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Goal of this project

- This project was for creating an image-trained circus robot as described in the headline
- We were given 4 tasks that the robot must complete autonomously: complete a dance routine, wave a flag, scroll song lyrics and display a light show. We had to think of 3 new tasks for it to complete autonomously. We came up with: indoor weather monitor with multisensor, intruder detection (?), ultrasonic distance detection of distance of shown images/paper.

Eventual full implementation

One chunky Python program with everything necessary to control the components inside it and our Arduino running the appropriate .ino file

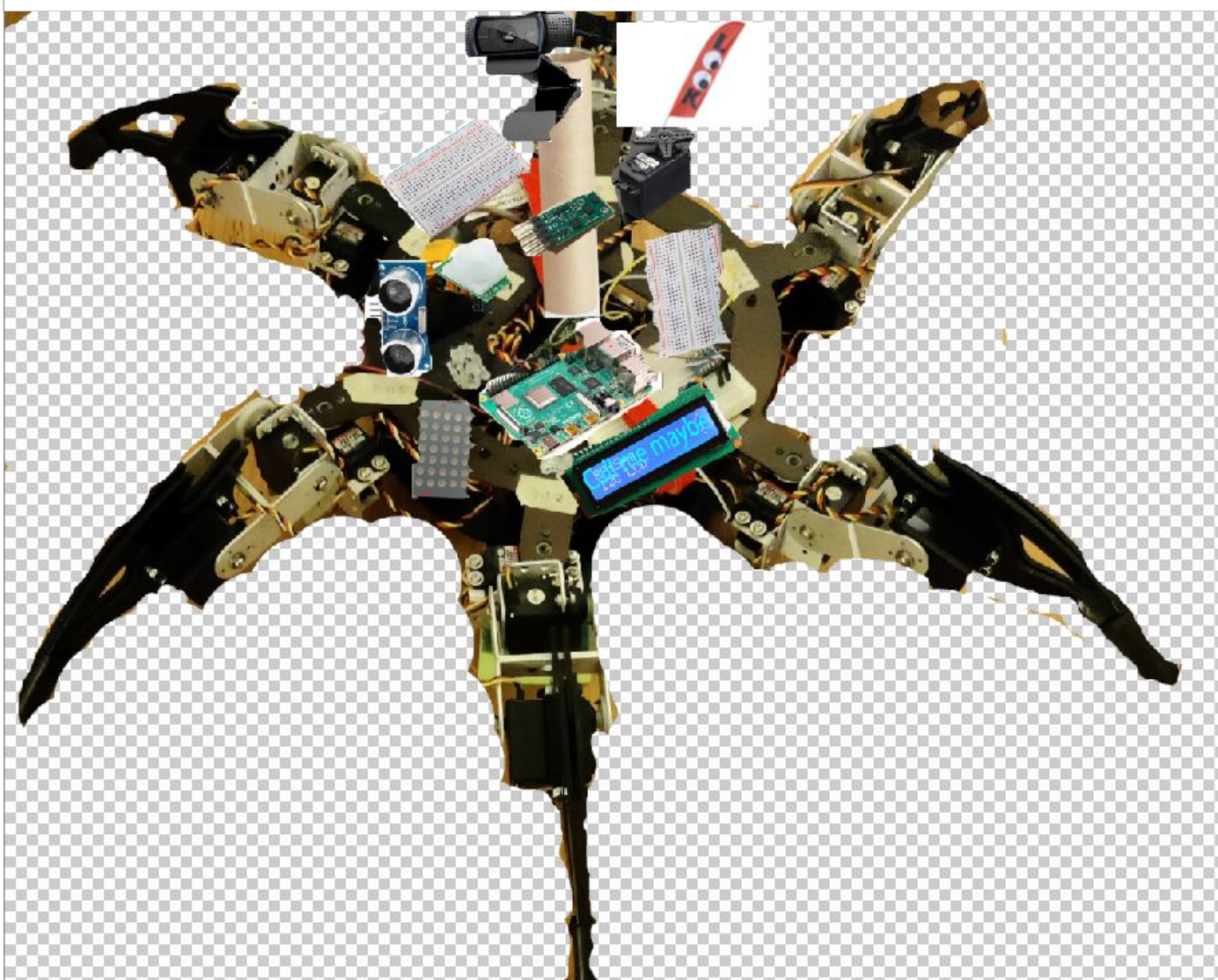


Figure 1. Love it or hate it, this is the robot (18 pt [for this picture alone? nice]).

Image detection

Using CV2 libraries in Python, we use template matching and apply a “likelihood thresholding”, if the detected template has a good enough likelihood of being the actual shape we’re looking for, then we make the code do the appropriate stuff, otherwise it keeps scanning (and lagging)

Hexapod movement

- Idiotic, dumb servos that don’t know what to do
- Hexapod has its own Bot Board (v2?) (or something) for moving its legs.
- Each leg has three servos.
- Arduino connected to Pi – Arduino is configured to write in software serial (TX and RX on the Bot Board on the Hexapod - transmit (unnecessary) and receive serial info) whatever it reads from regular serial - we write to normal serial from Pi with Python code - with this we give commands to the servos

Different task components

Connected to Raspberry Pi (through pins):

- LCD display - Displaying “Call Me Maybe” chorus lyrics;
- Ultrasonic sensor - Detecting shown images and its ~~strange things~~ distance from the paper
- Logitech webcam for image detection - USB connection, for image detection for shown shapes
- Cheap continuous servo - for waving a flag
- Multisensor - to provide indoor temperature, altitude, pressure etc.
- Dot matrix display - display a light show and to flash certain patterns, if an intruder is detected with ultrasonic.

Problems

- Could not calibrate hexapod, as the software for calibrating it was ~~for Windows XP~~ not compatible with newer versions of ~~software~~(OS?) operating systems, even when trying to launch it in compatibility mode
- As described before, a lot of technical problems regarding the hardware that was provided, broken servo, arduino, Raspberry Pi (Non-functional USB ports and finicky power port (finicky as in apply 0.0001N of force and it will lose power) - new one is a must),
- Old guides, not very clear in their instructions with references to deprecated software