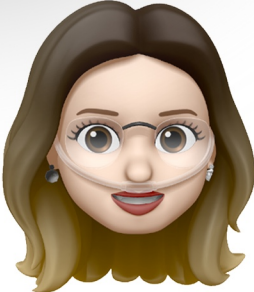




PERCEPTION
DEATH FLASHBACK



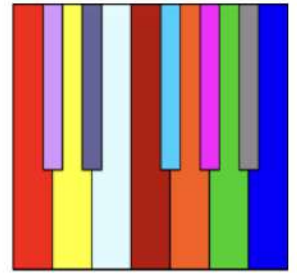
Carpe diem

Data & Paper

SYNAESTHESIA

Synaesthesia is a perceptual phenomenon in which stimulation of one sensory or cognitive pathway leads to involuntary experiences in a second sensory or cognitive pathway.

In layman's terms: indicates that a sensory stimulus or cognitive pathway spontaneously and involuntarily elicits another perception or awareness.



THERE ARE TWO OVERALL FORMS OF SYNESTHESIA

- Projective synesthesia: seeing colors, forms, or shapes when stimulated (the widely understood version of synesthesia)
- Associative synesthesia: feeling a very strong and involuntary connection between the stimulus and the sense that it triggers.



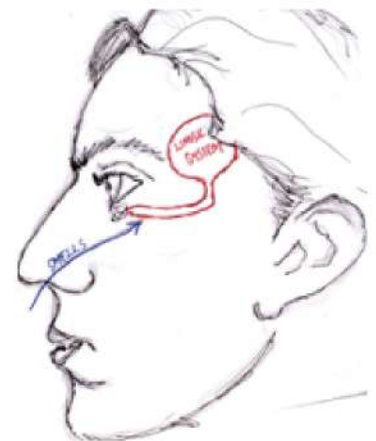
ESSAY ON THE SENSE OF SMELL

SMELL AND COLOR

Superior olfactory language and cognition in odor-color synaesthesia.

“In the present study we demonstrate odor cognition is superior in odor-color synaesthesia, where there are additional sensory connections to odor concepts.”

The sense of smell is closely linked with memory, Marcel Proust, in his book “A Recherche Du Temps Perdu”, (translated as either ‘Remembrance of things Past’ or ‘In Search of lost Time’), wrote that a bite of a madeleine cake vividly recalled childhood memories of his aunt giving him the very same cake before going to mass on a Sunday. The part of our brain that deals with the process of smell is in close proximity to the part that processes memories. So triggering the human sense of smell can take somebody back to an old memory.



SMELL AND EMOTION

In addition to being the sense most closely linked to memory, smell is also highly emotive. The perfume industry is built around this connection, with perfumers developing fragrances that seek to convey a vast array of emotions and feelings; from desire to power, vitality to relaxation.

THE SENSORY INTERACTION BETWEEN SMELL AND TASTE

Smell and taste receptors are located near each other and interact closely.

SMELL AFFECTS VISION

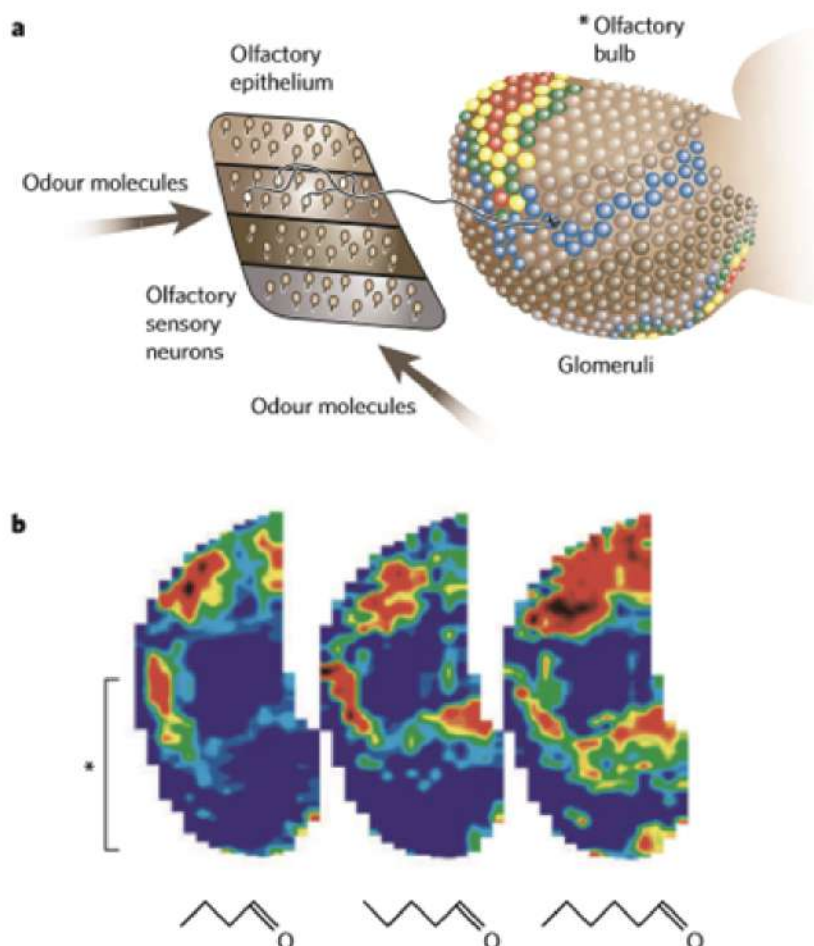
We tend to think that vision tends to dominate smell; usually what we see influences what we smell. Researchers have found evidence to the contrary: smell can influence visual perception. <https://www.nature.com/articles/466162e>

THE CROSS-ASSOCIATION BETWEEN SMELL AND SIGHT

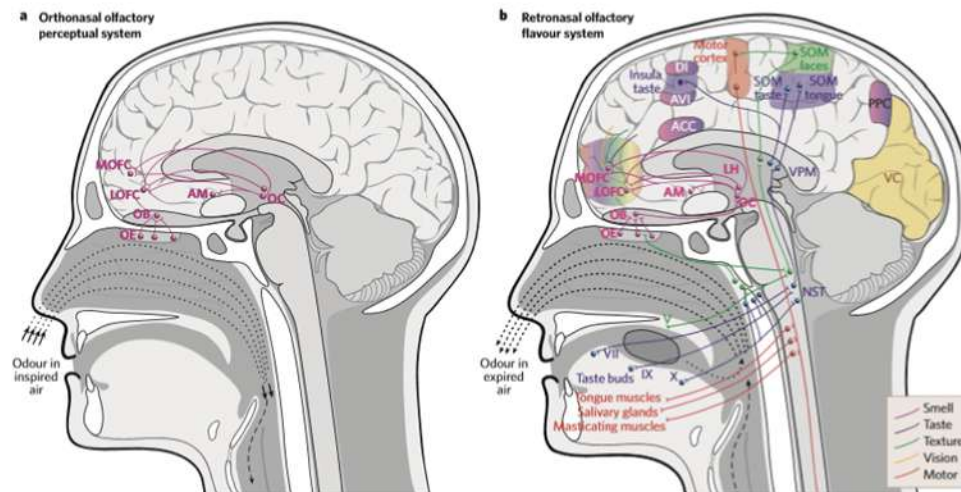
Odours can affect visual processing by attracting attention to the possible odour source and by facilitating its identification.

THE PRINCIPLE OF HUMAN PERCEPTION OF SMELL

Odors have the powerful ability to spark off vivid emotional autobiographical memories (Chu & Downes, 2000). After an odor has been associated with an emotional experience, it is able to evoke the associated emotions when later encountered, which in turn can lead to an alteration of thoughts and behavior (Epple & Herz, 1999; Millot & Brand, 2001).



Odors seem to trigger physiological effects and induce activation or relaxation states by provoking changes in physiological parameters such as heart rate or skin conductance (Alaoui-Ismaili, Robin, Rada, Dittmar, & Vernet-Maury, 1997; Alaoui-Ismaili, Vernet-Maury, Dittmar, Delhomme, & Chanel, 1997; Bensafi et al., 2002a, 2002b; Delplanque et al., 2009; Ilmberger et al., 2001). Odour stimulation of olfactory sensory cells in the nose involves odour molecules interacting with olfactory-receptor proteins (Shepherd, 2006).



The axons of sensory neurons in the olfactory epithelium project to the olfactory bulb, where they converge onto modules known as glomeruli (Fig. a).

The olfactory system thus resembles other sensory pathways in that it uses activity patterns in two-dimensional neural space to represent its sensory modality. And such patterns, analogous to those of other sensory systems, constitute ‘odour images’, or ‘odour maps’.

Work on tracing the connections in the olfactory bulb is revealing the distributed circuits that process the images¹⁵. These allow two-dimensional images (Fig. b) to encode the multidimensional odour space inherent in the complex structures of odour molecules. This principle of odour-molecule representation by glomerular activity patterns applies across phyla¹⁶ (Shepherd, 2006).

Case study

I.BRAIN SMELLS (BCI LAB, BIT STUDIO, NOSE STORY)

Interactive installation visualizing brain activities stimulated by scents.



ABOUT THE PROJECT

Although scents have the power to instantly bring back our memories, take us on a journey and even make us want to stop breathing, we have never taken a proper look at its influences on us.

Brain Smells is a collaborative project between scent designers (NOSE Story), brain computer interface engineers (BCI Lab, Mahidol University) and creative technologists (Bit Studio) for TEDxBangkok 2017. The project sets out to explore the influence of scents on our emotions and creative means to express it. Each participant is asked to plug in brain sensors, go through a 10 second calibration process and smell 3 scents designed to bring out different emotions. The brainwaves are then visualized in a formless liquid format using color and surfactant drops on milk basins.

The abstract morphing visuals represent the transitory qualities of scents and emotions. Each color represents an associated emotion – ‘red’ for stress, ‘yellow’ for creativity, ‘blue’ calm and relaxation. Surfactant which causes the ‘disperse’ motion for when the participant tries to recall memories and or uses imagination (active communication between the two hemispheres).

2. DESSINE MOI UN ARC-EN-CIEL(“DRAW ME A RAINBOW”)

“Dessine moi un arc-en-ciel” (“Draw me a rainbow”) is an olfactory installation by artist Esmeralda Kosmatopoulos that invites visitors to explore the concept of color beyond its visual dimension.



ABOUT THE PROJECT

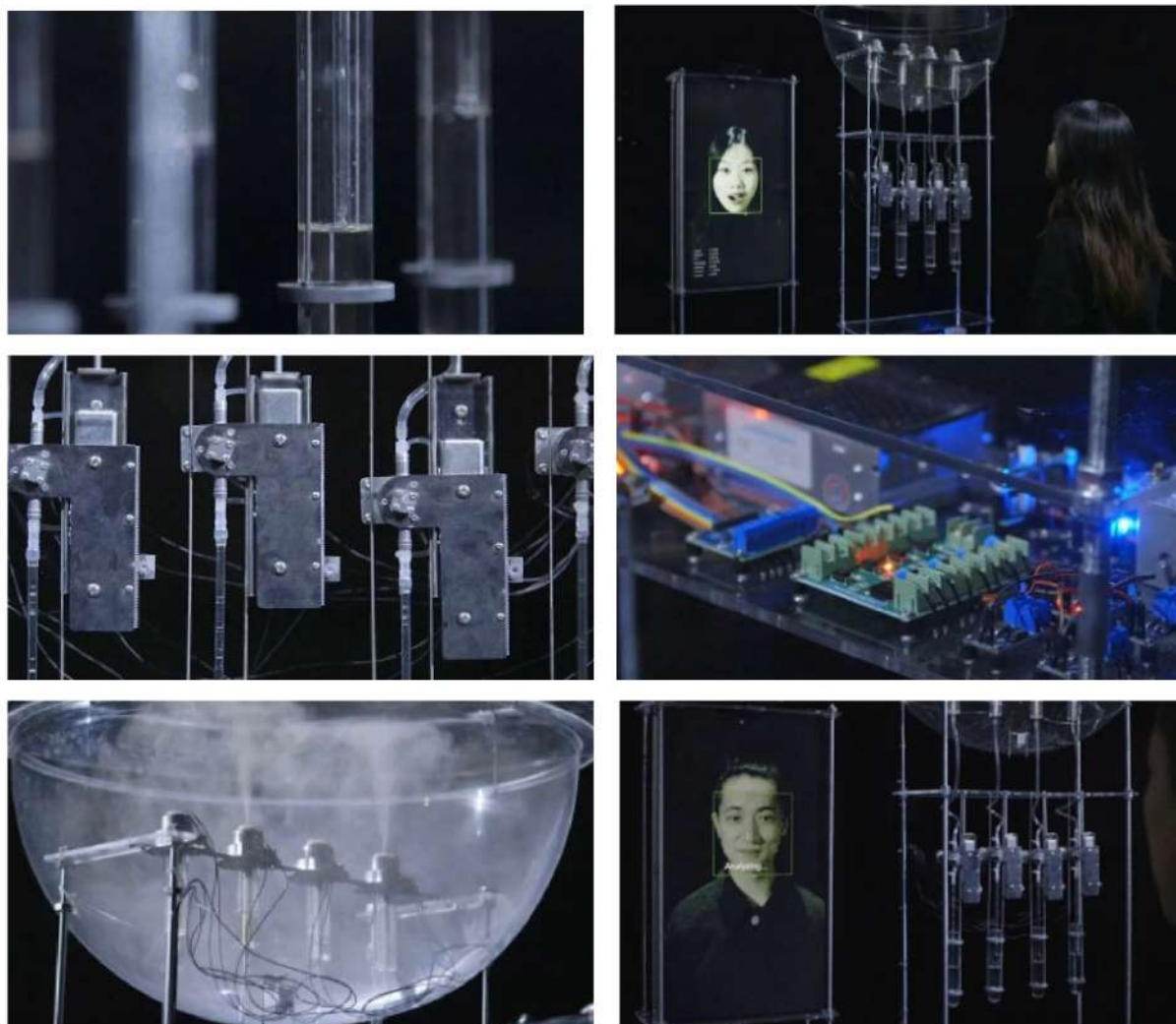
Much more than a simple visual attribute, colors carry in them a vast universe of symbols and mental associations acquired over time. Culture, religion, language along with personal sensory experiences and memories are all elements that affect our perception of them as concepts and allow us to give them meaning. Kosmatopoulos worked with visually impaired participants and perfumers to create a scent for each of the seven colors of the rainbow.

The title refers to the famous phrase repeated over and over by the little Prince in the book of Saint Exupéry, "please...draw me a sheep". Like the narrator in the Little Prince, “Dessine moi un arc-en-ciel” proposes to put the colors inside "imaginary boxes".

The purpose of the project is not to create a universal smell of colors but to encourage viewers to engage in an internal travel in time and space through the odors that will revive olfactory memories – memories about childhood, travels, readings, dreams and loved ones... attached to their personal history – opening a dialogue freed from any visual limitation. Going through this immersive experience, the question remains: “What colors means to me?”

3. SYNAESTHESIA MACHINE

The work is an artificial intelligence with synesthesia, which emits a corresponding unique smell while perceiving human expressions. Through the equipped expression recognition algorithm, it can analyze the facial expressions of the audience and output the values of different emotions. At the same time, based on these emotional values, the device is driven to extract different proportions of odor liquid atomization and mixing, and convert the audience's expressions into a unique smell.



ABOUT THE PROJECT

"Synesthesia" consists of two parts: the image acquisition device on the left and the odor generation device on the right. When the audience walks into the image collection area and stays for 3 seconds, the camera will take a photo of the audience's face and input it into an artificial intelligence program to analyze the audience's expression in the photo.

The test tubes in the odor generating device on the right are filled with liquids of woody, chemical, fruity and foul odors, respectively. The program will drive the device to operate and draw different proportions of odor liquid to the test tube above based on the result of expression analysis, spray the flavor through the atomization device and mix it in the hemisphere. Finally, the fan is turned on to blow out the mixed scent based on the audience expression data.

INTRODUCTION & TECHNOLOGY

The expression recognition code in the work is completed by combining TensorFlow and OpenCV, which can analyze the facial expressions in the image and output the proportion value of different emotions. These values are linked to the scent generation part of the device, and the Arduino receives different emotional data from the facial expressions of the audience through the Bluetooth module, and uses it to drive the operation of the entire main device.

Hu Shuai's work "Synesthesia" connects the AI expression recognition algorithm with the smell synthesis device, forming a connection between expression and smell, and interpreting the expressions of the participating audience and the emotions contained in the expressions through the dynamically synthesized smell. Formed a "smell" phase" synaesthesia behavior. This participatory and humorous work tries to awaken the dusty synesthesia genes in the audience, and constructs new synesthesia reactions through the intervention of technology.

4. 22-MOLECULAR COMMUNICATION

22-Molecular Communication (2019) is an odor landscape created by SisselTolaas based on the history of Berlin's Mullerstrasse neighborhood. The glass bottles give off steam, and each contains authentic scents from a different nearby location, such as a polluted power plant, nearby vegetation, and the leather scent of a tannery.



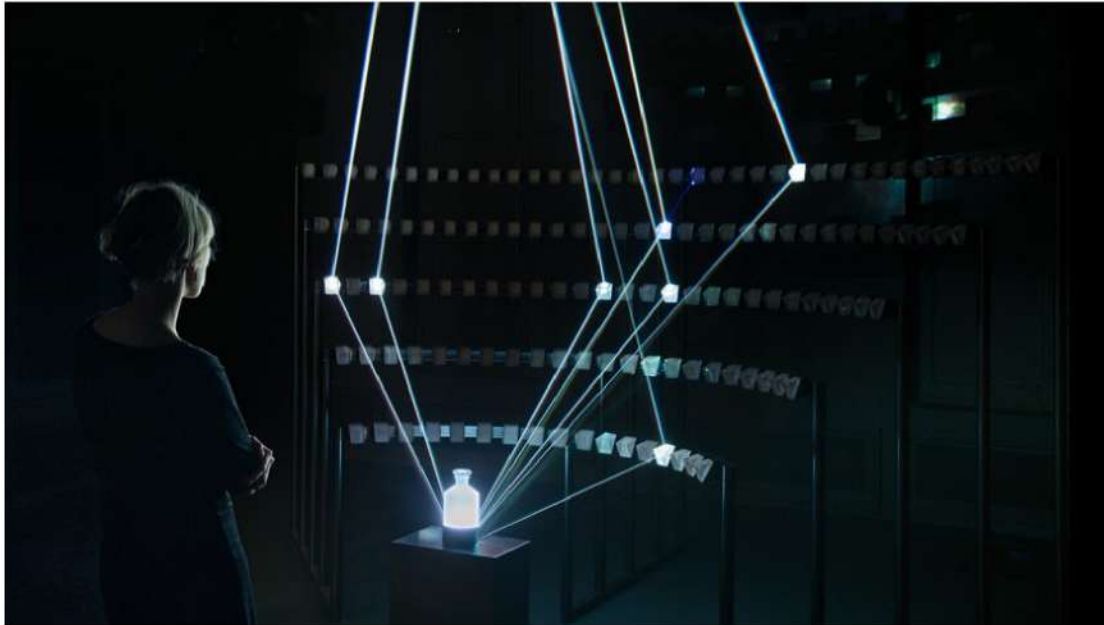
ABOUT THE PROJECT

Viewers are encouraged to smell unique odor molecules or complex molecular compounds, and they can smell the history of the Mullerstrasse neighborhood through the installation. The charm of this project is that the abstract glass bottle installation brings the audience back to a moment in the history of Berlin. She uses scent to recreate the historical scene, allowing the audience to experience the memory of the era in a specific period.

Additionally, her work explains to the viewer why each scent is the way it is, all from being part of the community, from different historical objects. She invites the viewer to experience the scents and to know that they are part of the history of the place, and when Sissel Tolaas's work brings this knowledge to the viewer, the viewer is given a way to make a new connection with the project.

5. SCENT CONSTELLATION

The multi-sensory art installation "Scent Constellation" designed by British artist Jason Bruges uses visual art to three-dimensionally show the process of fragrance production. The prism emits melodious notes and refracts dazzling beams of light, like constellations shining in the night sky. And each light beam represents a fragrance raw material, with light and shadow vertical and horizontal, just like a perfumer mixing various raw materials together.



ABOUT THE PROJECT

Experiencing Jason Bruges' installation at Le Grand Musée du Parfum, viewers will see a "perfume organ" depicted by 200 optical prisms, connected directly to 200 sounds representing the aromatic palette of raw ingredients, from bergamot oil to Synthetic Musk and Violet Leaf. These notes respond in the way of a traditional perfume pyramid: top notes are ephemeral, middle notes last longer, and base notes provide lasting emotion.

The sounds of the ingredients are artfully "mixed" together to create 5 different musical compositions of the fragrance: Eau de Cologne, Ambrée, Fougère, Floral and Chypre. "In the museum, these olfactory mini-symphonies play in harmony with light, as each ingredient in the fragrance formula is triggered by a laser beam hitting a prism, which then catapults into and illuminates the center section of the glass bottle, where bottling ends. Works. Poetic audio-visual metaphors for imagining the process of a new fragrance.

6. SCENT CONSTELLATION

Dispersions 0.2, exhibited at the 14th Croatian Sculpture Triennial at the Croatian Academy of Arts and Sciences.



ABOUT THE PROJECT

0.2 is a multi-sensor ambient sound wave installation, which changes the perception experience of the observer in the actual space by exploring the connection between sound, wind, fog, motion and space, thereby enriching the new meaning and content of space in In this installation, Alex created the possibility of synchronized movement of ventilators and nebulizers with music, in order to bring the audience closer to sensory synaesthesia. The result of the exploration is the connection between digital sound and its physical representation in space.

7. SMELL MEMORY ARCHIVE

There are five types of memories that people trigger with smells: connect the past with smell, associate a scene/situation with a smell, associate an object with a smell, associate someone with a smell, associate a certain emotion with a smell.



ABOUT THE PROJECT

The magic of smell is that it can carry vital life memories, just like a powerful memory storage chip. Different scents can evoke wonderful moments in people's lives, instantly pulling our feelings and emotions back into that scene.

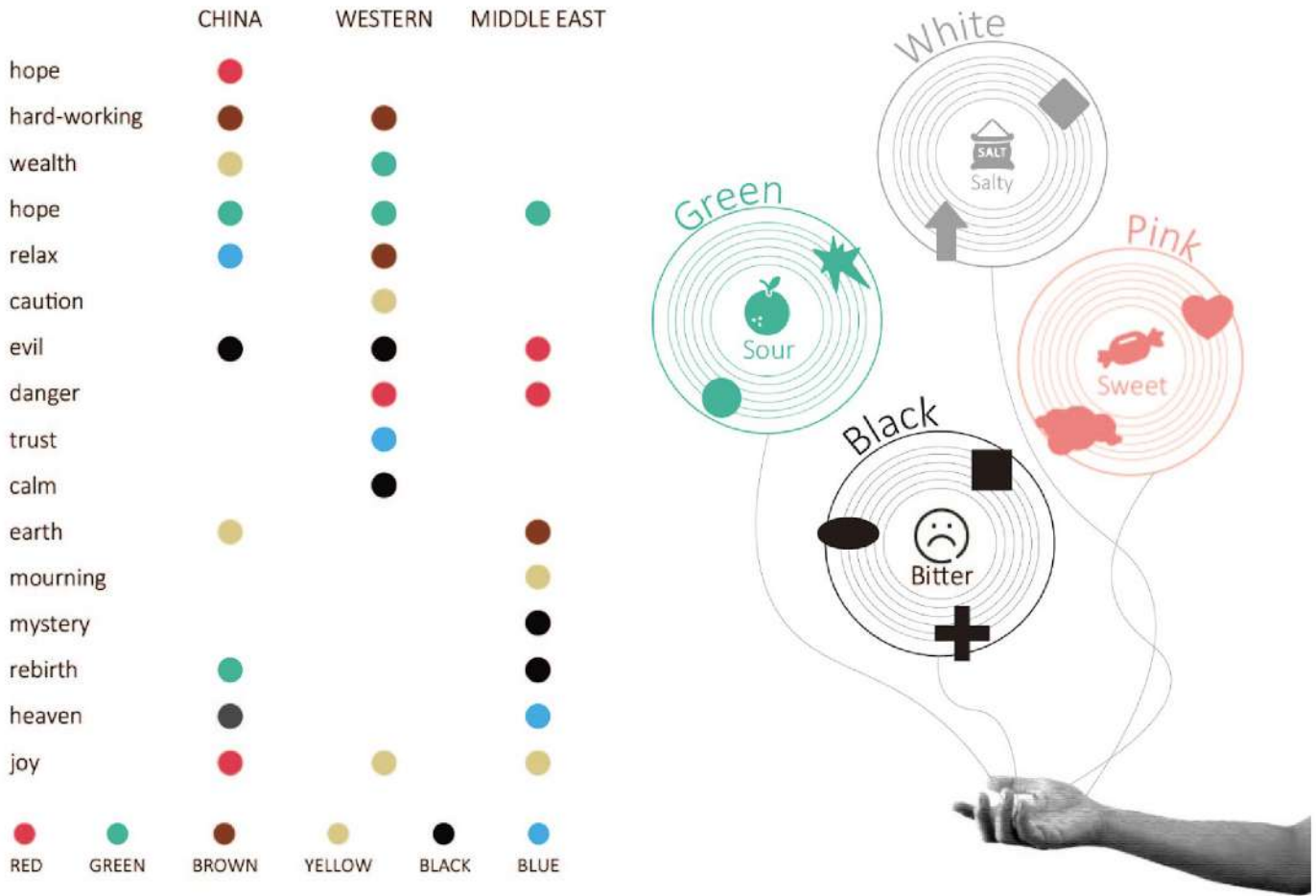
In general, people's memories of smells are unique and subjective. However, some memory descriptions of smells overlap (for example, many people associate the smell of aloe vera with hair). The most frequent key word in memory descriptions was "childhood", which shows that smells are more likely to induce people's long-term memories.

Some smells are more likely to trigger memories of a person (for example, the smell of powder musk triggers memories of a person in most audiences)

Some smells are more likely to trigger memories from the past (for example, the smell of toffee triggers childhood memories in most people)

When listeners associate the past and people with a certain smell, it is always accompanied by words related to mood and emotion (for example, when people refer to their family, emotions of joy and happiness are expressed).

DATA COLLECTION AND VISUALIZATION



He, G. (2009). English and Chinese cultural connotation of color words in comparison. *Asian Social Science*, 5(7), 160-163.

Wan, Xiaolang et al. "Cross-Cultural Differences in Crossmodal Correspondences Between Basic Tastes and Visual Features." *Frontiers in psychology* 5 (2014): 1365-1365. Web.

Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2014.01365/full>

CONCEPT DESIGN

Theme: Death flashback

Location: In the Dark, huge room, the Dark room

Experience: There are five screens (dark state),

The light guides the experiencer, the light looks at the picture/video

displayed (which can be abstracted), and the fragrance and sound are

released simultaneously. After looking at the five images, people finally

saw themselves in the mirror. (Big mirror, Carpe Diem stickers)

Educational significance: Cherish the present, cherish the beauty of life now.

Educate people: Everyone

PHASE & NODE:

1. Born (positive, sunshine and vitality) : disinfectant (hospital), milk smell, soap, childhood, candy, leaves, grass smell

2. Eighteen (wasteful, romantic) : smoking, drinking and falling in love (rose, chocolate)

3. Family (warm and cozy) : food smell, charcoal

4. The Old (lonely) : rain, cool

5. Dying (negative, helpless, regret, relief) : old smell, disinfectant smell, blood smell, pills (scenery: final stage, hospital bed, curtain)

USER JOURNEY MAP

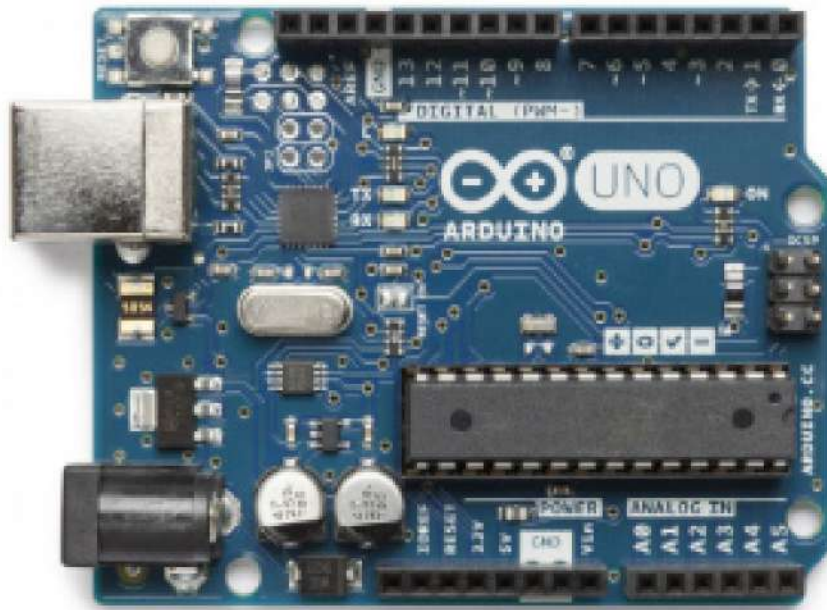


Technical Aspect

I.I Digital Tech

I.I.I Control lights and smell with Arduino

Arduino is an open-source electronics platform based on hardware and software. It is designed to make the process of creating interactive electronic projects accessible.



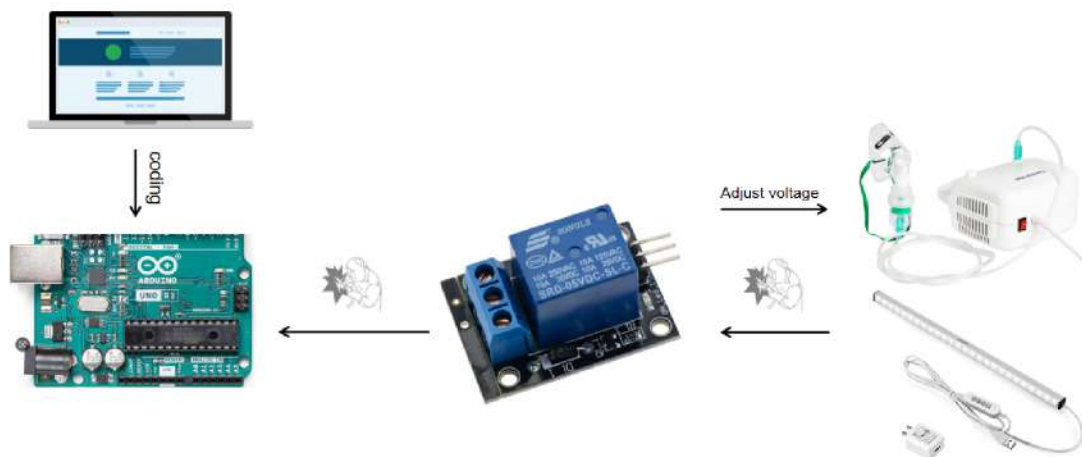
Arduino plate

Arduino boards are small computers that can read inputs (such as from sensors or buttons) and control outputs (such as lights or motors). They are programmed using a simplified version of C++, making it possible to write code and create projects that interact with the physical world.

For controlling and realizing automation:

1. Gather the necessary materials: You will need an Arduino board, a relay module, a power source (such as a battery or wall adapter), light bulbs or LED strips, and a fragrance dispenser (such as a nebulizer or diffuser).
2. Connect the relay module to the Arduino board: The relay module is an electronic switch that allows the Arduino to control high-power devices, such as lights and fragrance dispensers. You will need to connect the relay module to the Arduino board using jumpers and follow the wiring diagram provided by the manufacturer.

3. Write the code: You can use the Arduino Integrated Development Environment (IDE) to write the code that will control the lights and fragrance dispenser.



Connection Diagram

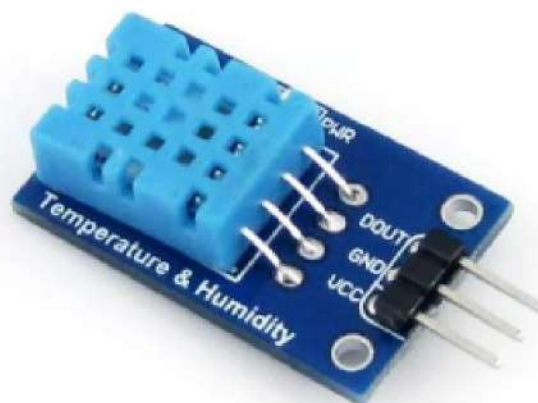
4. Connect the fragrance dispenser. Use a similar approach to control the fragrance dispenser, using the relay module to turn it on and off, or use the delay() function to control the duration and frequency of dispensing.

5. Upload the code to the Arduino board.

6. Test the project: Once the code is uploaded, connecting the power source and test the project.

For developed options:

Arduino can connect infrared sensors, humidity sensors, temperature sensors, contact sensors, etc. The principle is to input sensor data into computer programming ide, then calculate the data, trigger different effects, and then send it back to arduino, and then control the electrical signal output through arduino, Connect hardware, control hardware switch or run speed.



Humidity sensor

1.1.2 Coding for Arduino

Using the Arduino Integrated Development Environment (IDE) to write the code that will control the lights and fragrance dispenser. Using the `digitalWrite()` function to turn the relay on or off, and the `delay()` function to create a pause between actions. For example, the following code will turn on the light for 5 seconds and then turn it off:

```
void setup()
{
    pinMode(13, OUTPUT);    // Configure the mode of the pin
}

void loop()
{
    digitalWrite(13, HIGH); // turn the relay on
    delay(5000);            // create a pause between actions
    digitalWrite(13, LOW);  // turn the relay off
    delay(1000);           // create a pause
}
```

Initial code implementation

In addition to directly controlling the brightness of the LED lights, a more advanced technology is to add sensors between the arduino and the hardware, such as using an infrared sensor to control the lights. When people approach, the lights become brighter, and when people walk away, the lights dim. Or connect the infrared sensor to the aromatherapy machine, when people approach, the machine will start to work and release the fragrance.

```
void setup()
{
    pinMode(relayPin, OUTPUT); // Set the relay pin as an output
    pinMode(irSensorPin, INPUT); // Set the IR sensor pin as an input
}

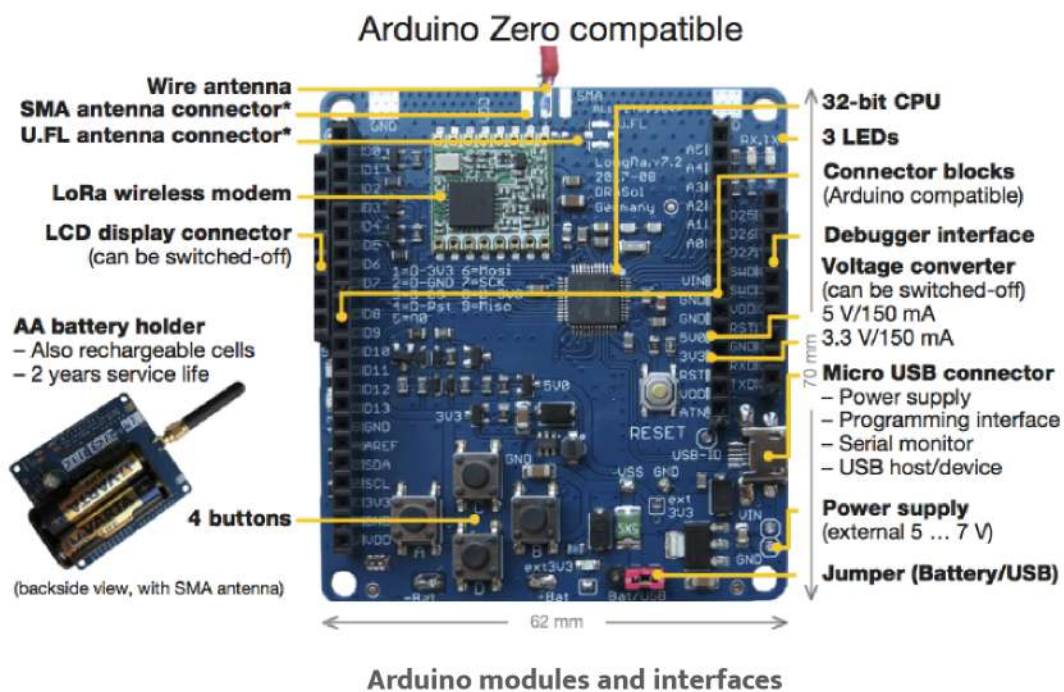
void loop()
{
    int irSensorValue = digitalRead(irSensorPin); // Read the IR sensor value

    if (irSensorValue == HIGH)
    { // If the IR sensor is triggered
        digitalWrite(relayPin, HIGH); // Turn on the relay (lights)
    }
    else
    {
        digitalWrite(relayPin, LOW); // Turn off the relay (lights)
    }
}
```

Infrared sensor controls lights

1.1.3 Circuit commissioning

1. Gather the components: Including the Arduino board, power supply, sensors, actuators, breadboard, jumpers, and any other necessary components.
2. Plan the circuit: Sketching out the circuit on paper or using a circuit diagram tool. Visualizing the connections and ensuring everything connected correctly.
3. Connect the components to the breadboard: Start by inserting the components into the breadboard, making sure that each component is in the correct position and orientation.
4. Connect the power supply: Connect the power supply to the breadboard, either using a battery or a wall adapter. The positive lead of the power supply should be connected to the + rail on the breadboard, and the negative lead should be connected to the - rail.



5. Connect the sensors and actuators: Connect the sensors and actuators to the breadboard, follow the correct pinout and wiring diagram for each component.
6. Connect the Arduino board: Connect the Arduino board to the breadboard. Connect the ground (GND) and 5V power pins from the Arduino to the corresponding rails on the breadboard, and connect the data pins from the sensors and actuators to the appropriate digital or analog pins on the Arduino.
7. Test the circuit: Test the circuit by uploading a basic sketch to the Arduino and observing the behavior of the sensors and actuators.

1.1.4 Audio

Sound Design

Born

Born, a word that symbolises the beginning of a new journey, the inception of life. It is a word that carries with it a sense of excitement, hope, and promise. Born is a word that captures the essence of change, the transformation from the unknown to the known. It is a word that embodies the power of creation, the spark of life that sets us on a path to explore, to learn, and to grow. Born is a word that is filled with mystery, wonder, and the boundless potential of the human spirit. It is a word that inspires us to embrace the unknown, to embrace the future, and to be born anew.



Eighteen



18 years old, a milestone that marks the transition from adolescence to adulthood. It is a number that symbolises the passage of time, the accumulation of experiences, and the growth that comes with age. At 18 years old, one is no longer a child, but rather a young adult, with the responsibilities, freedoms, and opportunities that come with this new status. 18 years old represents the end of one chapter and the start of another, filled with uncertainty, possibilities, and the chance to forge a path of one's own making. This number holds a sense of both excitement and apprehension, as it ushers in a new era of self-discovery and independence. At 18 years old, one is ready to take on the world, ready to make their mark, and ready to live life to the fullest.

Family

Family, a word that evokes a sense of love, belonging, and security. It is a word that represents the bonds that connect us to one another, the ties that hold us close even when we are apart. Family is a word that encompasses the essence of what it means to be human, to share our lives with others, and to find comfort in their presence. Family is a word that defines who we are, where we come from, and what we value. It is a word that represents a rich tapestry of relationships, experiences, and memories that weave together to form the fabric of our lives. Family is a word that inspires us to love unconditionally, to forgive readily, and to support each other through thick and thin. It is a word that is synonymous with home, with warmth, and with the comfort that comes from knowing that we are never truly alone.



The Old



Old, a word that can carry with it a sense of negativity, of decline, and of the loss of vitality and purpose. It is a word that speaks to the fear of growing older, to the anxieties that come with the passage of time, and to the sense of impermanence that pervades the human experience. Old is a word that represents a decline in physical abilities, a loss of vitality and energy, and a growing sense of isolation and loneliness. It is a word that touches on the fear of becoming irrelevant, of being forgotten, and of losing touch with the world around us. Old is a word that can evoke feelings of sadness, fear, and uncertainty, reminding us of the transience of life and of the fragility of our existence.

Dying

Dying, a word that can carry with it a sense of fear, of loss, and of the unknown. It is a word that represents the end of life, the conclusion of our time on this earth, and the farewell to all that we hold dear. Dying is a word that touches on our deepest fears and anxieties, reminding us of the fragility of our existence and the transience of life. It is a word that speaks to the loss of control, the sense of abandonment, and the fear of the unknown. Dying is a word that can evoke feelings of sadness, anger, and despair, as we are forced to confront the fact that one day we too will pass on, leaving behind a world that will continue to spin without us.



Ambisonic Tech

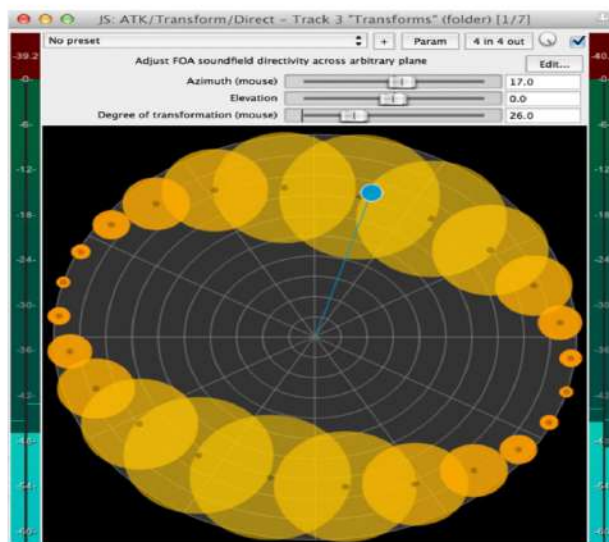
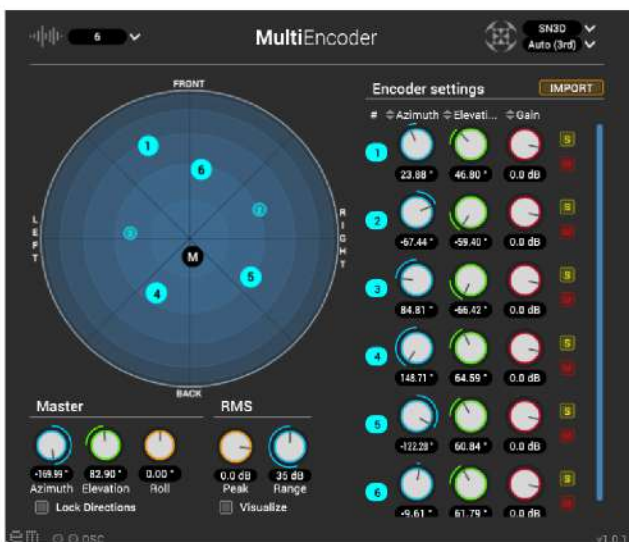
Ambisonics is a full-sphere surround sound technology that can provide a more realistic and immersive listening experience compared to traditional stereo or surround sound formats.



Ambisonic in reaper

In Ambisonics, sound is captured or created using a multichannel approach that represents the sound field in a full sphere around the listener. The information captured in this way can then be decoded and played back through multiple speakers to create a 3D sound field that accurately represents the spatial information of the original sound.

To record ambisonic sound, you'll need an ambisonic microphone with multiple channels. Place the microphone in the center of the recording area and aim it upwards to capture sound from all directions. Minimize extraneous noise and carefully control the levels of the different channels to ensure a balanced recording. After recording, use specialized software or hardware to decode the audio into a format suitable for playback through multiple speakers. The decoded audio can then be played back through a suitable speaker setup to create a full-sphere surround sound ex.



I.2 Fragrance Analysis

I.2.1 How to Make the Smell of Rain

<https://www.youtube.com/watch?v=bl7K3IRPLYo&t=21s>

I.2.2 Fragrance making

Distillation:

In a broad sense, essential oil is a general term for volatile substance products extracted from aromatic plants or perfumed animals. But the daily use of essential oil refers to the water steam distillation, or pressing, or cold grinding, or dry distillation method, from the fragrant plants to extract fragrant substances products, these products at room temperature in liquid, only a few varieties of solid.

Essential oil is extracted from leaves, flowers, seeds, fruits, roots, bark, resins, wood cores and other parts of plants by steam distillation, cold pressing, liposuction and solvent extraction, with a high concentration of aromatic and volatile substances. In addition to one part of the plant, some plants can extract essential oil from several parts. For example, bitter oranges can extract essential oil from three parts: bud, leaf and fruit.

Not all plants produce essential oils, only those with balsam glands. The distribution of balsam glands varies from plant to plant. Some are on petals, leaves, rhizomes, or trunks. After the sachets are extracted, they become what we call "plant essential oil". Essential oils contain many different ingredients. Some, like rose, can be made from more than 250 different molecules combined. Essential oils are lipophilic and easily soluble in oils because their molecular chains are usually short, which allows them to penetrate the skin easily and enter the body through the abundant capillaries under the fat beneath the skin. Essential oils are made up of small molecules. These highly volatile substances are absorbed into the body by mucous membranes in the nasal cavity. They send messages directly to the brain, through the limbic system of the brain, to regulate emotions and physiological functions of the body. So in aromatherapy, essential oils enhance both physical and psychological functions. Each plant essential oil has a chemical structure that determines its fragrance, colour, fluidity, and the way it interacts with the system, giving each plant essential oil a unique set of functional properties.

<https://www.youtube.com/watch?v=1ErdD2tN-oo>

Enfleurage (*Cold/Hot*):

Enfleurage is a technique that extracts scents and oils from plants (or other materials). The advantage of this technique is that even the most fragile plants can be used. Depending on the plants that are chosen, the oil or the fat with which the plants are mixed can be heated. It is this oil or fat that traps the plants' fragrance.

Using cold or hot depends on the thermostability of materials.

Essential tools:

flasks, condenser pipes, heaters, rubber tubes... organic solvents, original materials



Enfleurage tray with Tuberoses flowers

I.2.3 Fragrance diffusion

Instruments:

Ultrasonic diffusers

Basic model:

An electric, ultrasonic, diffuser dispenses essential oils into the air through **vibrations** of a plate which causes **ultrasonic waves**, creating microscopic particles of oils which disperse into the air.

Possible use:

Connect with the sensors.

I.2.4 Some possible elements/materials for fragrance making

Born & childhood (Hope, unknown, happiness):

A new life borned in a hospital: medical disinfectant, alcohol

A growing infant (sense of well cared): milk aroma, shampoo

Eighteenth (Sentimental, rebellion):

Cigarette (smoky smell)

Alcohol

Hormones

Family (Warm, ordinary, stable):

Charcoal

Fire

Cooking

Old (Lonely, deserted, obsolete):

Smell of rain, earthy and dust

rotten wood, old furnitures

Death (flashback, quiet, fear):

Medical disinfectant, alcohol

Blood (smell of rust)