BEADS for beads.

Big Electrically Actuated DC Sorter (BEADS) for beads

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1 Intro

Often times when you are creating something with beads, particularly if you are a child, you have by accident or on purpose mixed all your beads in one big box, or just mixed some of them in different containers. This is particularly frustrating for older beaders who usually want to make some more structured art, like the Bodø/Glimt logo seen on the right. You might also get a request from an angry child who desperately want the last 16 pink beads from a box of 15 000 different beads. Then you will want our Big Electrical Actuated DC Sorter (BEADS) for beads.

The goal of the BEADS for beads project was to design a Sorting machine that could:

- Sort beads with great accuracy.
- Sort beads at a high speed

2 Tools

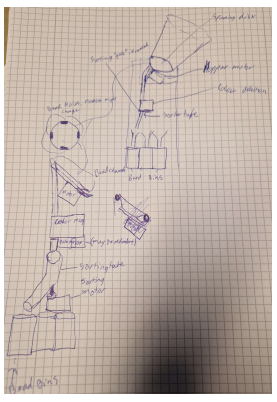
We used the Arduino ide for programming our arduino nano and python with numpy and matplotlib for visualizing the data as well as testing various colour detection implementations. For the physical prototype we used a Creality Ender 3d printer

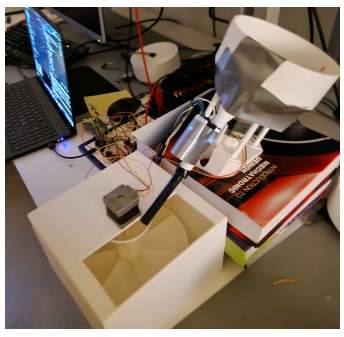
Bill Of Materials (BOM)

- stepping motor and motor driver*2
- RGB sensor
- Arduino Nano 33 BLE

We attempted to optimize our colour recognition. Recognizing colours turned out to be quite difficult to optimize as certain colours were near or fully indistinguishable with the used RBG sensor and setup. We attempted to first visualize the different colours and manually tune threshold values. Due to the controller having little time and limited resources to make a prediction this seemed like the only realistic option.

3 Conclusion





First sketch of design on the left, final Prototype on the right

While we did not fully achieve our goals we did design a physical prototype that can sort beads with a reasonable accuracy. We were held back by our choice of controller and a somewhat faulty RGB sensor. The prototype can now quite reliably at a reasonable speed sort some different bead colours, but others are not distinguishable with our current implementation and hardware.

Manually optimizing colour recognition thresholds did work quite well on meassured training data, though it is a process we would have liked to automate if time permitted. The varying light conditions of the real world did however mean that sustaining similar levels of accuracy proved impossible in practice with our current settup.

Future Work

Had time permitted it we would have liked to automate and improve the colour recognition setup process. And also some improvements to the physical prototype including isolating the sensor further from light as well as fine tuning the sorter and hopper designs. We would also have liked to integrate the electronics and move the prototype over to battery power or a standard power supply.

Extra figures



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GitHub repo →