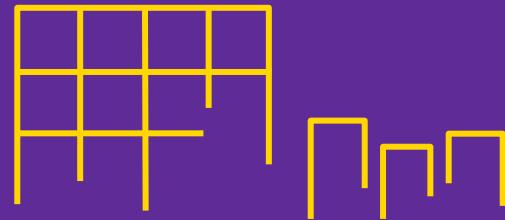


WeCare iBoard

Team Hugo



Team



Anish



Maryam

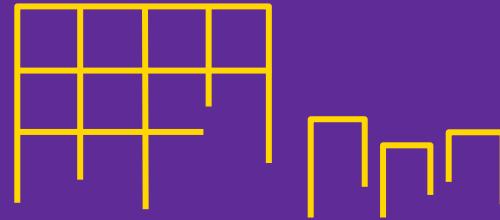


Peter

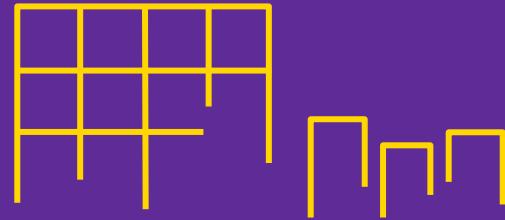


Shivaani

Why & What + How



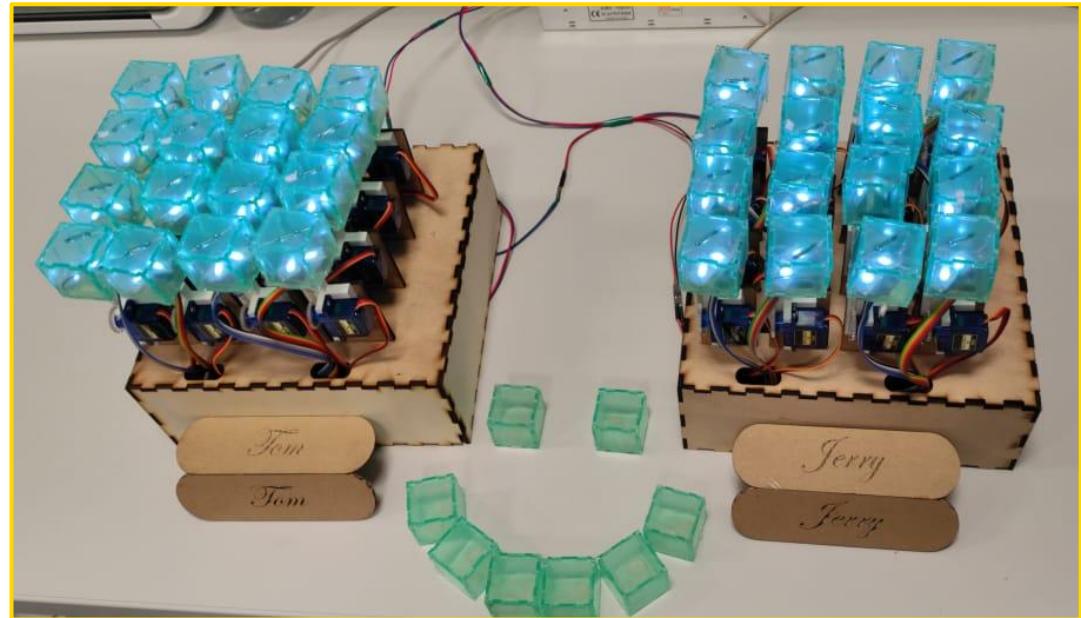
Why & What + How



What is the device

Interactive Boards

- Remote communication
- Play games
- Remote collaboration



What are the components?

Interactive Board

- 4x4 modules
- Each module
 - Actuate
 - Change color
 - Sense magnetic objects
- Cubes as magnetic object
 - Simple
 - Consistent
 - Intuitive



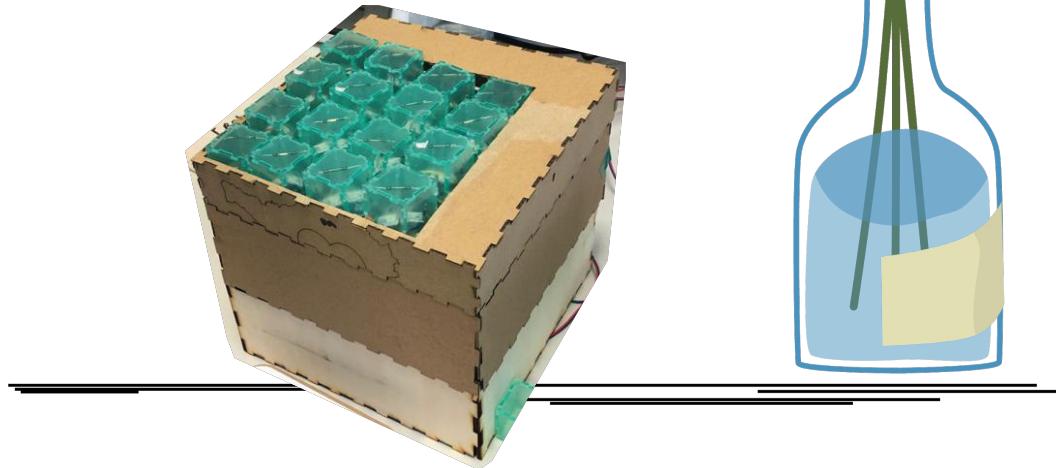
How it works

- Output: Combination of movement and color change
- Input: Magnetic objects



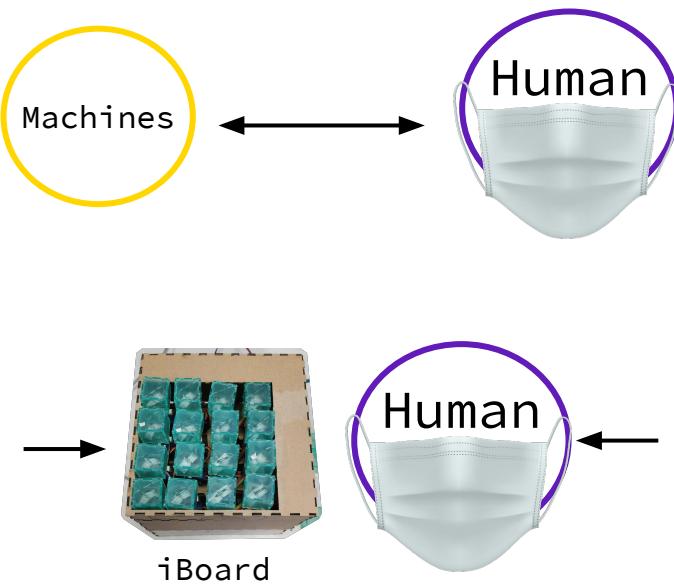
Key features

- Suitable to place on the desk
- Easy to learn and use
- Embody digital information into the physical world
- Go beyond regular GUI
- Bring us closer

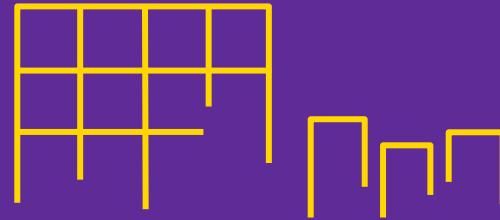


Key features

- Suitable to place on the desk
- Easy to learn and use
- Embody digital information into the physical world
- Go beyond regular GUI
- Straightforward modular design



Why & What + How



How

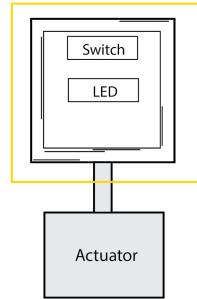
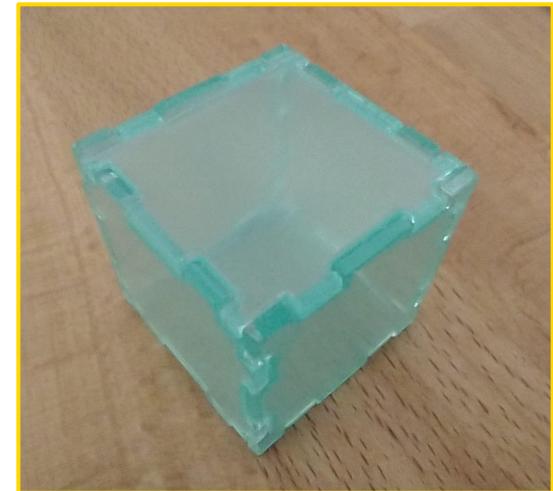
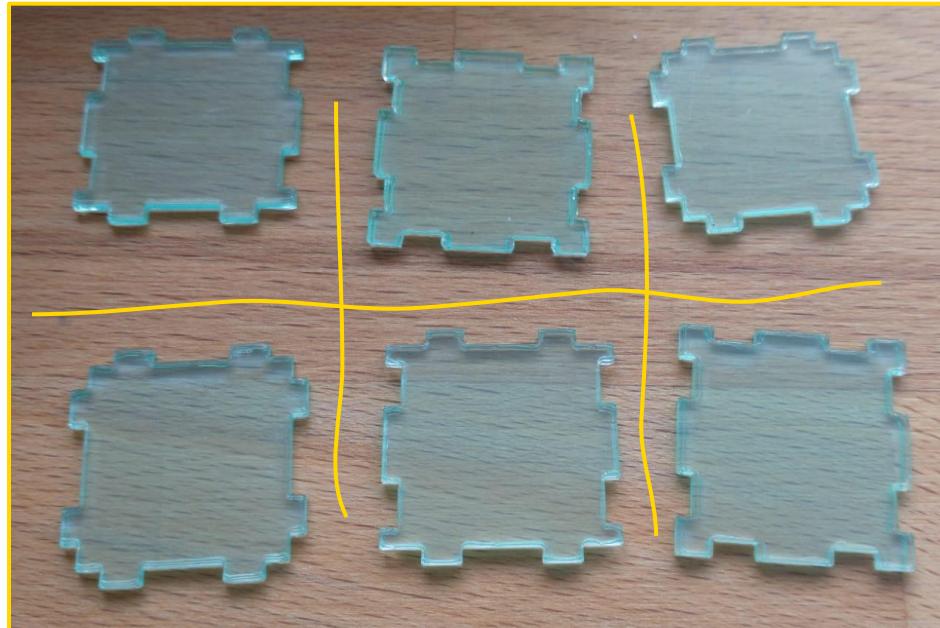


How



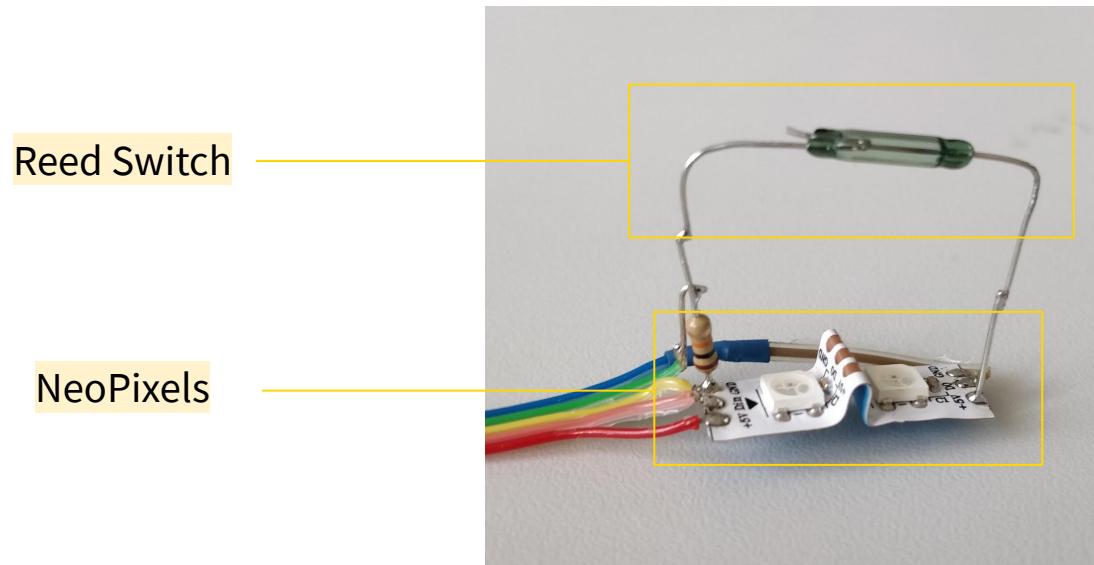
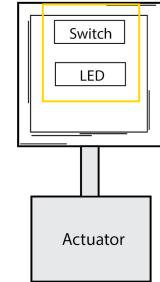
Hardware

Cubes/Pixels



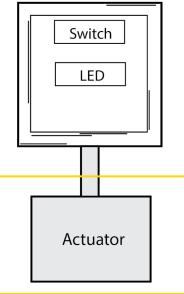
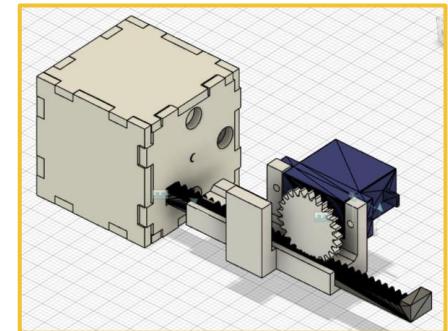
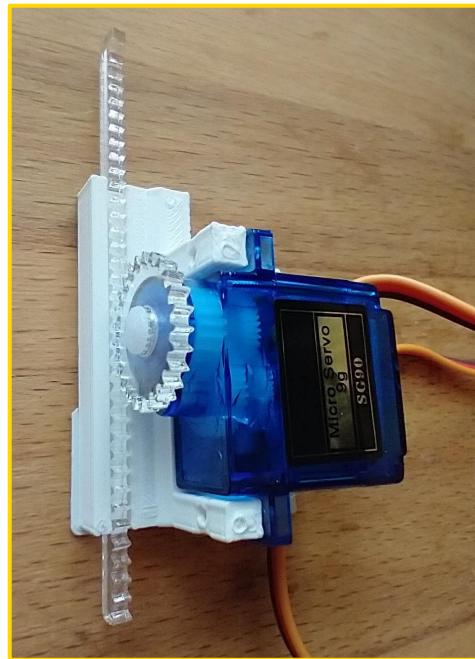
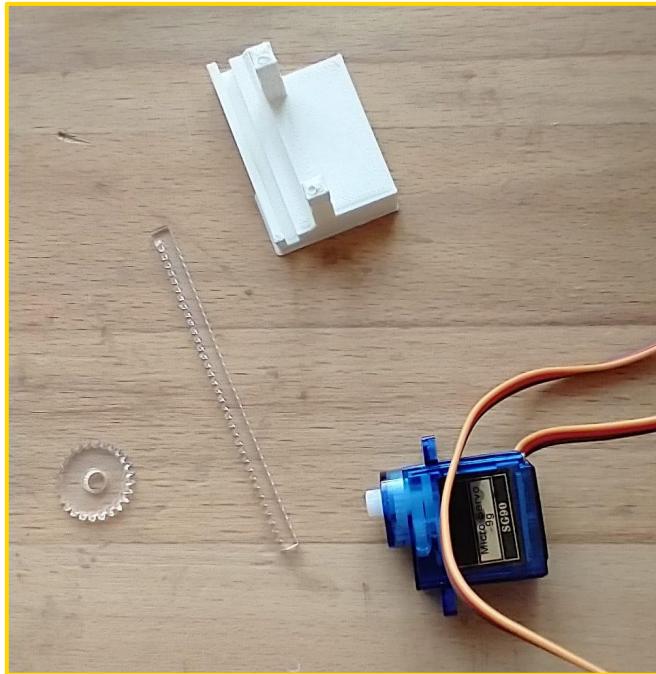
Hardware-Sensing and Feedback

Switch + LED



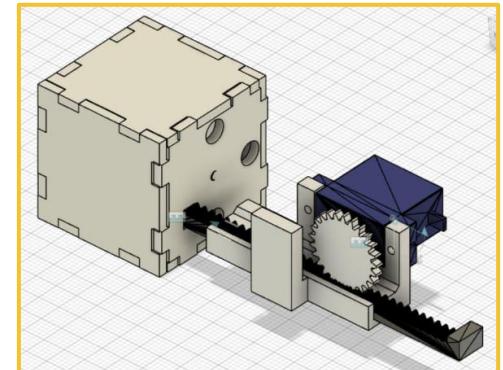
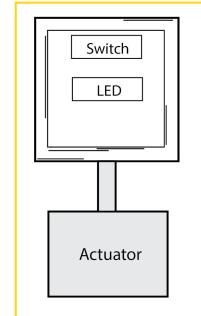
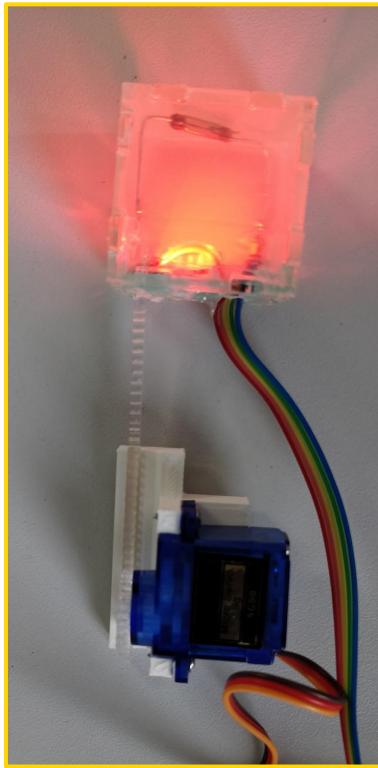
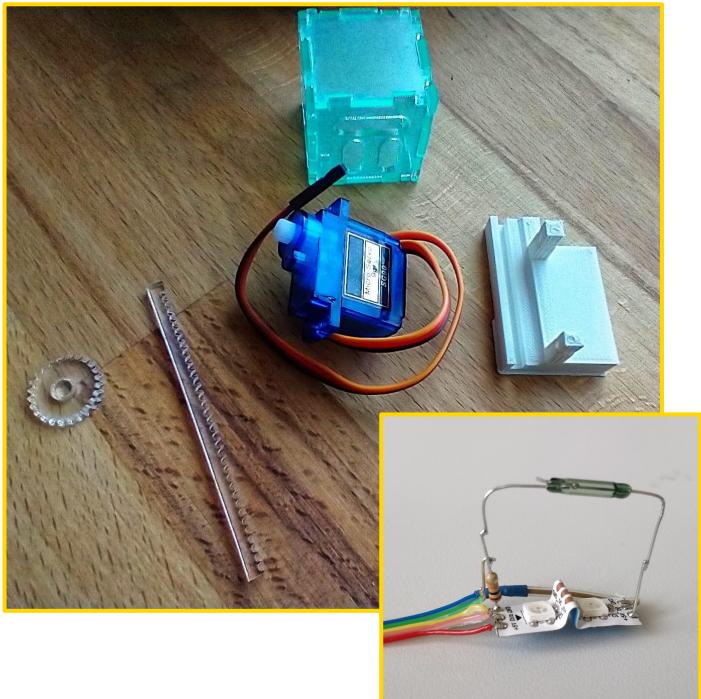
Hardware-Actuator

Servo + Base



Hardware

One Module/One pixel



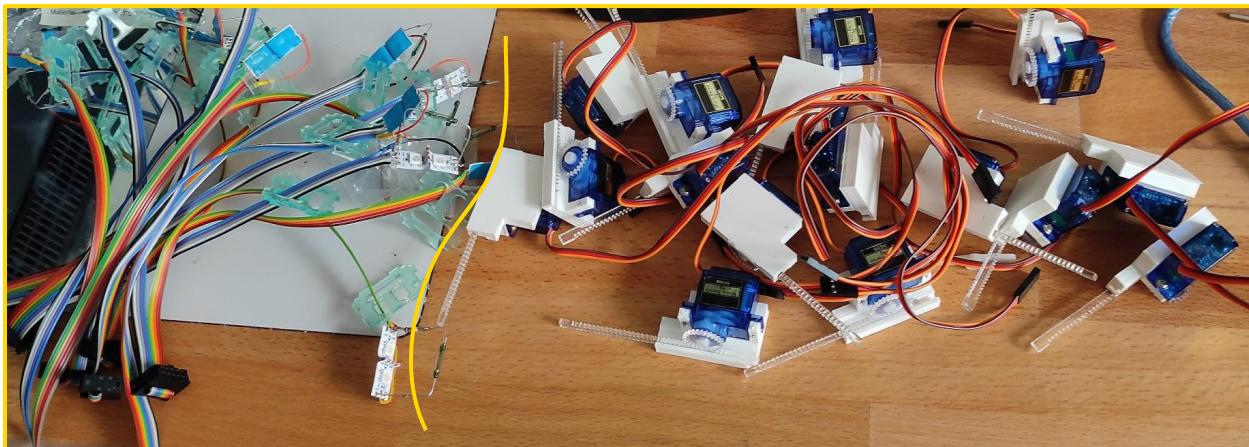
Hardware

Replicating



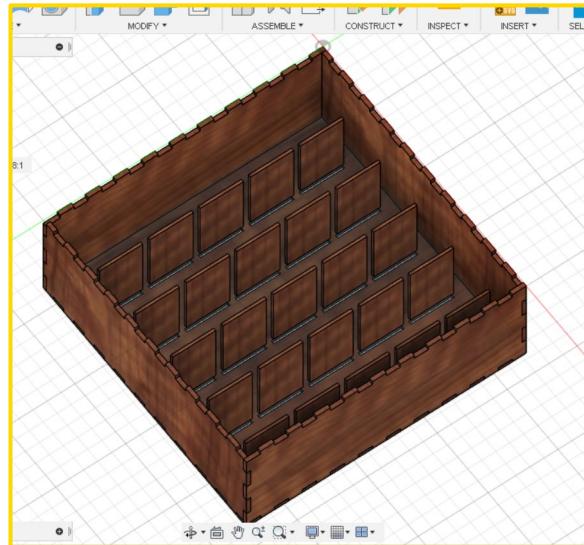
Hardware

Replicating



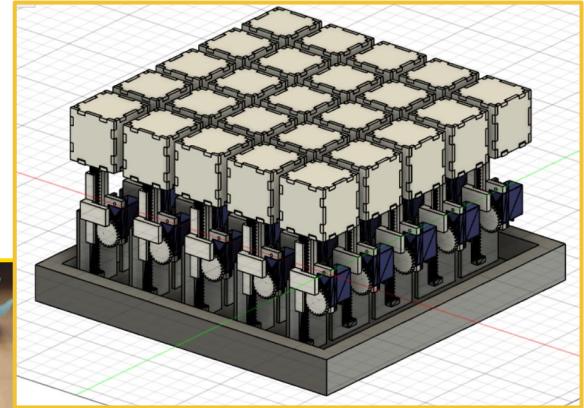
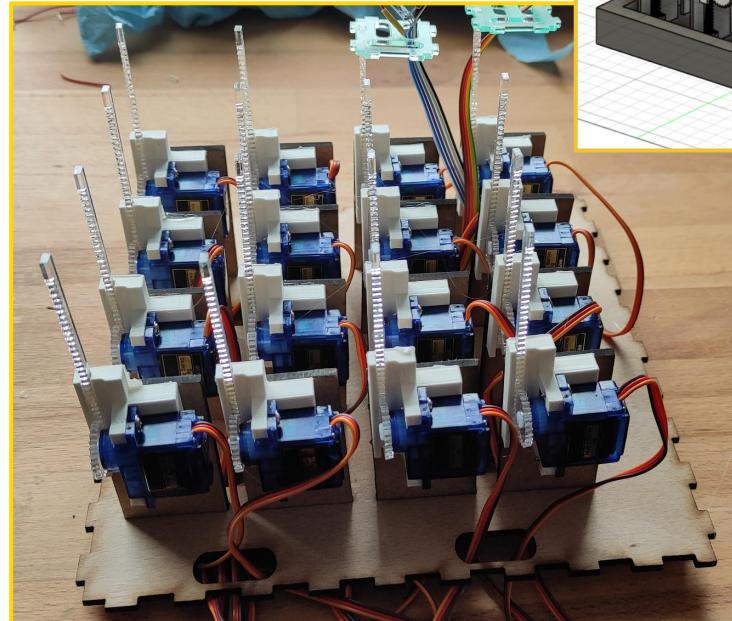
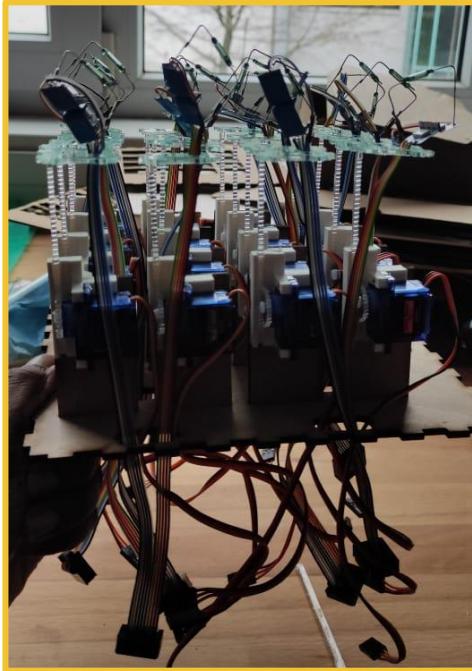
Hardware

The Outer Boxes



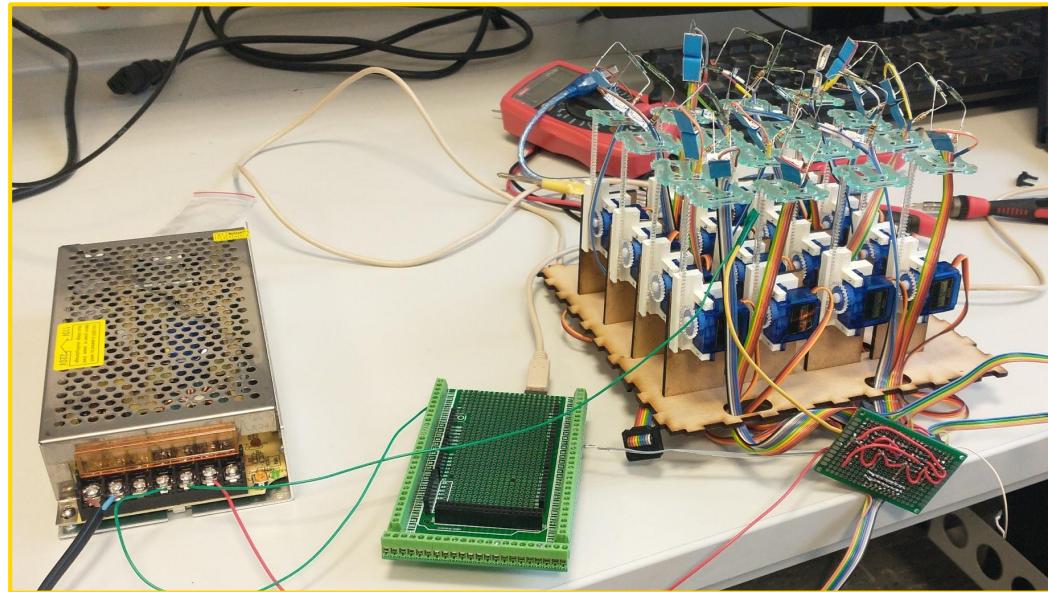
Hardware

Attaching Pixels to the Plywood Base



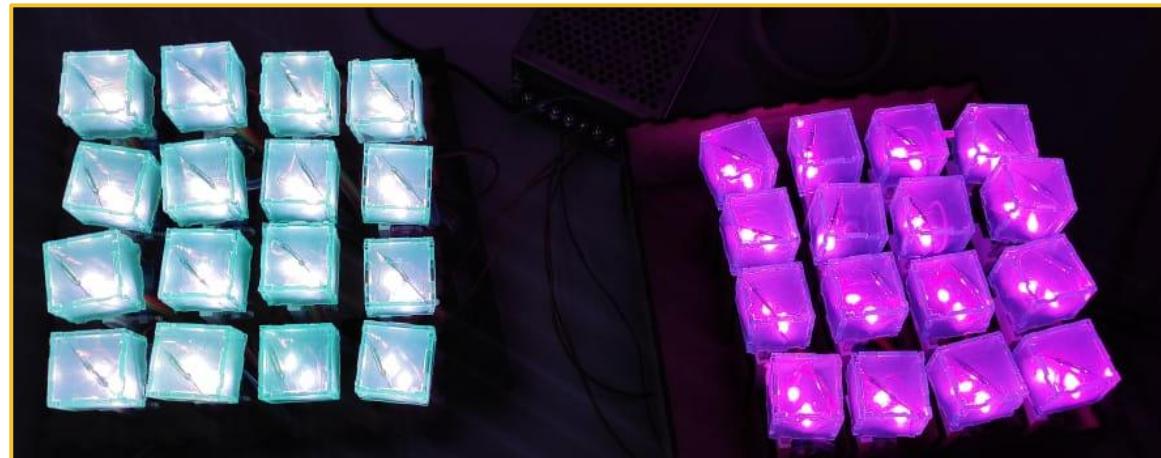
Hardware

Wiring the Electronics to the Controller



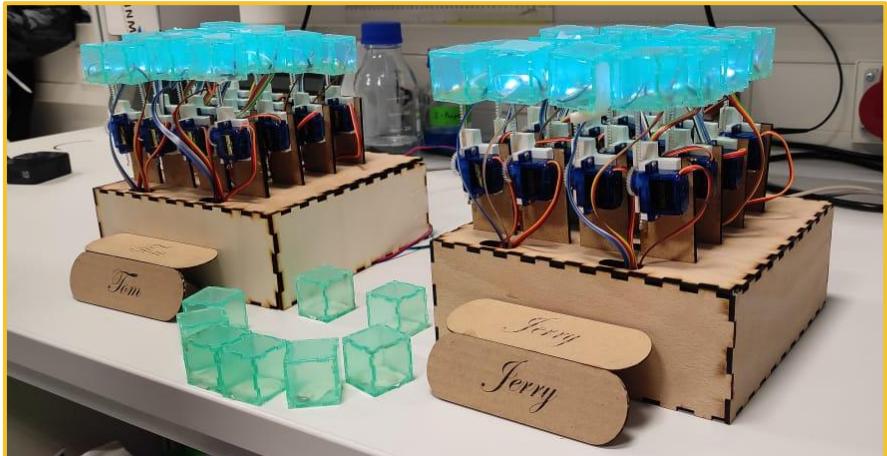
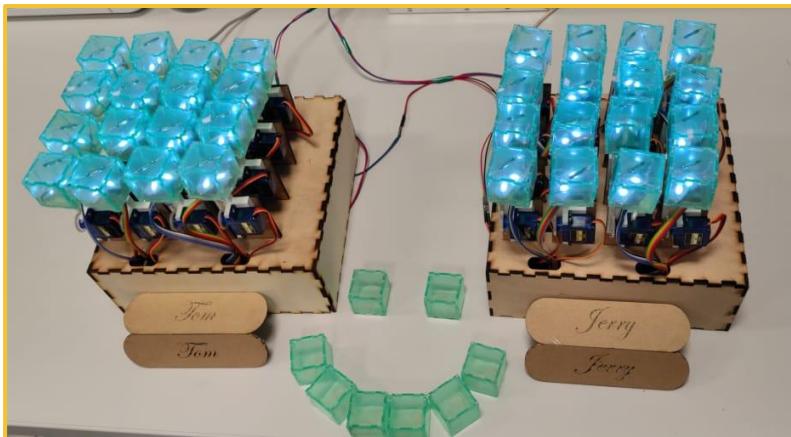
Hardware-Testing Prototype

Light-up



Hardware-Testing Prototype

Finished Prototype for Demo



How

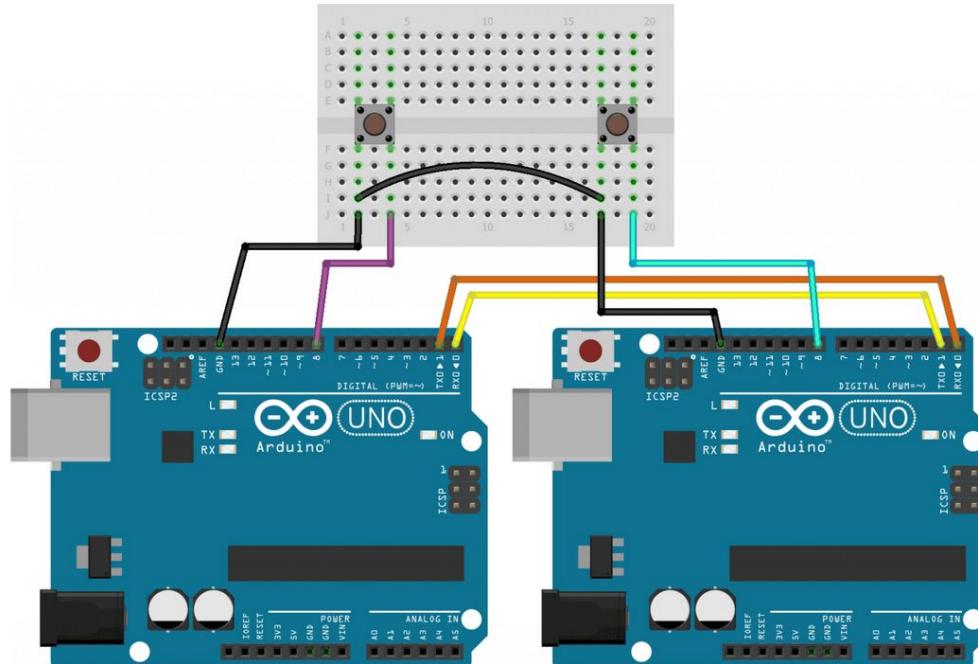


Software

- Modular design approach
- Scalability
- Portable code base
- Easy integration of advance

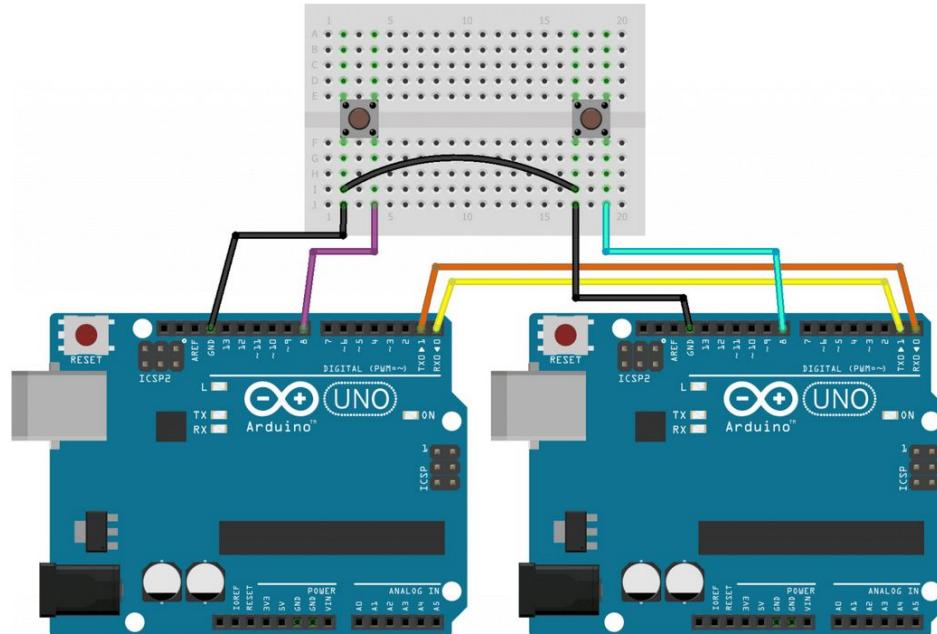
Technologies

- Easy to configure



Software

- UART communication
 - Arduino to Arduino Interprocess Communication Protocol
- Hardware interface
 - Algorithms for actuation
 - Algorithms for LED control
 - Sensing algorithm
- Time keeping



Limitations



Limited time

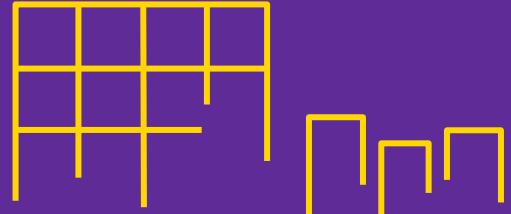


Limited budget

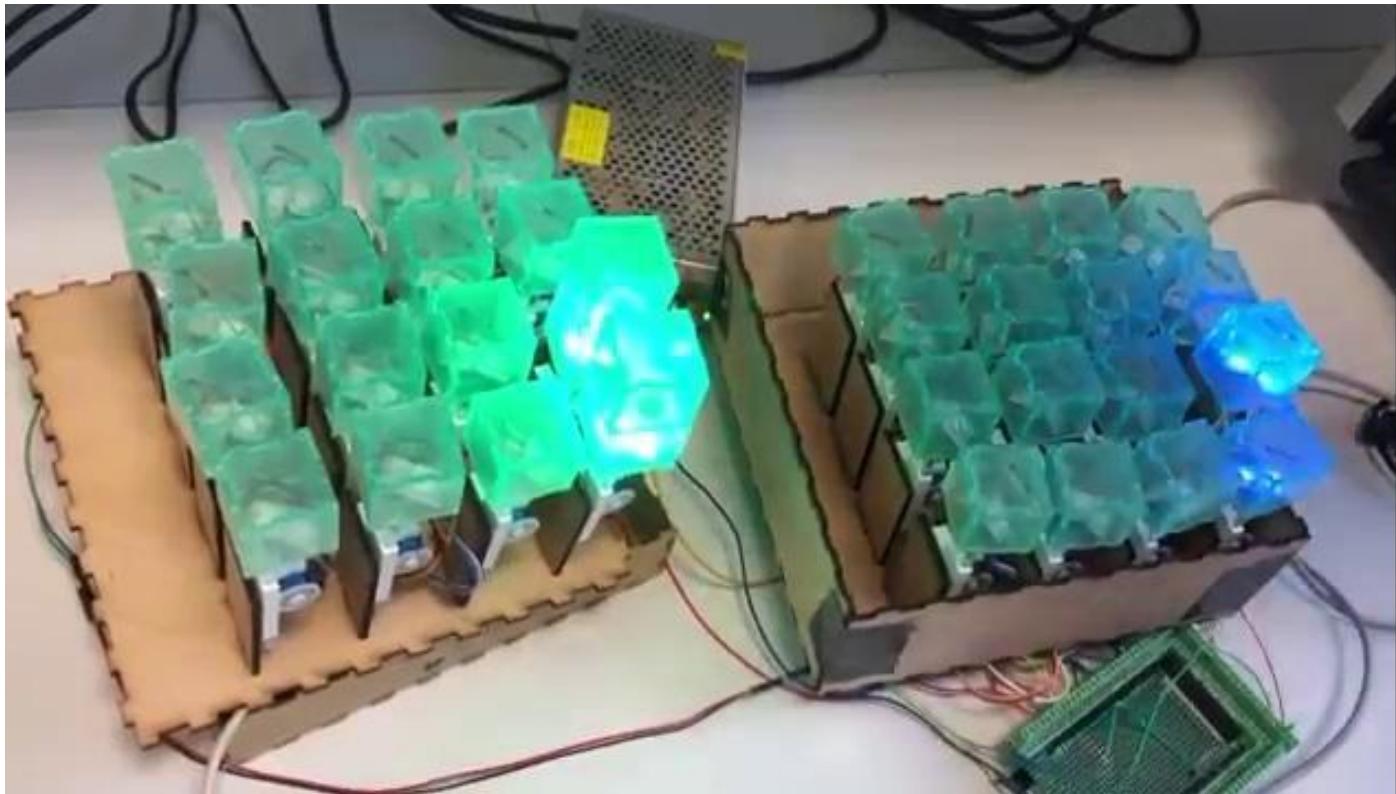
Limitations

- Technical Issues
 - Software:
 - Servos + Neopixels library
 - Hardware:
 - Scaling from 1 to 4x4 led to
 - Stability - Jitters
 - Alignment - one rack and pinion design
 - Unexpected hardware failure - Due to spikes
 - Material selection for the rack
 - Connectors and wires used

Use Cases



Basic interaction 1

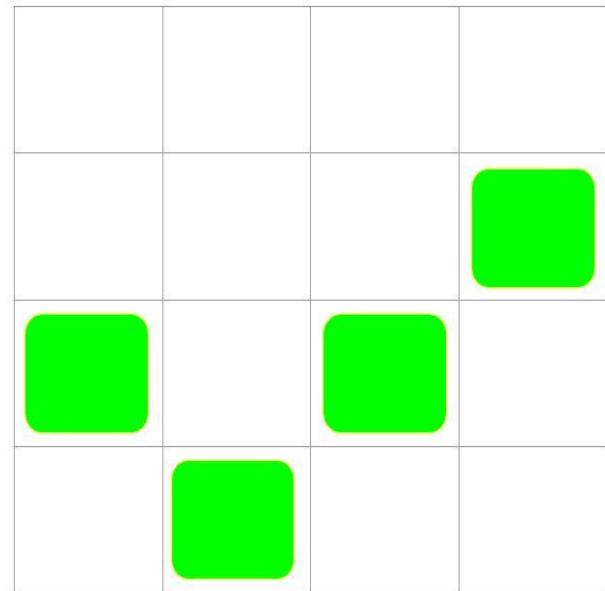
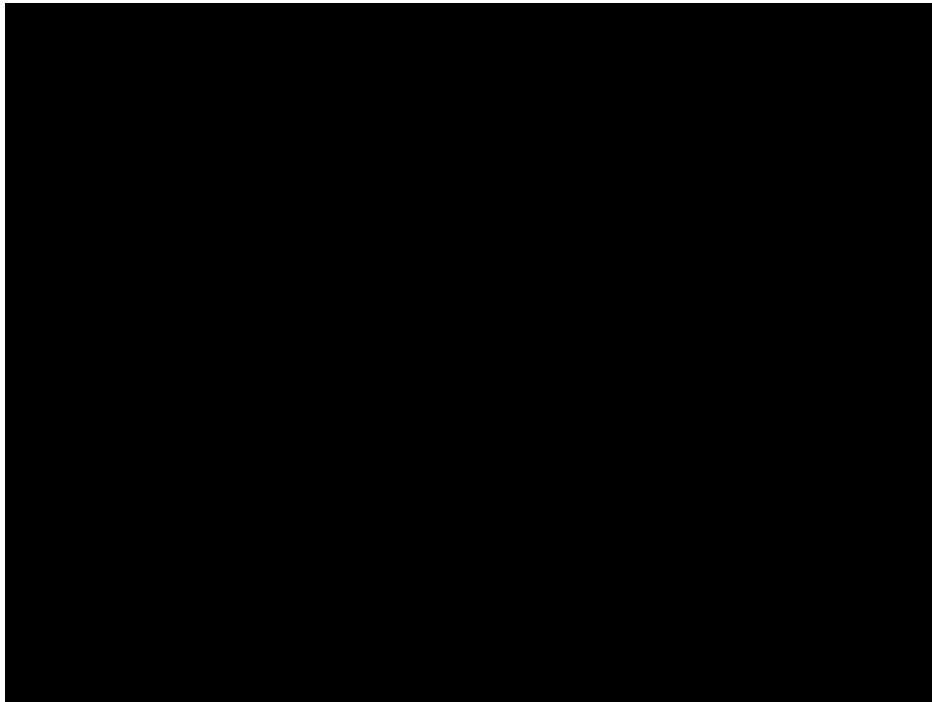


Basic interaction 2



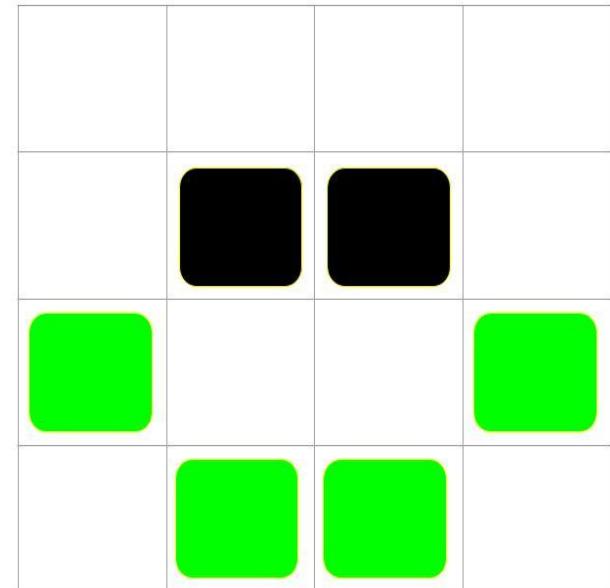
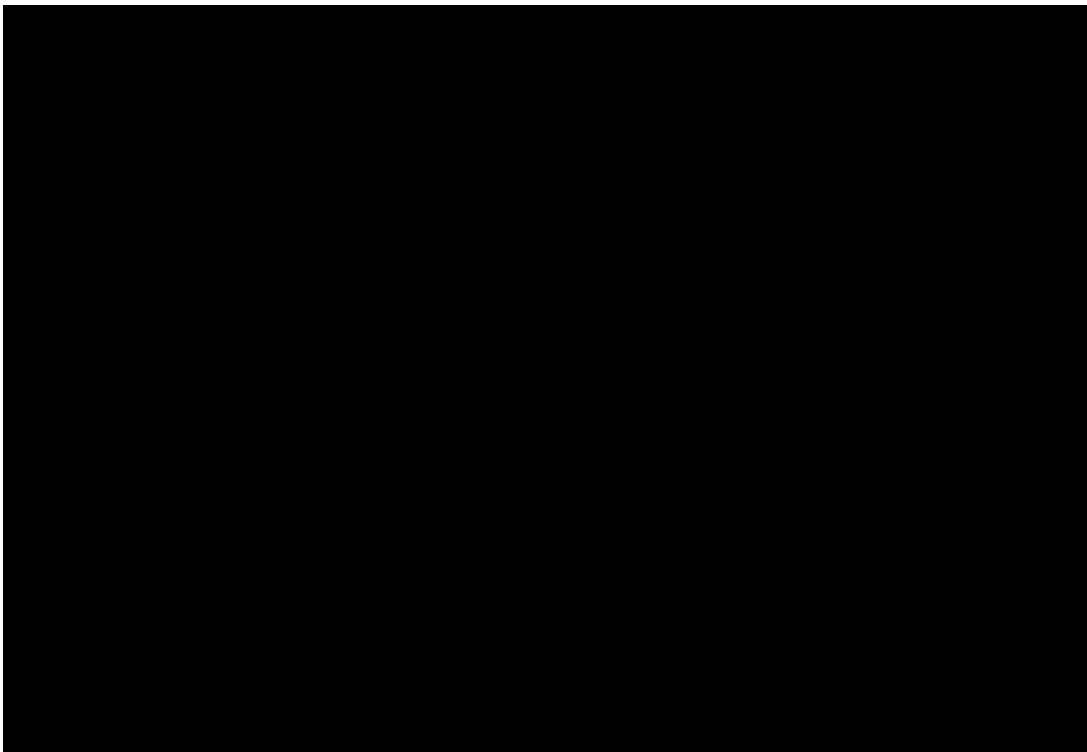
Use Case 1

Icons



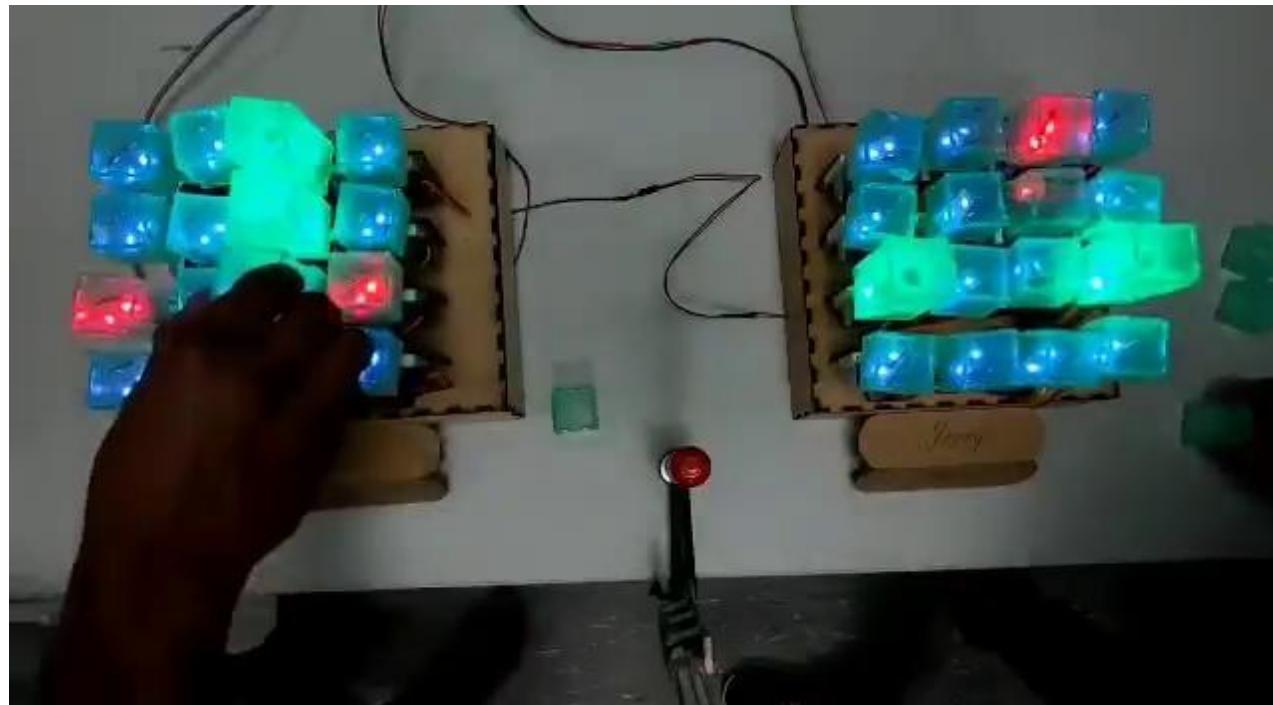
Use Case 2

Emojis

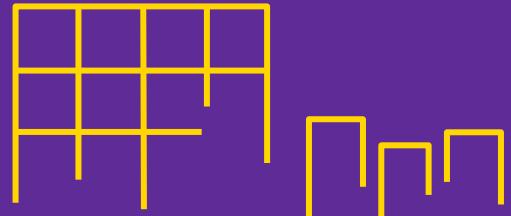


Use Case 3

Games - Tic Tac Toe

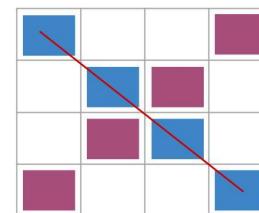
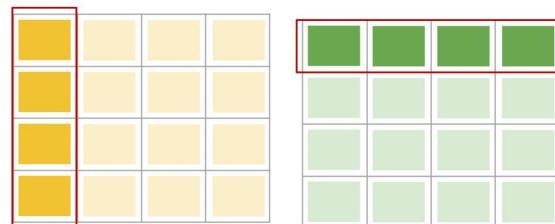


Next iteration



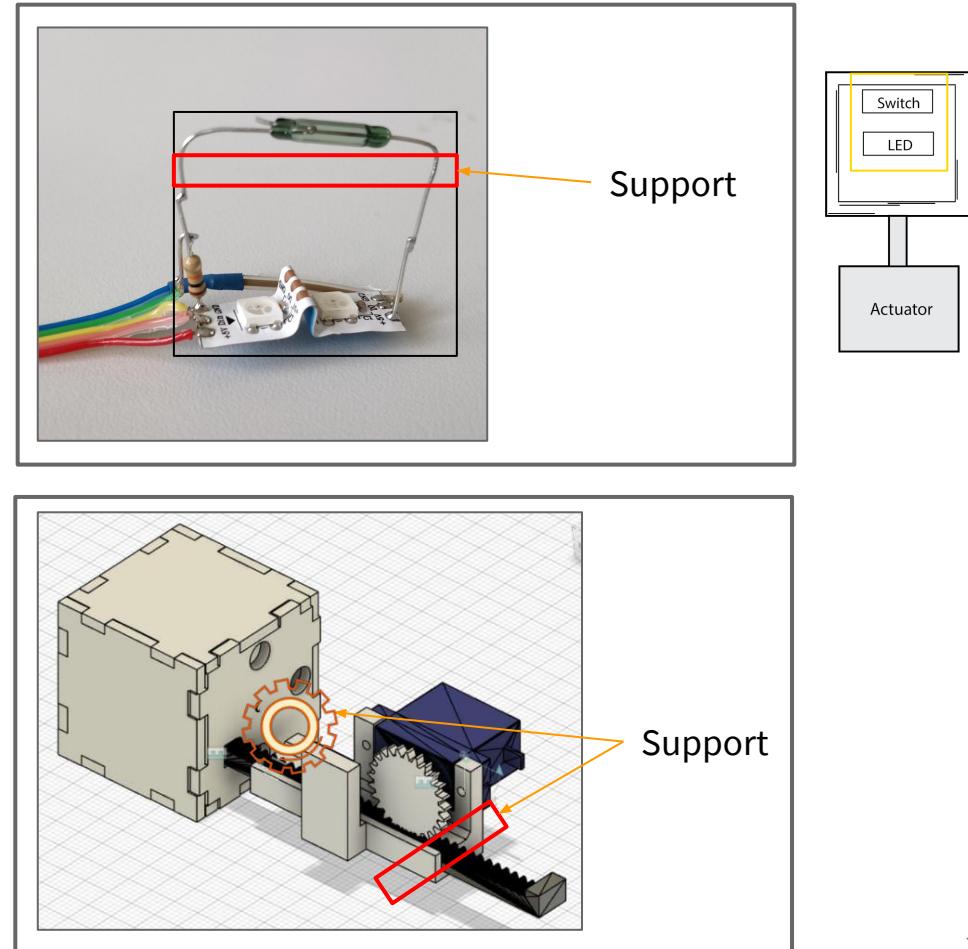
User Study

- Evaluate and create more applications
 - Emoji transfer
 - Game
 - Progress bar
 - And more.....
- Enhance the interaction
 - Improve feedback

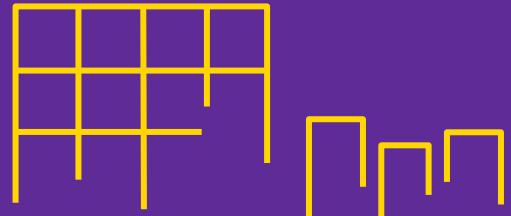


Design Modifications

- Add support for Reed switch and LEDs in each cube
- Rack and pinion design change
- Thinner and more flexible wires
- Diffuser sheet for better illumination
- Replace soldered boards with PCBs
- Use ESP module for LEDs and go WIRELESS
 - Add hardware
 - Add communication
 - Add Algorithm

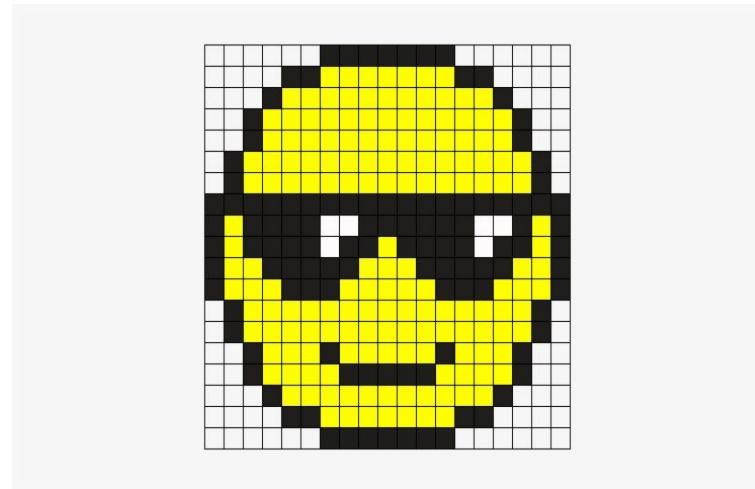


Future Works



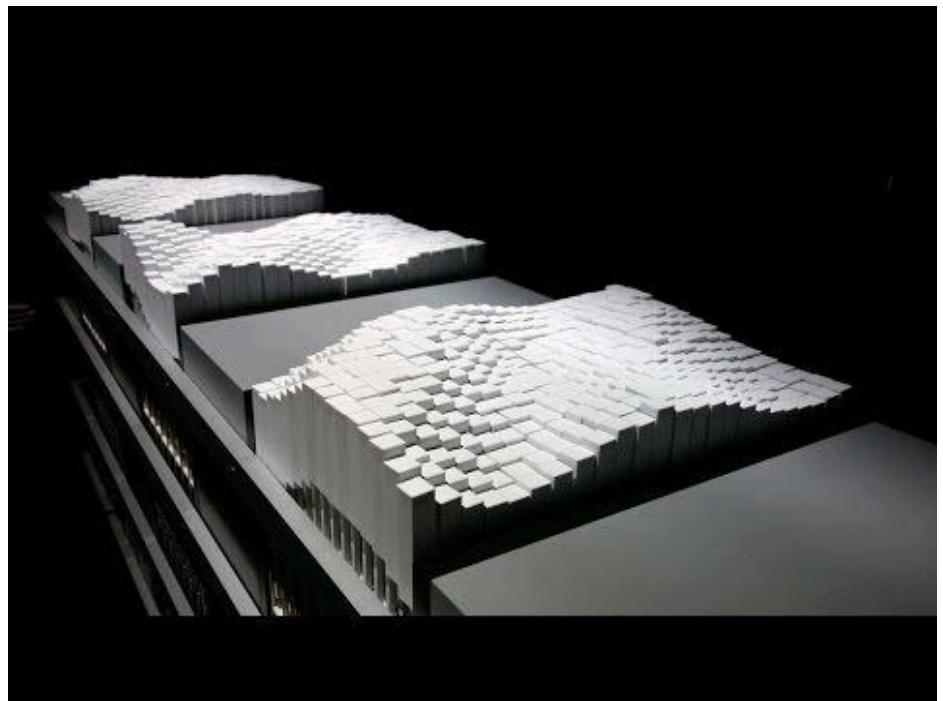
Pixelate

- 4x4 Pixel image
- Increase the number of pixels



More ideas

- Wave pattern
- Moving objects - more sturdy design
- Use better linear actuation
method/actuators



Live Demo

- ⇒ Use case 1 : Emoji transfer
- ⇒ Use case 2 : Icon transfer
- ⇒ Use case 3 : Games : Tic tac toe

