Interface Design Final Presentation
## - *A Breathing Window*

Xiaomei Xie

What to do

- I am going to do an interactive installation to simulate a window and light phenomenon in daily our life.
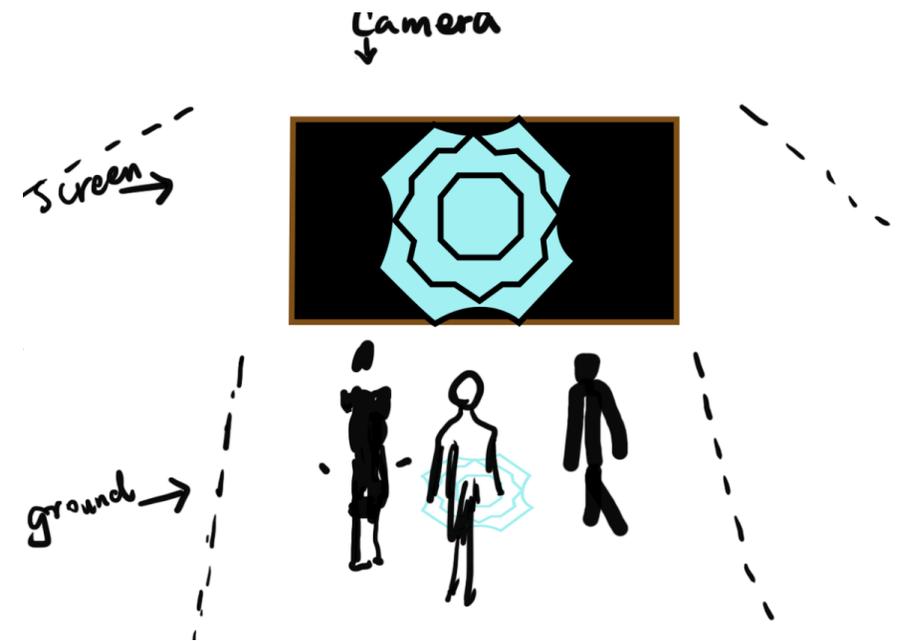
- But in my system,

- **The window on the wall are virtual**, I design the pattern by program, which can change as the viewers move.

- **The light on the ground is real**, whose changes follow the window's change in real time.

  And in this system actually we can play with the window and the light, which can't be realized in real world.
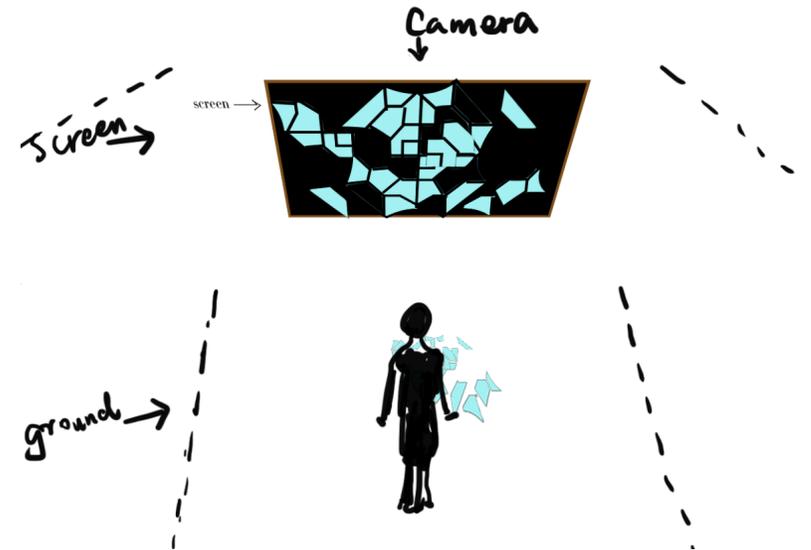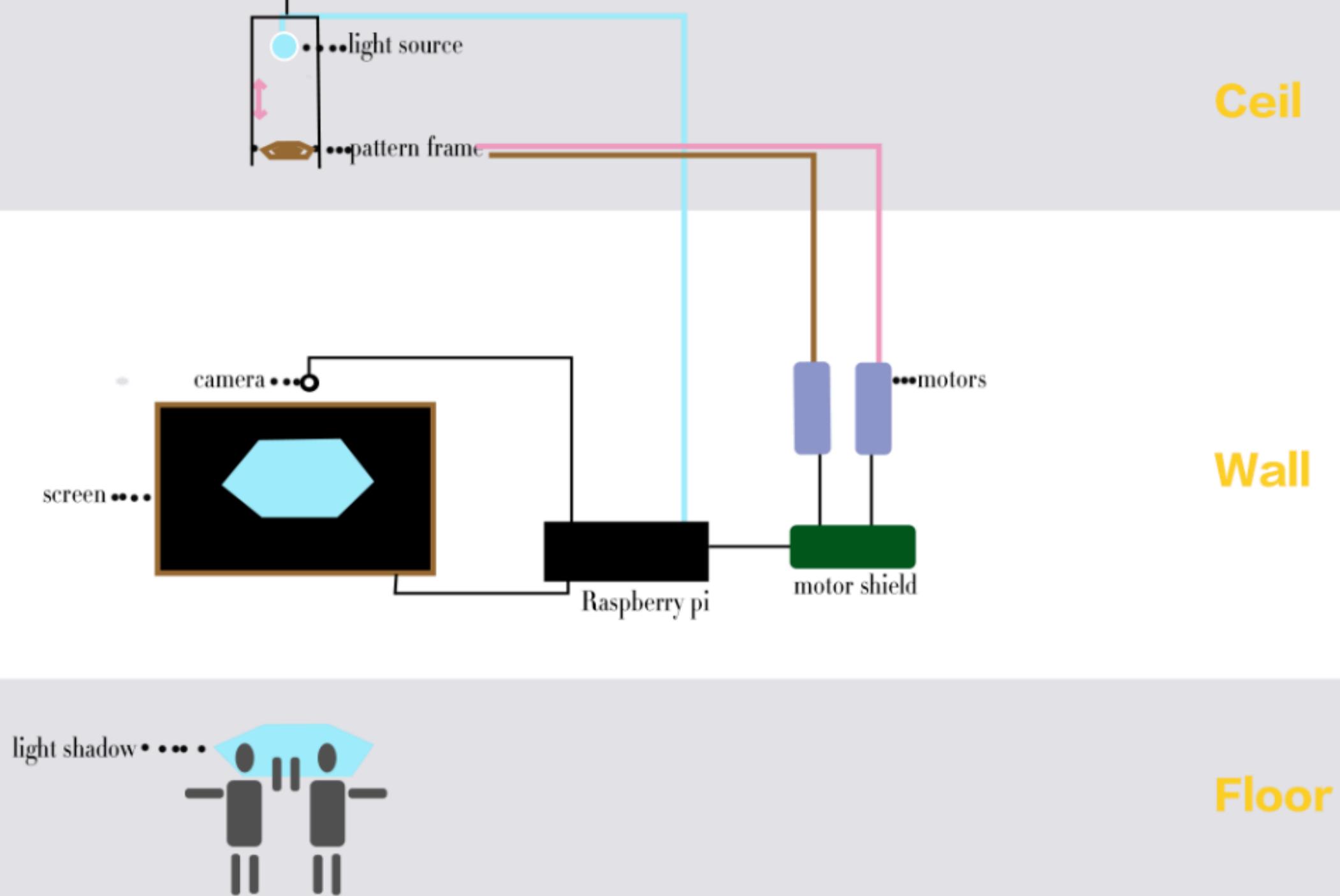
- After some research, I found that the difficulty of this project is that the virtual window pattern and the real light shadow should be highly consistent. So on my first try I would like to simplify the pattern and its changes

- **Pattern:** geometry

- **Changes:** simple shape morphing and its frequency

- **Light** brightness change with the same frequency

Like window is breathing, so I call this *A Breathing Window* .

How to do

Ceil

light source

pattern frame

Wall

camera ••• motors

screen ••••

Raspberry pi

motor shield

Floor

light shadow • •••• •

window pattern

- Run **C++** in raspberry pi, use camera and **open-cv** to extract the optical flow state of the visitors' movements. More active movement generates stronger the light flow ,and the morphing frequency is higher ,which results in a faster "breath".
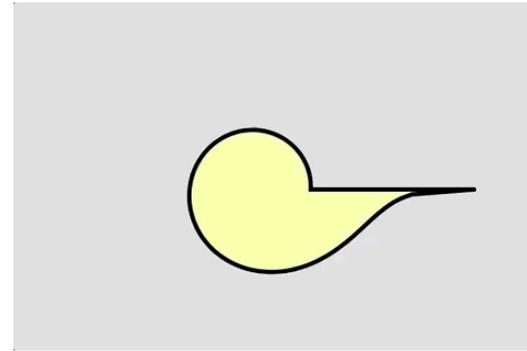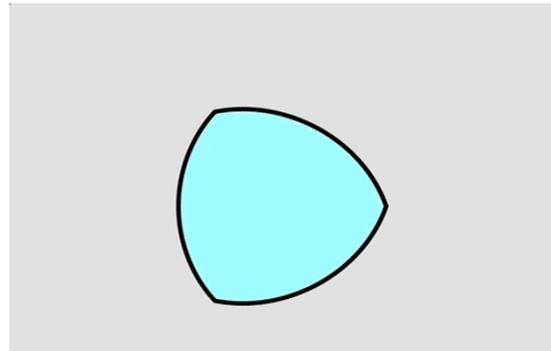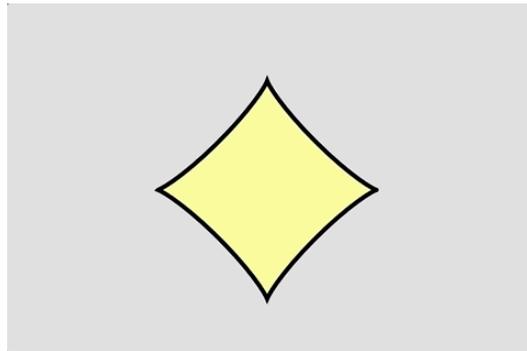
"light generator"

- a **motor shield** is connected to the raspberry pi, a light source model is designed on the ceil to allow the motors to control the **rotate angle** of the frame model itself and the **distance** from the light and frame shape itself. At the same time, the light is flashing at the same frequency.
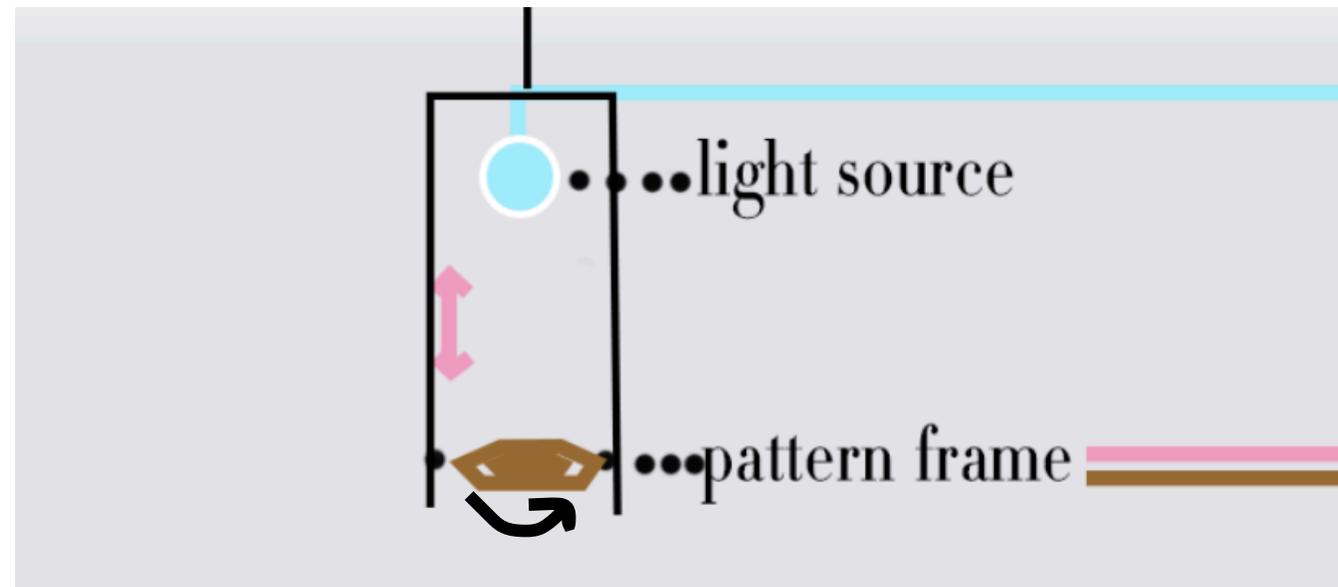
- **Light specific**

Day light & Night light/Interior light

- color change in screen
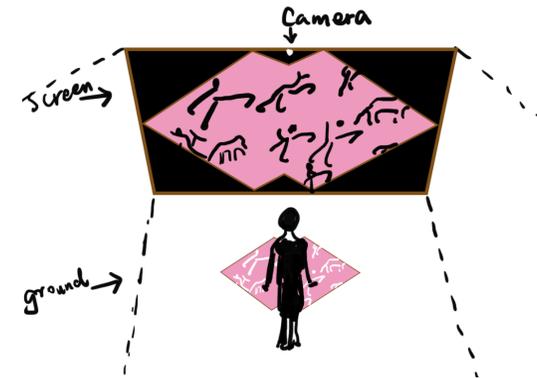- transparency paper change before projector)

Application

- Such a complete system can be installed in any type of building, and the patterns of the windows can be fixed according to the **surroundings.**

Totem version

Some references

- A church in Canada

- Saint Piérre Church at Firminy

- La Chapelle de Ronchamp

Le Corbusier

Technic tools list (hardware and software)

Window pattern :

- raspberry Pi
- Pi camera
- monitor /mouse
- open-Framework + open-CV

Light generator:

- Motor shield
- different motors(servo motor, DC motor)
- Window frame model
- bubbles/ Projector /LED
- cables

Thanks.