POLITECNICO
MILANO 1863

Final Project

L I L Y

Group 11

BACKGROUND

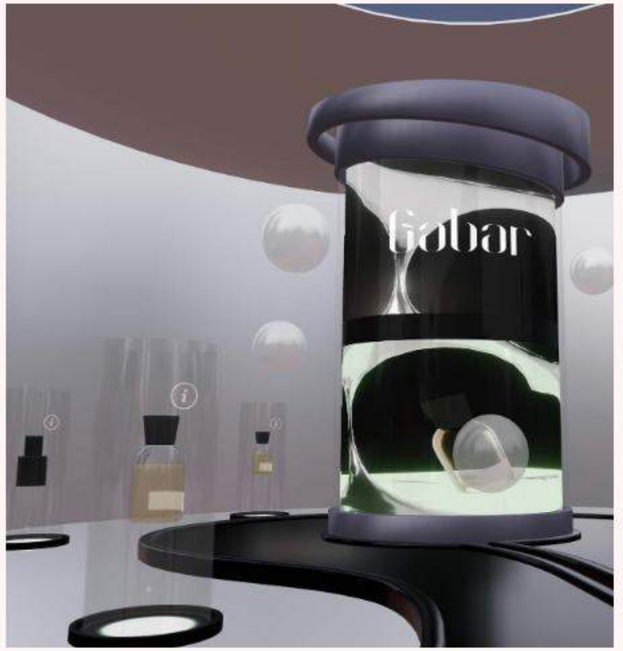
BRIEF

Develop a portable olfactory display prototype designed for perfumery exhibition and customization using piezo-atomiser technology. The aim is to **allow the user to test fragrance combinations** while informing him/her about the specific ingredients used while **complementing their experience with augmented reality** to deepen user connection with the brand.

RESEARCH

FeelReal

The Power of Scents: a Neuromarketing study in Virtual Reality reveals new insights



In the Metaverse, Perfume Is About Everything But Scent

USER

Young User (20-35 y.o.) interested in the perfume world and trying more experiences in the luxurious world. He is willing to use different products to involve himself in the perfume context, from physical to virtual material.

&

The referent context is a luxurious specific brand store. It is a place where the user can customize the perfume he wants to display through mixed realities technology.

CONTEXT

REQUIREMENTS

Use AR control board with AR-Markers

Display fragrance information when interacting with the scent

Capability to hold 6 scents

Capability to operate the system physically while being guided virtually (AR)

Rely on piezo-atomizer technology

Allow easy disassembly for the replacement/refill of fragrances and components

Select set of fragrances in AR

VIDEO 1

A new way to experience
the fragrance world

STORYBOARD

STEP I Scent Selection

Once the user is connected with the AR Environment he/she may select one of 6 scents. These can be combined.

STEP II Scent Selection

Once selected, the AR Icon enlarges and the scent is **SELECTED.**

STEP III Scent Information

By pressing the icon a **2nd time**, an **INFORMATION WINDOW** pops up - explaining the characteristics of the specific fragrance.

STEP IV Re-selection

By selecting the fragrance a 3rd time, it is **DESELECTED**.

The user can then choose different scent/s.

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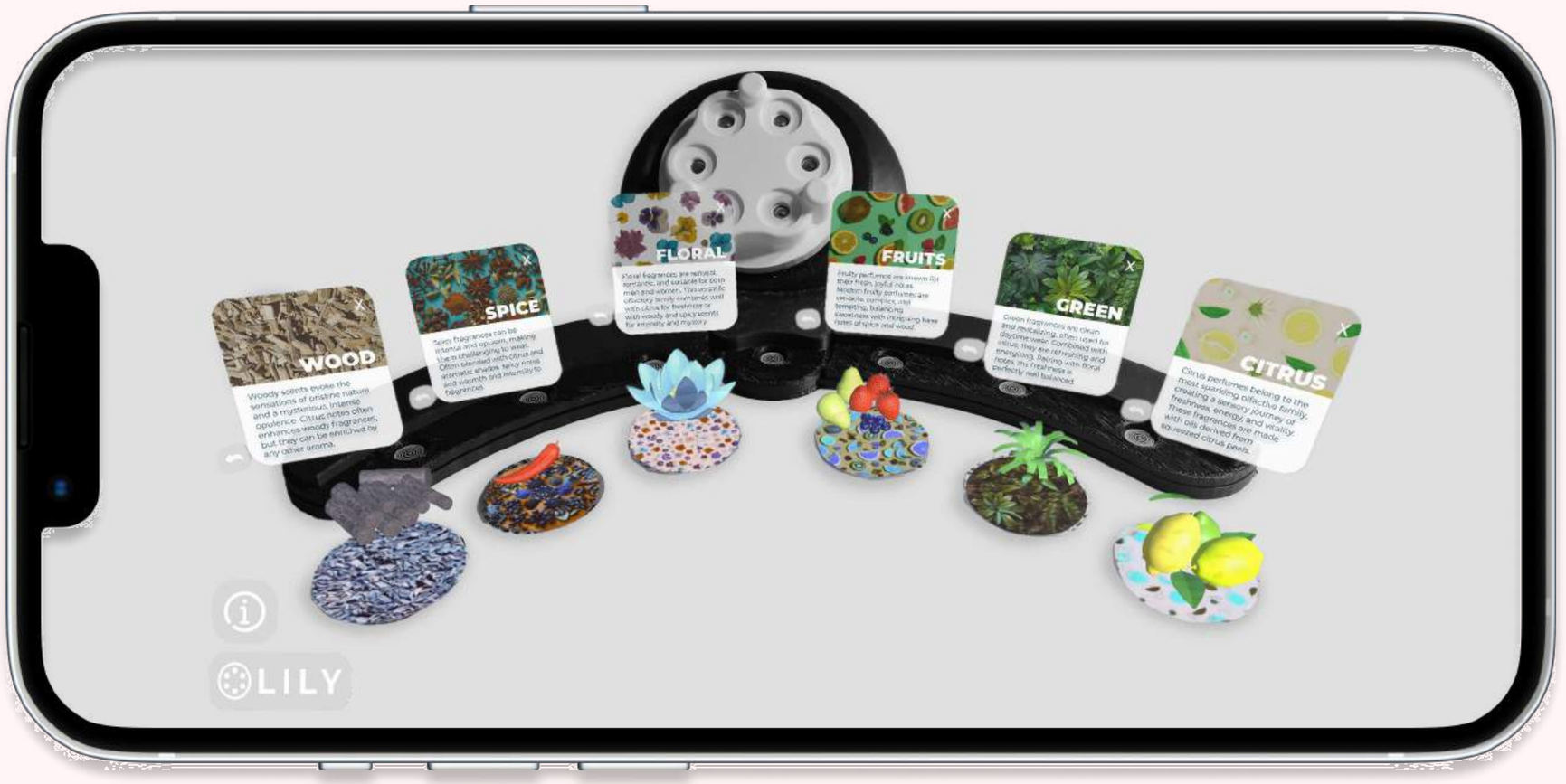
STEP V Selection Input

The user may select a combination of up 6 fragrances by pressing the icon button once for each selection.

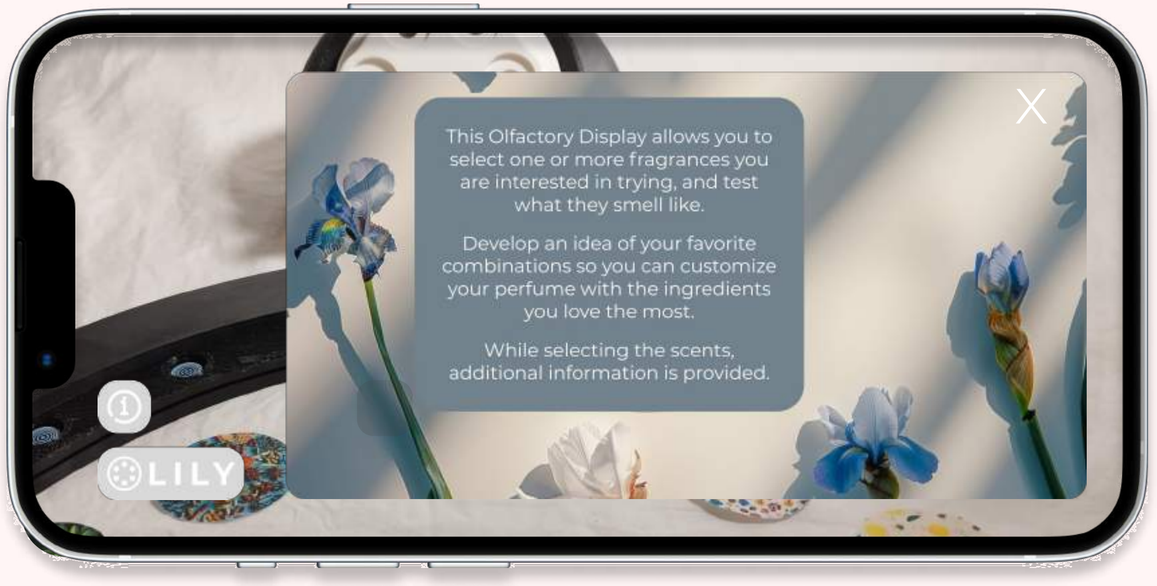
STEP VI Scent Dispersal

Once selected, the fragrant-specific atomisers are activated, dispersiong a personalised perfume.

AR EXPERIENCE



Info Panel



Project Panel

FRAGRANCES

1. Floral
Common Scents: Rose, Jasmine

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol (alcohol) for better evaporation and scent throw
- Additional Ingredients: Glycerin (for a slight moisturizing effect and improved longevity on the skin)

2. Citrus
Common Scents: Lemon, Bergamot

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol for proper diffusion and lightness
- Additional Ingredients: Water (to balance the intensity and provide a more refreshing spritz)

3. Woody
Common Scents: Sandalwood, Cedarwood

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol to help with even dispersion
- Additional Ingredients: Dipropylene glycol (DPG) for better blending and a smooth release

4. Spicy
Common Scents: Cinnamon, Clove

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol to enhance scent diffusion
- Additional Ingredients: Polysorbate 20 (to emulsify the oil and water components, ensuring consistent spray)

5. Fruity
Common Scents: Apple, Pear

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol for an effective spray and scent projection
- Additional Ingredients: Propylene glycol (to help dissolve the oils and improve stability)

6. Green
Common Scents: Cut Grass, Green Tea

- Filling Components: Essential oil or fragrance oil
- Base: Ethanol to aid in quick evaporation and clear scent presentation
- Additional Ingredients: Water (for a light, fresh finish)

Button controllers

Cards

3D objects

Floral fragrances are sensual, romantic, and suitable for both men and women. This versatile olfactory family combines well with citrus for freshness or with woody and spicy scents for intensity and mystery.

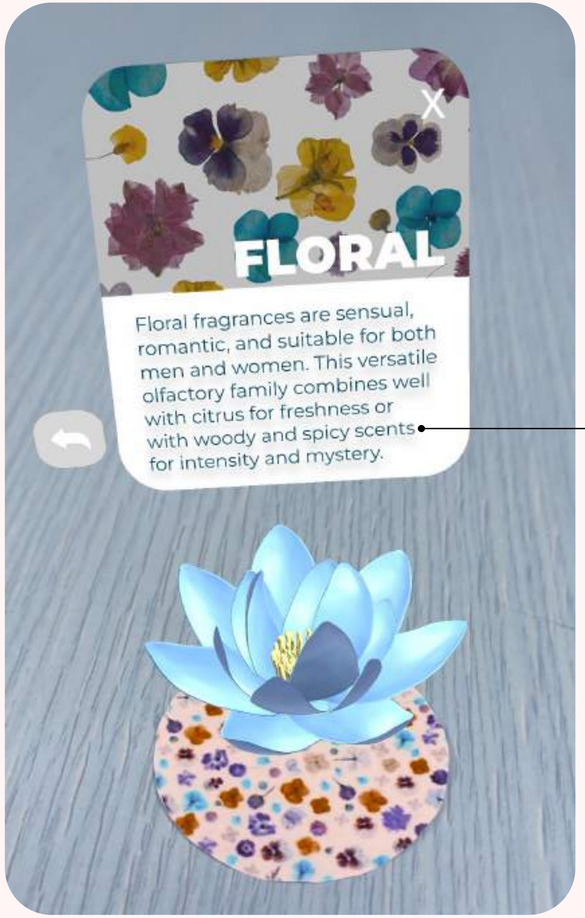
Citrus perfumes belong to the most sparkling olfactive family, creating a sensory journey of freshness, energy, and vitality.
These fragrances are made with oils derived from squeezed citrus peels.

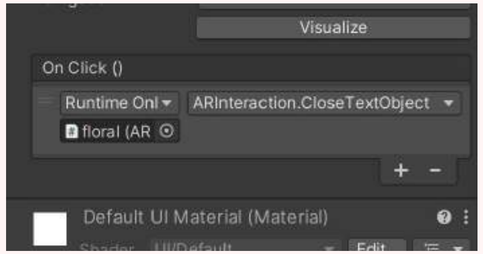
Fruity perfumes are known for their fresh, joyful notes. Modern fruity perfumes are versatile, complex, and tempting, balancing sweetness with intriguing base notes of spice and wood.

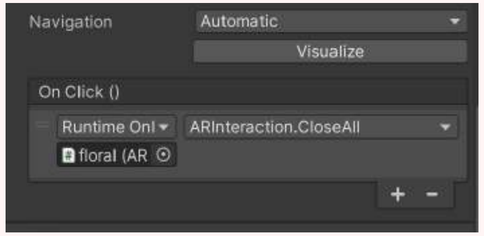
Woody scents evoke the sensations of pristine nature and a mysterious, intense opulence. Citrus notes often enhances woody fragrances, but they can be enriched by any other aroma.

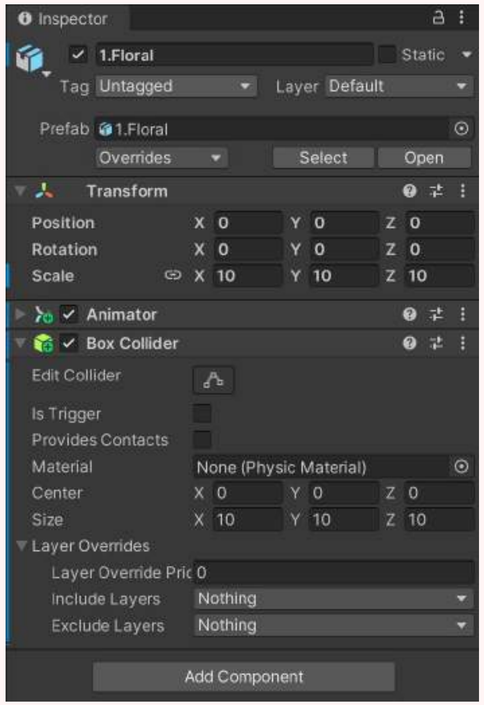
Green fragrances are clean and revitalizing, often used for daytime wear. Combined with citrus, they are refreshing and energizing. Pairing with floral notes, the freshness is perfectly well balanced.

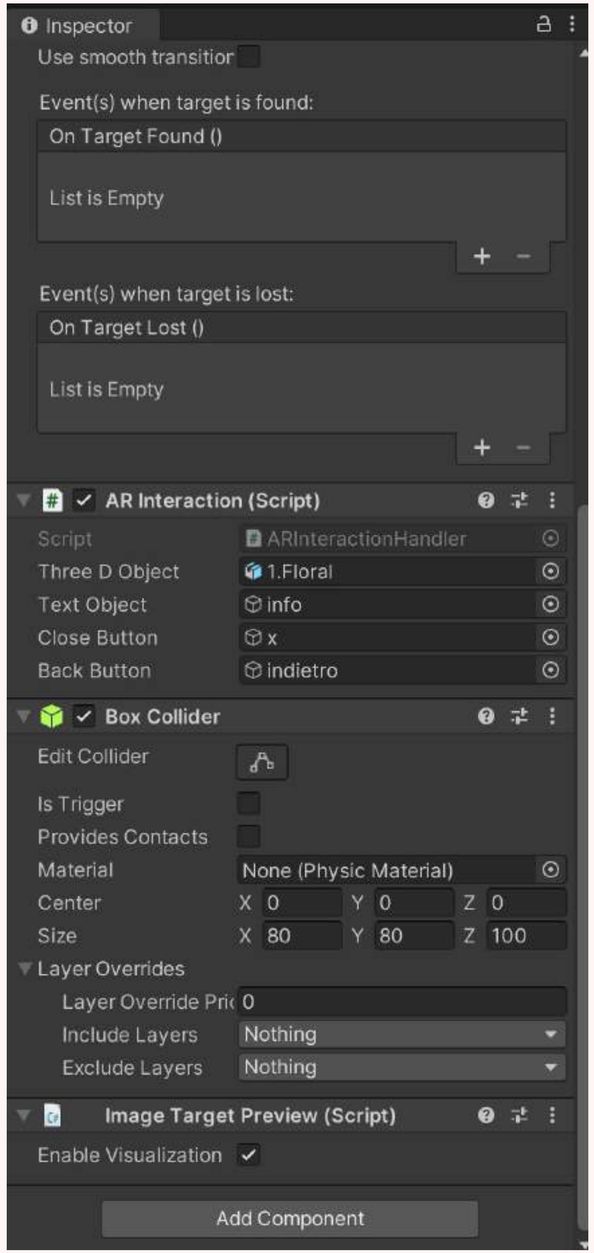
Spicy fragrances can be intense and opulent, making them challenging to wear.
Often blended with citrus and aromatic shades, spicy notes add warmth and intensity to fragrances.

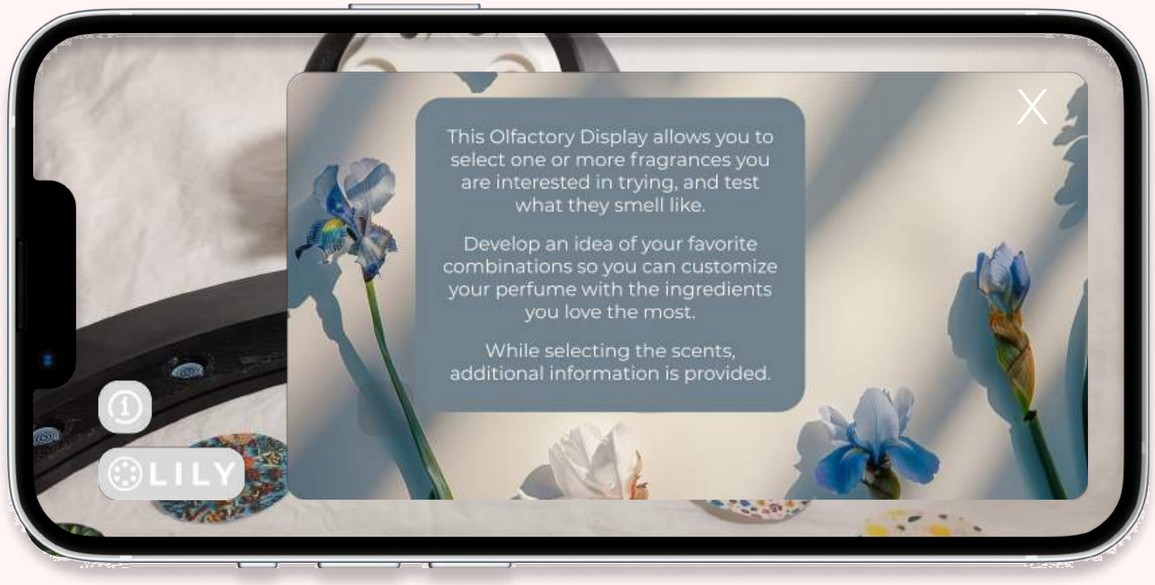

FLORAL
Floral fragrances are sensual, romantic, and suitable for both men and women. This versatile olfactory family combines well with citrus for freshness or with woody and spicy scents for intensity and mystery.


Visualize
On Click ()
Runtime Onl
ARInteraction.CloseTextObject
floral (AR
Default UI Material (Material)

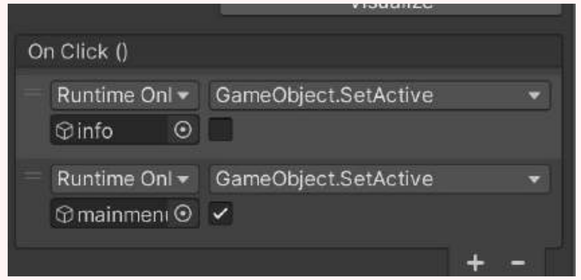

Navigation
Automatic
Visualize
On Click ()
Runtime Onl
ARInteraction.CloseAll
floral (AR

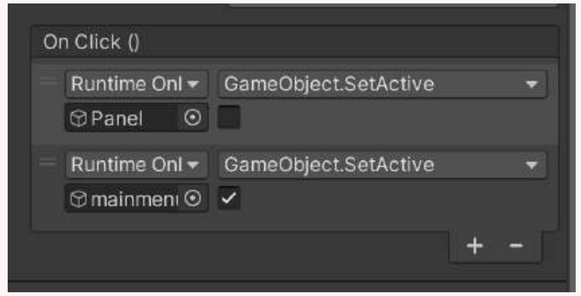

Inspector
1.Floral
Static
Tag Untagged
Layer Default
Prefab 1.Floral
Overrides
Select
Open
Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 10 Y 10 Z 10
Animator
Box Collider
Edit Collider
Is Trigger
Provides Contacts
Material None (Physic Material)
Center X 0 Y 0 Z 0
Size X 10 Y 10 Z 10
Layer Overrides
Layer Override Pric 0
Include Layers Nothing
Exclude Layers Nothing
Add Component

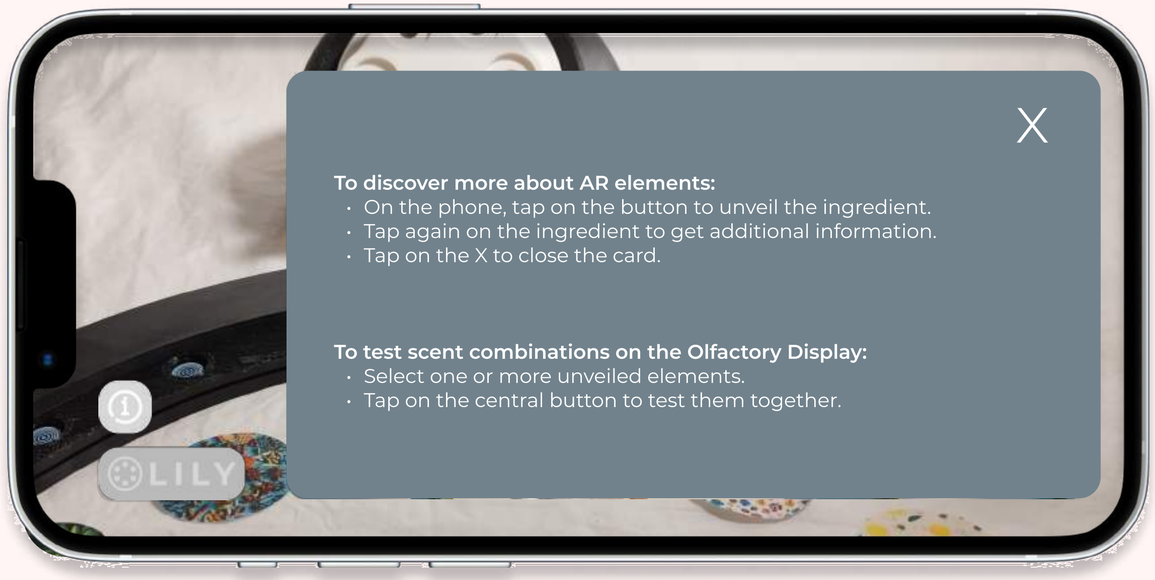

Inspector
Use smooth transitior
Event(s) when target is found:
On Target Found ()
List is Empty
Event(s) when target is lost:
On Target Lost ()
List is Empty
AR Interaction (Script)
Script ARInteractionHandler
Three D Object 1.Floral
Text Object info
Close Button x
Back Button indietro
Box Collider
Edit Collider
Is Trigger
Provides Contacts
Material None (Physic Material)
Center X 0 Y 0 Z 0
Size X 80 Y 80 Z 100
Layer Overrides
Layer Override Pri 0
Include Layers Nothing
Exclude Layers Nothing
Image Target Preview (Script)
Enable Visualization
Add Component



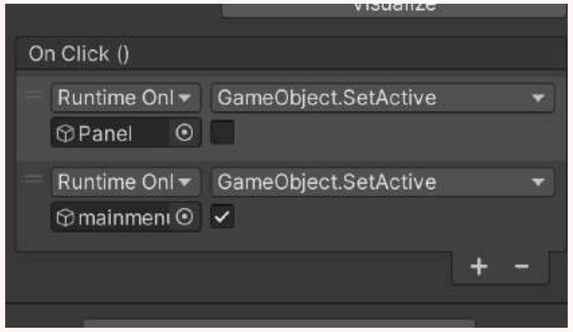
Info/Project info

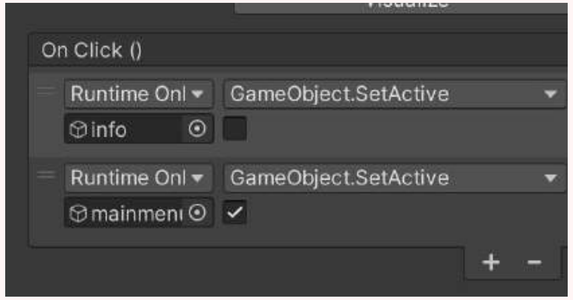






Info panel/Project panel





TECHNICAL APPROACH

Nozzle Unit

Holds the atomisers and cartridges. The Unit can be fully disassembled for easy storage, cleaning and replacement.

Main Chassis

Holds all main electronic components, such as the microcontroller, atomiser grove modules and cable connections.

Control-Board

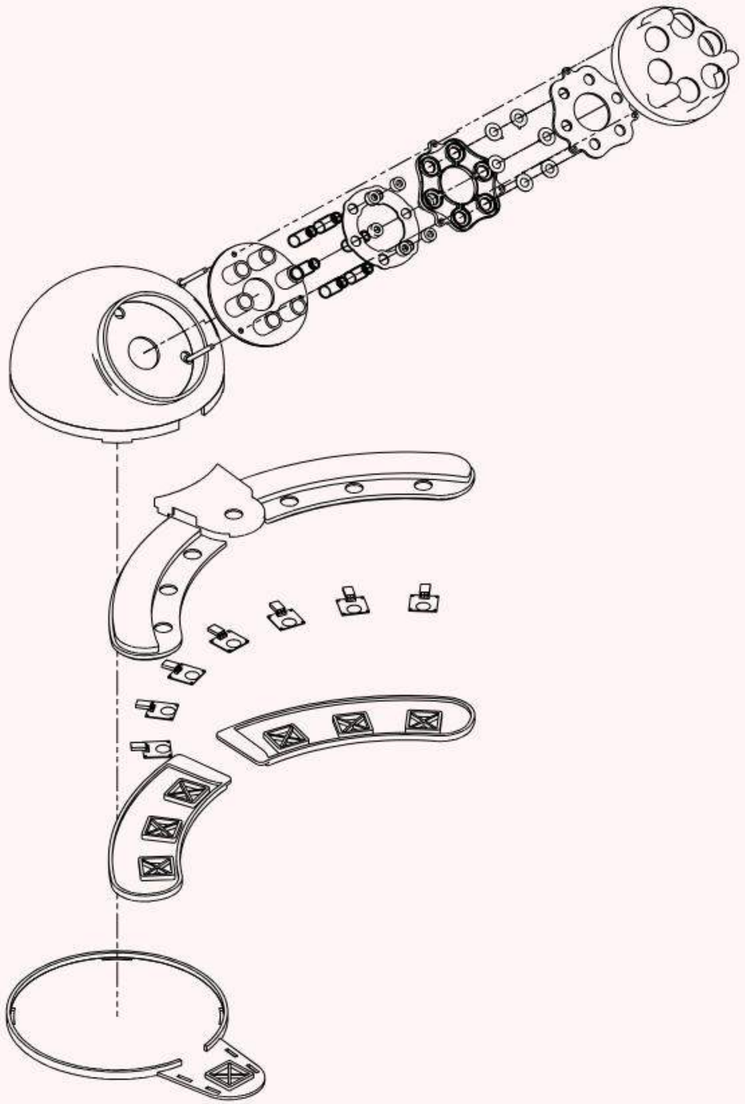
Holds the capacitive touch sensors with which the user selects the atomisers and corresponding scents. The visual cues are communicated through the AR Environment.

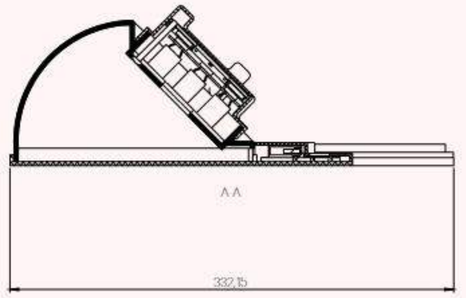
Central Touch Pad

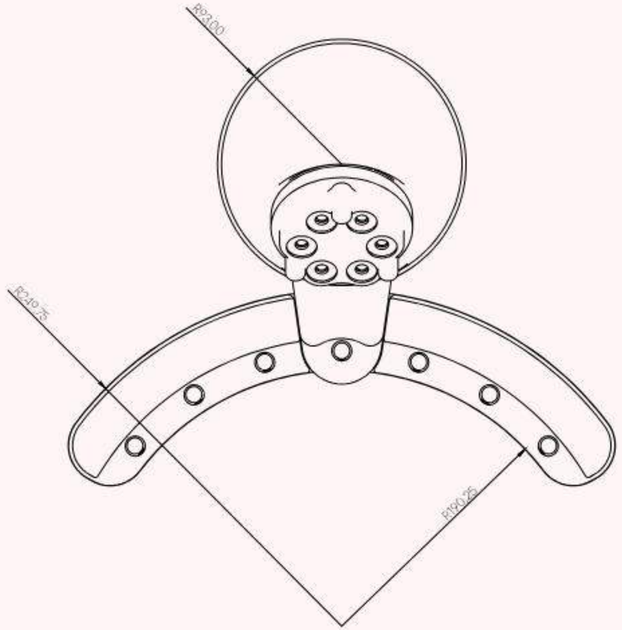
The Central Touch Button controls the atomiser dispersion. By selecting scents from its flanking console and pressing the central button, the device fires the given selection.

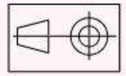
EXPLODED VIEW

TECHNICAL DRAWINGS









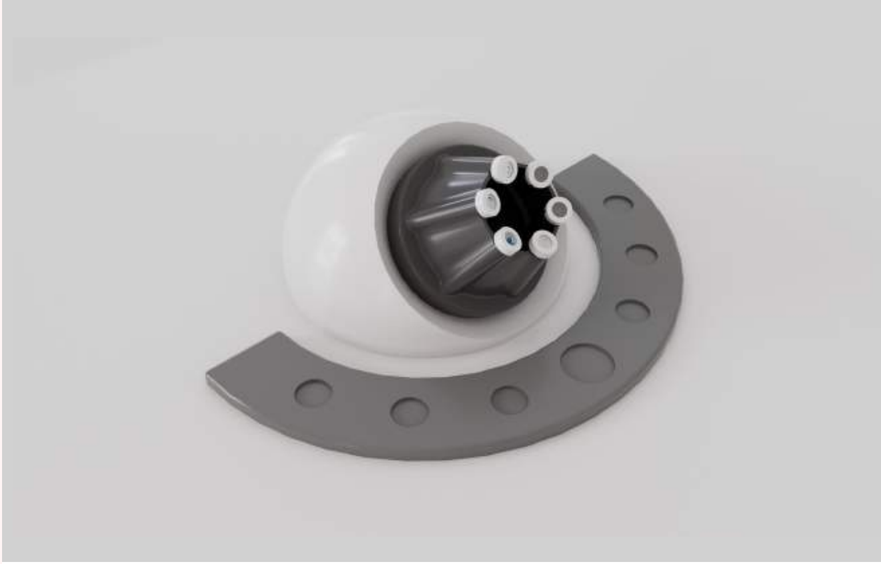
DEVELOPMENT PROCESS

VERSION I

- **Determined 45° to user**
- **Removable nozzle**
- Unnecessarily large
- No control Interface
- Inspired by Lily

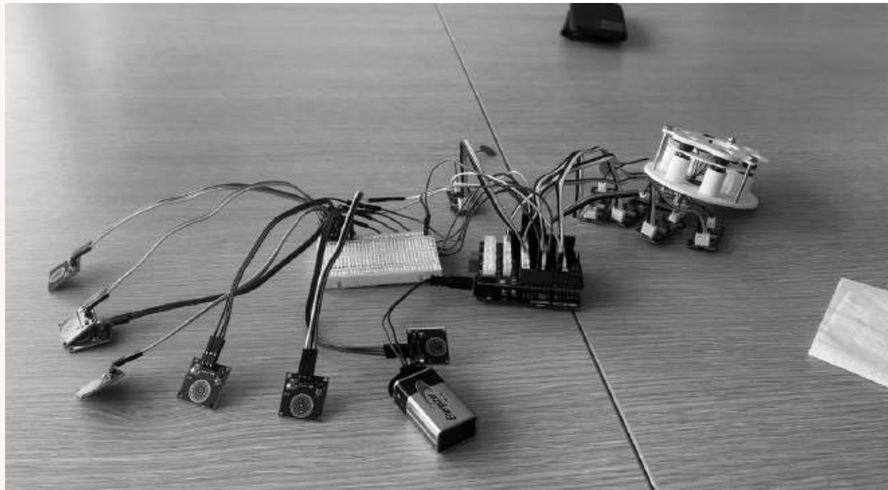
VERSION II

- **Decreased size**
- **First semi-circular interface**
- Only atomisers removable, but difficult
- Finding: 3D printed parts not suitable as cartridges
- Interface not optimal for interaction



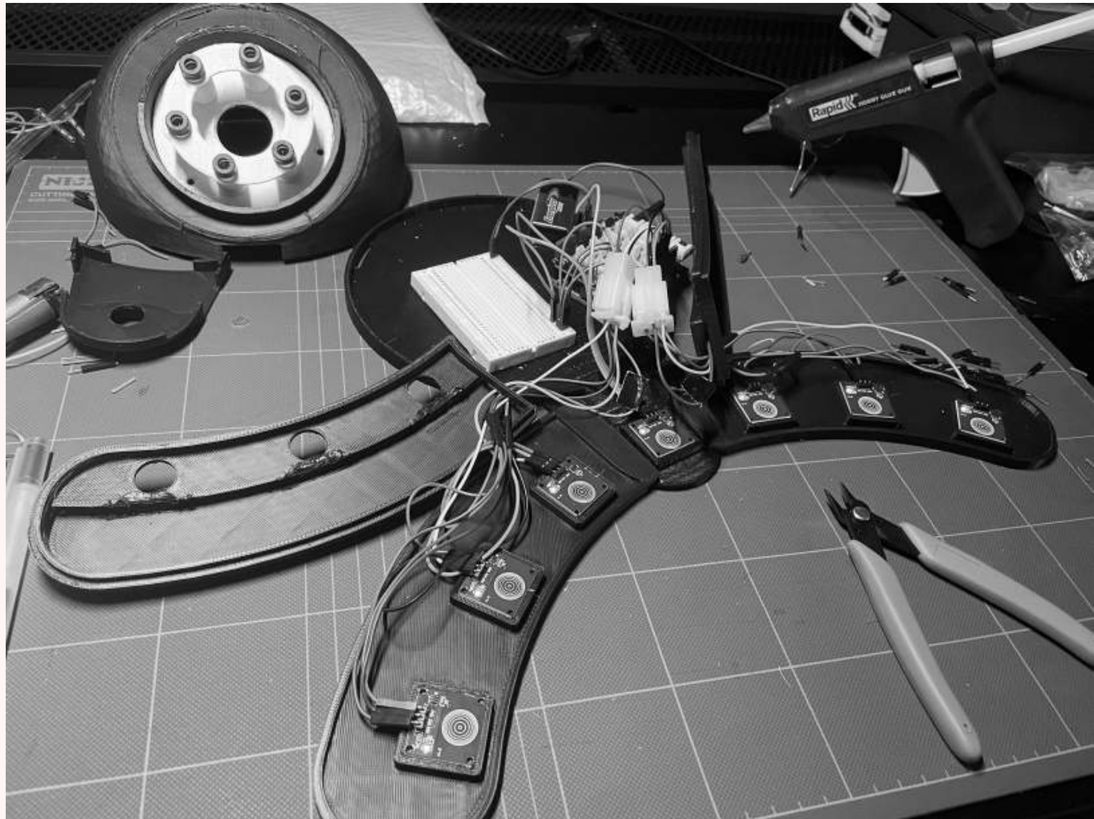
VERSION III

- **Focus on Nozzle**
- **Nozzle fixed and easily disassemblable**
- **Cartridges & atomisers can be taken out as one**
- Dimension error, atomiser caps would not press-fit
- **New Cartridges prevent spillage**
- Introduction of capacitive touch sensors
- **Success:** First successful code test with all components



VERSION IV

- Final Design
- Integration of all components in 3D-printed hull
- **New atomiser plate keeps them in place**
- **Control-Board split in 2** & connected by single plug for easy disassembly
- **Nozzle Cap hides screws**
- **Press-fitted design for easy separation**
- **Successful code test with all components**



OLD

NEW

VIDEO 2

THANKS FOR YOUR ATTENTION