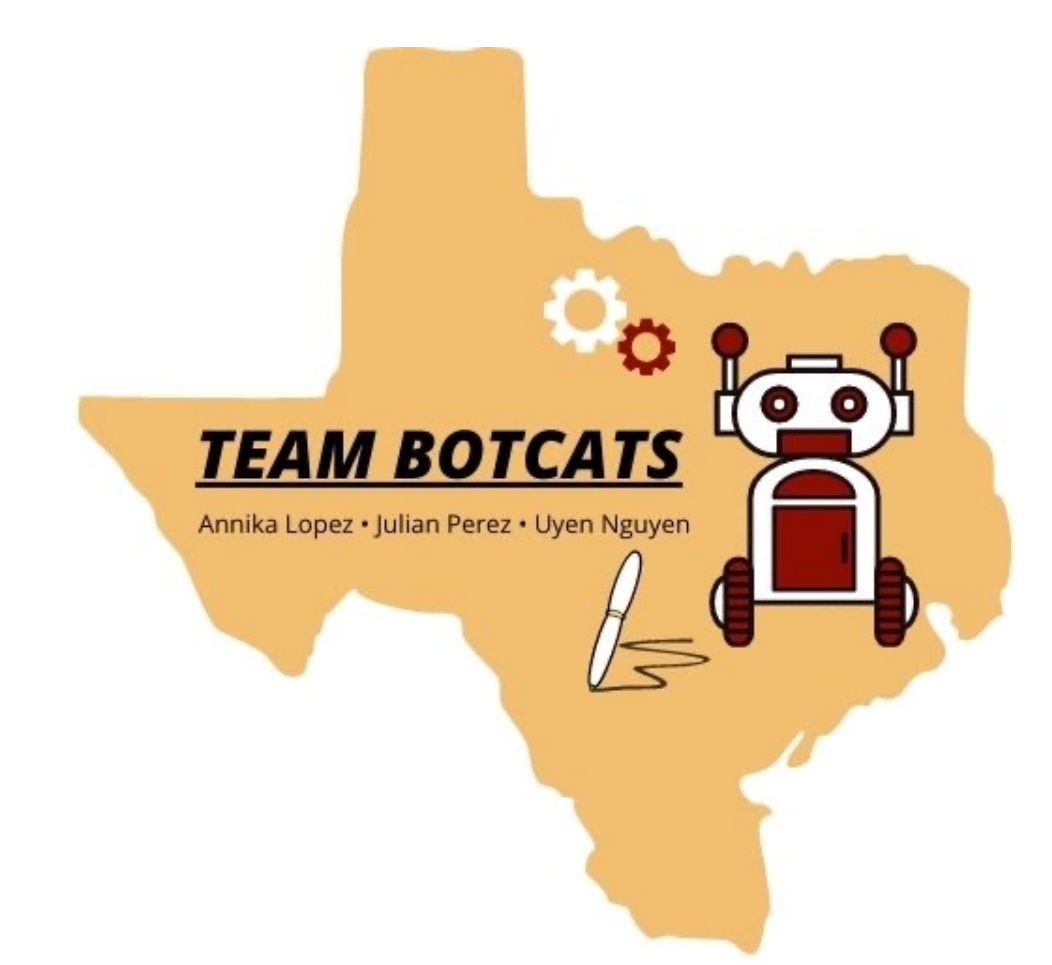


E1.07 Team BotCats: PenBot

Line-Drawing Robot

Annika Lopez (Project Manager), Uyen Nguyen, Julian Perez



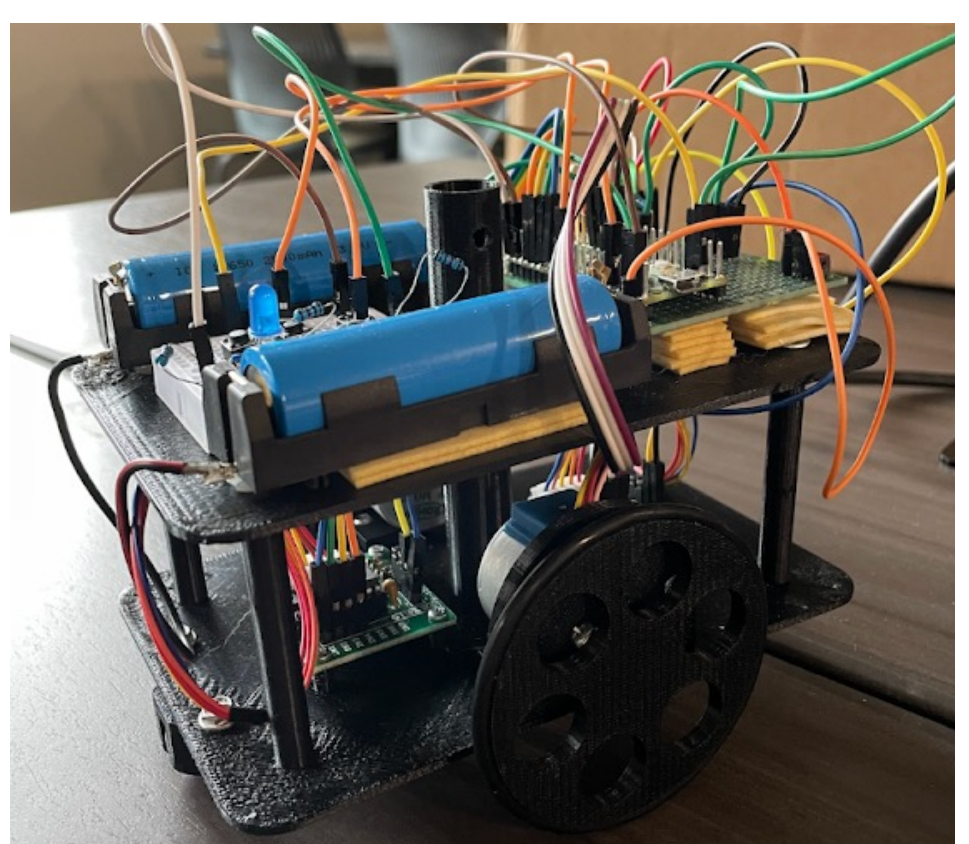
Background

Our PenBot product is a small autonomous vehicle which moves precisely on a flat poster board or whiteboard surface while creating line drawings.

Design Requirements

- ❖ Must be autonomous
- ❖ The robot will complete drawings stored on internal memory
- ❖ D1 Prototype must use two 28BYJ-48 Stepper Motors with ULN2003 Drivers for movement
- ❖ A jpg or bmp file converter to make a line drawing that can be used by the bot to draw a version of the original
- ❖ An interactive mode where the pen bot can be controlled remotely and wirelessly using a game controller, phone, or tablet; Standard forward, back, circle left/right, and rotate movements must be supported along with ability to draw simple shapes such as a square or circle with a single command
- ❖ \$120 bill of materials cost. PenBot must not exceed \$30 in materials per unit
- ❖ Maximum Width and Length = 160mm (there is no height restriction)
- ❖ Maximum Weight = 380 grams

Current Chassis



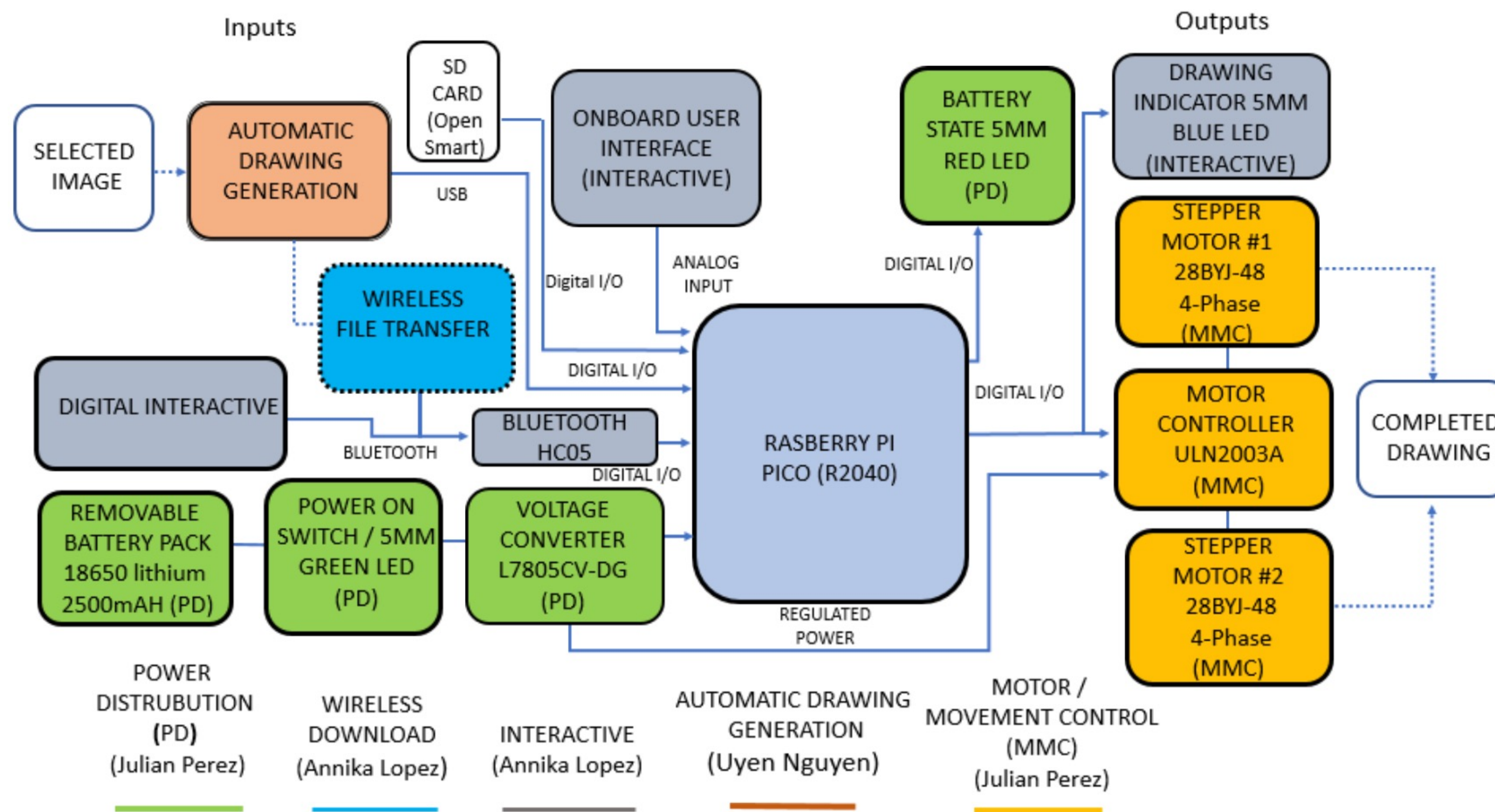
- Includes:
- ❖ Two 3D printed levels, two wheels, and pen holder
 - ❖ A power 'on' switch, which lights a green LED
 - ❖ Three pin-tact push buttons to draw a square, triangle, or circle
 - ❖ Blue LED to indicated when PenBot is drawing

The Team



Julian Perez Annika Lopez Uyen Nguyen

System Block Diagram

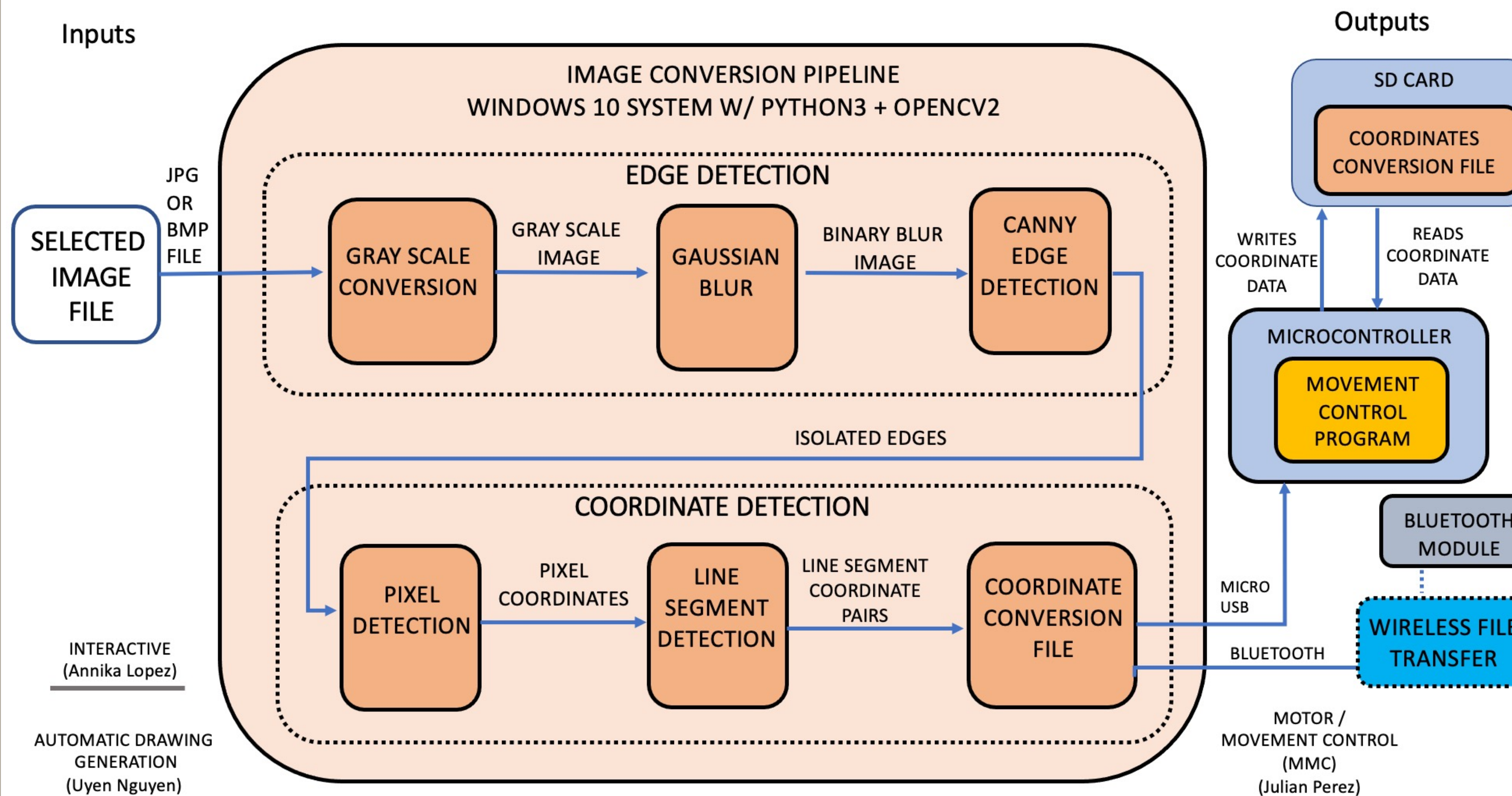


Representative Drawings Required

Illustration	Max Time	Description
	90 seconds	A medium size ~12" x 12" drawing of a recognizable object such as a flower, butterfly, guitar, cat, etc.
	5 minutes	A portrait of a recognizable figure drawn to the size of standard posterboard (22" x 28").
	30 minutes	An interesting and complex pattern of curved and straight lines that largely fills the area of the posterboard.
	1 hour	A highly detailed natural landscape or cityscape that largely fills the area of the posterboard.
	2 hours	The bot must create a large drawing on 48" tall white kraft paper that is also at least 10 feet wide. It must be completed with no more than one battery replacement.

Images are examples and not final line drawings the PenBot will complete. Image Sources: Shutterstock, dreamstime.com

Automatic Drawing Generation Block Diagram



Plans for D2

- ❖ Troubleshoot our HC-05 Bluetooth module or find another alternative
- ❖ Create a digital user interface for the 'interactive' feature
- ❖ Integrate the generated coordinate pairs into the base code and validating testing
- ❖ Modify the chassis to ensure it is below the allotted weight limit, as well as create a more stable pen holder

Acknowledgments

- ❖ Sponsor: Lee Hinkle
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