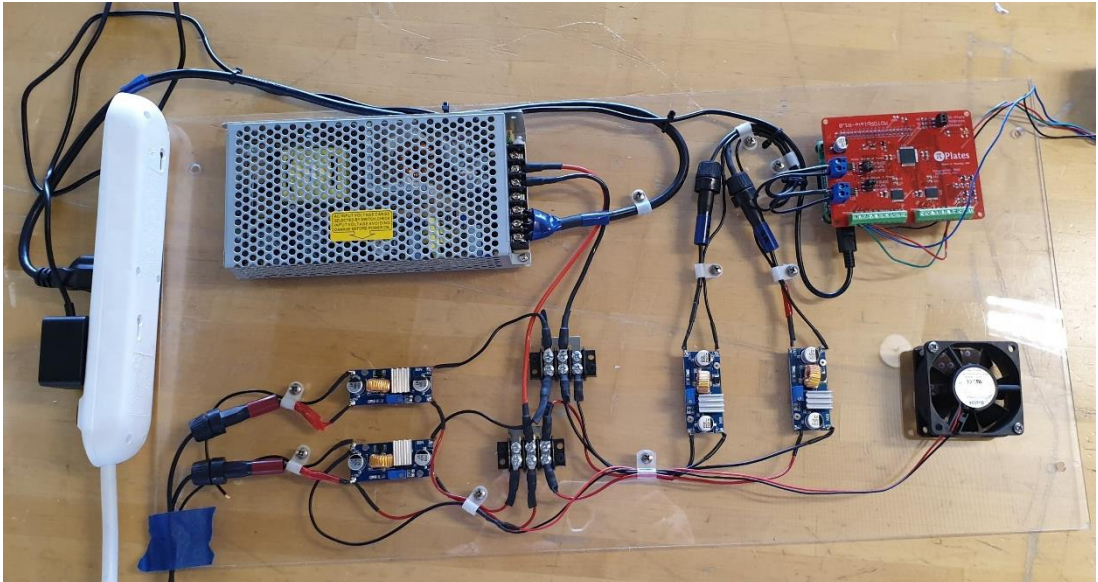
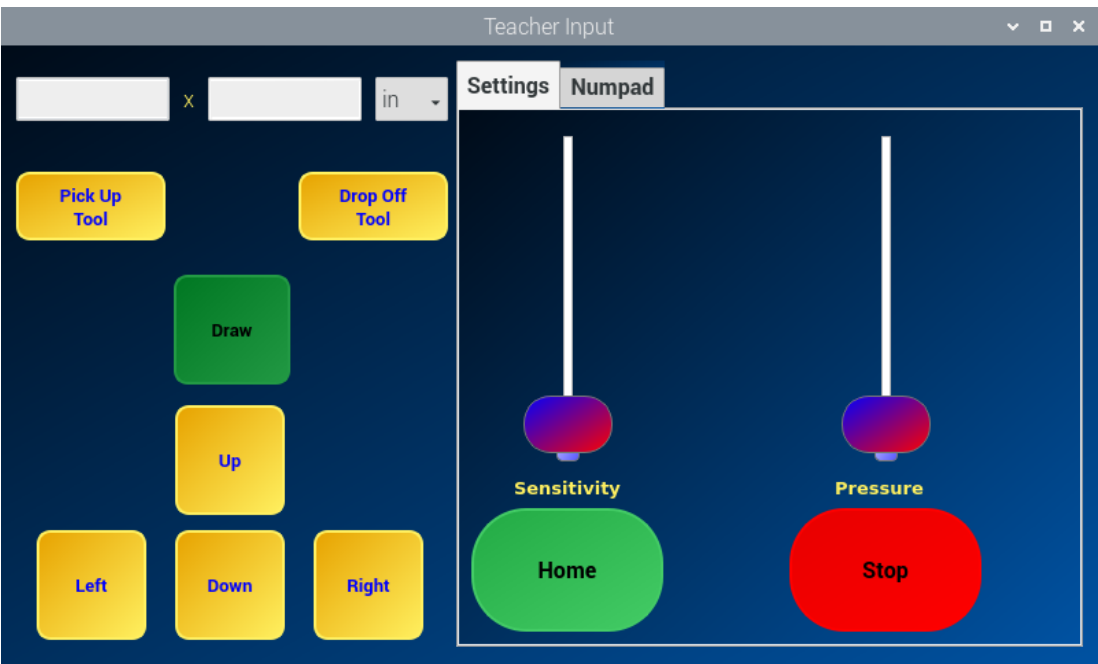
- Move the gripper in x and y directions
- Stepper motors to track location

Framework

- PVC for smooth drawing surface
- 80/20 and T-nuts for structure during transportation
- Plastic electronics enclosure
- Magnetic sheet for paper attachment



Electrical System



Teacher Input

- Programmed in Python, displayed on touch screen
- Allows device set-up through inputting the paper size and changing the sensitivity of movement and pressure based on the tool
- Can override student input if needed

Power and Control

- Device plugs into the wall and converts to DC
- Buck converters convert 12V to component voltages
- Raspberry Pi controls servos and motors via motorPlate and code

Student Input

- Easy Press Buttons or Joystick
- 4 Directions and start/stop
- Velcro attachments for different input configurations

Requirements

Key

- ✓ Met
- Partially Met
- x Not Met

Results

- ✓ Student Controlled Brush Strokes
- ✓ Variety of Tools and Colors
- ✓ 30 Minutes of Use
- ✓ Compatible with Standard Wheelchair
- ✓ Interchangeable Control Interfaces
- ✓ Dimensions
- ✓ Easy Set-up and Take-down
- Cost
- Portable
- Weight

Acknowledgements

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