Reflective Design·Wearable devices· Interactive art

MECHANICAL BELIEF STREAM

VIDEO LINK https://youtu.be/tKOyV0Ok2ZQ

2025.6-2025.9

3#

MAIN SOFTWARE

OVERVIEW

"Mechanical Belief Stream" is a project that integrates speculative design, interactive art, and wearable devices. It simulates the process of how future beliefs form as nature gradually evolves into mechanical beings. Through this, I aim to prompt viewers to think about the form of future human spiritual world.

BACKGROUND

"Genesis Of The Bible":

Nature Was Created By God. Light, The Sky, The Ocean, Plants, And Animals Are All Sacred Creations.

Yuval Noah Harari

Dataism: Humans Began To Believe That Data And Algorithms Are More Reliable Than Their Own Senses And Experiences.

OLD FAITH

NEW FAITH

Lao Zi

Man Follows The Earth, The Earth Follows The Heaven, The Heaven Follows The Way, And The Way Follows Nature

Environment And Cognitive Order Change

Max Weber

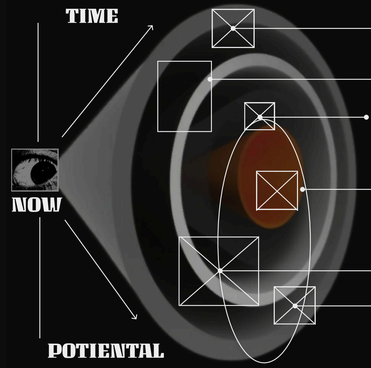
Faith Has Shifted To Trust In Machines And Systems.

Tendency

Modernization has brought about new environments and new ways of perceiving the world. Humans are constantly using man-made things to modify and replace the natural environment; and in this process, human beliefs are also being reshaped by these new things.

FUTURE CONE

I attempted to use the future cone to predict the trend of future changes in beliefs.



PREPOSTEROUS

Humans completely abandon a certain belief system

POSSIBLE

Some people abandon their beliefs and submit to their subconscious and instincts.

PLAUSIBLE

The two belief systems will coexist for a long time.

PROJECTED FUTURE

When humans themselves become artificial individuals, humans develop a worship for machinery, and a new belief system is fully formed.

PROABLE

Technology has led more people to embrace a new belief system centered around technological worship.

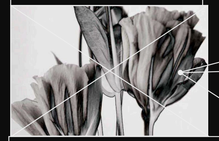
PREFERABLE

The new beliefs keep evolving along with the development of the times.

PHILOSOPHICAL ANALYSIS/RESEARCH

WHICH ELEMENTS CONSTITUTE FAITH?

ENVIRONMENT



People interpret the various information provided by the environment through their beliefs.

people perceive the world.

FACT

The purpose of humans in constructing beliefs is to explain the facts that the world presents to individuals.

PEOPLE

Human beings are the carriers of thoughts, the subjects of beliefs, and the sources of them.

Philosophically, faith is composed of the four elements: facts, environment, people, and the way people perceive the world.

CAUSAL ATTRIBUTIO

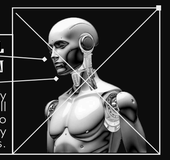
As technology becomes more complex, it will be more difficult for people to understand themselves and their environment.

EMOTION-DRIVEN

In order to explain the facts shaped by these artificial creations, people will establish a completely new cognitive order.

INDIVIDUAL INTERNALIZATION

As the cognitive order gradually takes shape, people will selectively utilize this belief to reinterpret the environment they have created themselves.



HOW DOES NEW BELIEF COME INTO BEING?

Hegel believed that the essence of faith is a cognitive order. In this sense, the development of both new and old faiths is the result of the interaction of the constituent elements of faith.

By studying the four elements that constitute belief, I will further elaborate on the future individual beliefs based on mechanics.

The mechanical self-acceptance of facts is actually a kind of data; this will lead to a difference between the world that the machine recognizes and the world that nature recognizes.

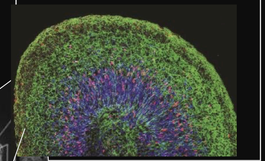
The mechani cal fact

Stage of causal attributio

Stage of Individual internalization

The brain receives information that is completely different from the natural beliefs, and thus needs to construct a new order.

The mechani cal brain

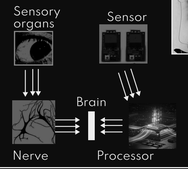


Mechanical environment

The artificial environment will take on a new form of expression, which is different from nature.

The way machines perceive and understand the world

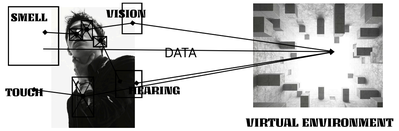
The main way for robots to perceive the world will shift to sensors, and there will no longer be neural responses.



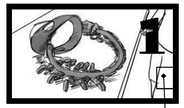
CONCEPT

BRIEF

Through a wearable device, people's sensory experiences are collected, and the data from these senses are transformed into the forms that future humans will perceive. This is to help people truly experience the process of future belief formation and stimulate their thinking.



INTERACTIVE PROCESS



1 Before wearing - Natural person

Before wearing it, people still perceive the world in their natural way.

2 Wear the device

Wearing the device symbolizes the temporary transformation into the perception of a robot.

3 Convert sensory data

The collected data is sent to the computer, which generates the visual form of the world that the robot perceives, and then returns it to the user.

4 Passive collection of senses

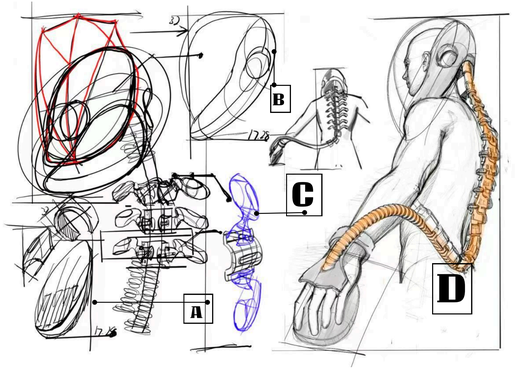
The sensors in the helmet will collect a large amount of environmental data that would normally be collected by the organs in the head.

5 Tactile sensory collection

By touching and squeezing, users can more actively experience the tactile perception of the mechanical human.

6 Experience completed

The experience is over, and it prompts reflection.



EARLY DESIGN OF WEARABLE DEVICES

- **A** Tactile collection device
- **B** The helmet serves as the main component of the wearable device.
- **C** Spinal simulation of sensory transmission channel
- **D** Wearing effect of the product

This section presents the initial design sketches of wearable devices, taking into account both the practical functional requirements and the aesthetic appearance aspects.

PRODUCT DESIGN

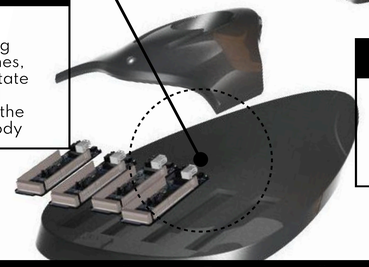
The final form of the wearable device is as follows: an integrated helmet that links and collects data from all human senses, and conveys this intention at the visual level through a futuristic spine.

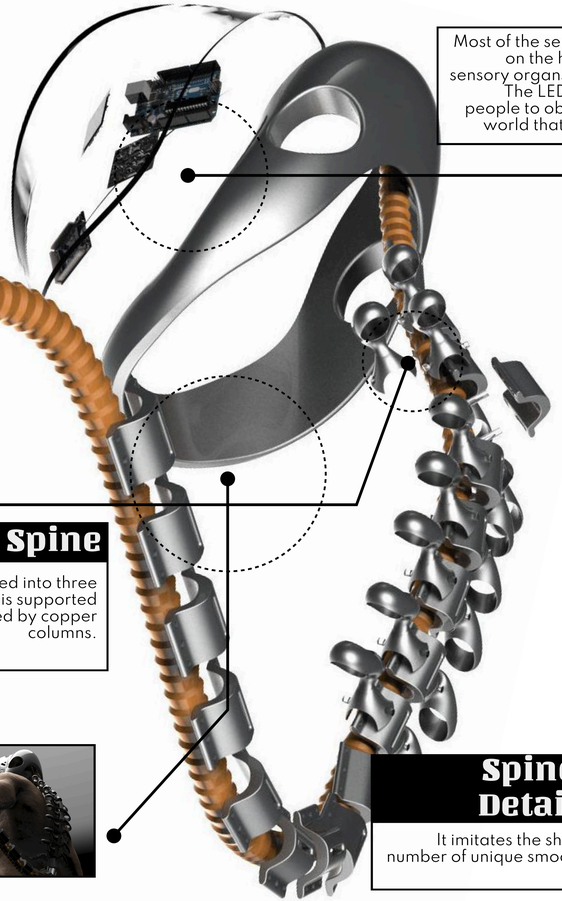
Tactile Detection

A tactile capacitance sensor is placed on each part of the finger that comes into contact with the ground. Once the user presses, the feedback value will change.

Associated Line

Internal connecting DuPont lines, which imitate the spinal nerves of the human body





Modular Spine

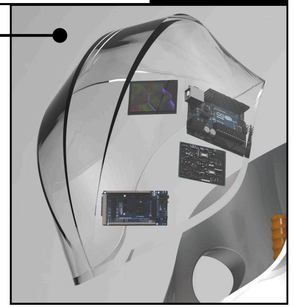
The spine is divided into three main sections and is supported and connected by copper columns.

Wearing The Device

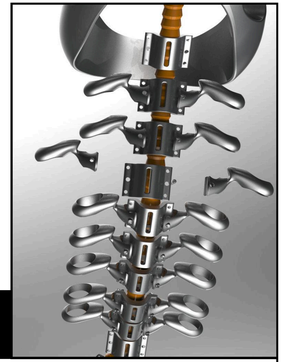
The wearing method is as shown in the figure. There are sensors on both the hands and the head that can collect data, while the spinal-like structure is responsible for connecting these two parts.

Helmet

Most of the sensors are still located on the head - in line with the sensory organs of a natural human. The LED screen also enables people to observe the form of the world that the robot perceives.



Spine Detail

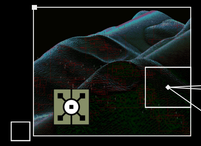


It imitates the shape of the vertebrae and uses a large number of unique smooth structures to highlight an industrial and futuristic feel.

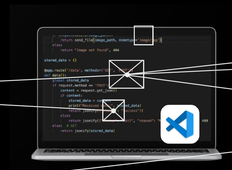
EMBEDDED SYSYTEM DESIGN

Software usage：
Arduino/VStudio

PRODUCT AND VISUAL LINKAGE SYSTEM



Send the JSON formatted text through the local server.



Send data

TOUCHDESIGNER

Through touchdeisgner, the received data is transformed into the abstract form of future beliefs.

Data transmission back

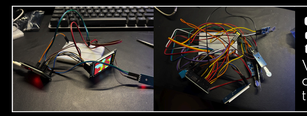
COMPUTER

The local area network of the computer will serve as the transmission channel for data.

WEARABLE DETECTION DEVICE

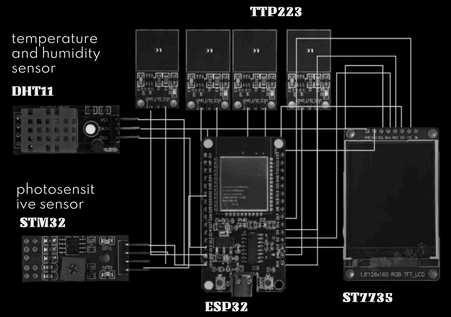
Wearable devices can collect data and send it to a computer. The main control chip, esp32, can also receive commands sent by TouchDesigner via wireless connection.

CIRCUIT DESIGN



Circuit connection and testing

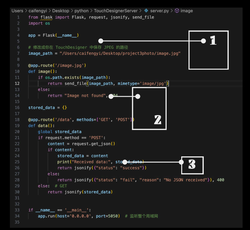
Verify the feasibility of the system through testing



CODE DESIGN

Server section

Using Python's lightweight web framework, a HTTP server is set up. It can receive data sent by devices and also send the images generated by TouchDesigner to the local server.



1 Create a new instance of Flask

2 Read the image from the address "project3photo/image.jpg"

3 Send JSON data via POST to /data

Arduino section

Define circuit pins

Sensor initialization

- Lines 44-177 of the code contains the programs for all the sensors.

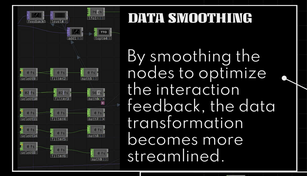
Construct the sensor data into a JSON string and send it to the server.

VISUAL DESIGN

Software usage：
Touchdesigner

TOUCHDESIGNER DESIGN

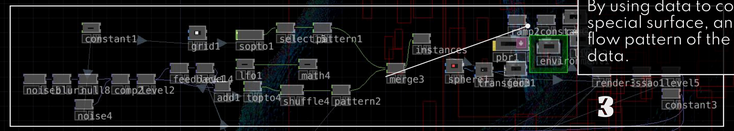
Through touchdeisgner, the received data is transformed into the abstract form of future beliefs.



DATA SMOOTHING

By smoothing the nodes to optimize the interaction feedback, the data transformation becomes more streamlined.

1



2

MAIN VISUAL

By using data to construct a fluidized special surface, and by controlling the flow pattern of the fluid through sensor data.

3

mainboard

DATA RECEIVING NODE

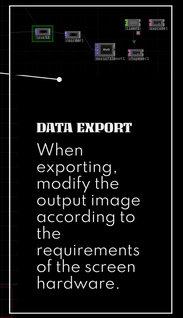
Using the timer node, TouchDesigner collects data every 0.2 seconds and converts it into a table.

4

DATA ANALYSIS RESULTS

Real-time analysis of the linear forms in the image and export of data distribution along the grid edges; simulation of data analysis results

5



DATA EXPORT

When exporting, modify the output image according to the requirements of the screen hardware.

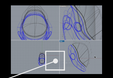
After the processing of the entire system, touchdeisgner is able to vividly present the future special belief forms and fully adapt to wearable devices.

PROCESS

The process of project completion has been fully documented, including the following six stages

MODELING

Use Rhino to complete the modeling based on the product sketches.



Step **1**

Step **2**

3D PRINTING / SPRAY PAINTING

Light-curing printer, and spray metallic paint according to the rendering effect

CIRCUIT CONNECTION TEST

The hardware functions were refined through multiple tests.

Step **3**

PROGRAM OPERATION TEST

Testing the TouchDesigner - Arduino Interconnected System

Step **4**

Step **5**

FINAL PRODUCT SHOOTING

The equipment is connected. Together with a large screen, it enables the completion of equipment connection and testing.

SUMMARY

#1.PROUD ASPECTS

I think this is a very compact yet exquisite project; What I am most proud of about this project is its excellent visual experience based on technology. Moreover, I believe that I successfully conveyed some of my design concepts and philosophical thoughts through it.

#2.GAINS

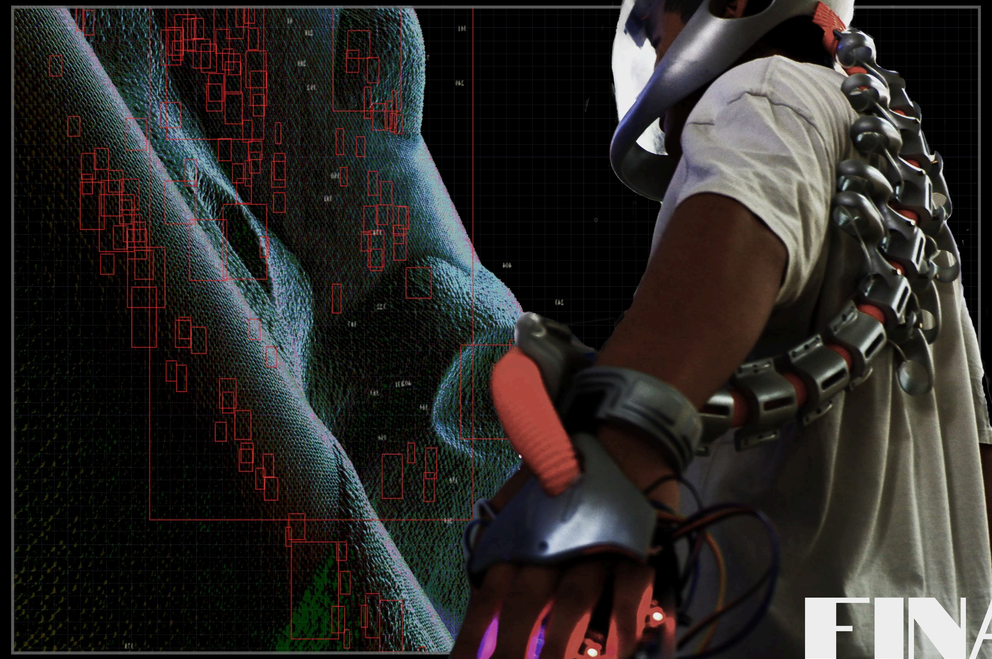
It provided me with an opportunity to start from the design, think about the future, and explore my own ideas. It also further enhanced my systematic thinking in the integration of software and hardware.

#3.IMPROVEMENT

The interactive feedback experience still has some deficiencies and needs to be further enhanced in terms of multi-sensory presentation.

VIDEO LINK

https://youtu.be/tKOyV0Ok2ZQ



MODELING

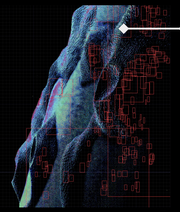
The wearable device has a screen. The wearer can continuously receive images sent by the computer, allowing the wearer to synchronously experience the facts received by a human and those received by a robot.

FINAL OUTPUT

DISPLAY INTERFACE

The data collected by the wearable devices will be immediately fed back to TouchDesigner, enabling real-time interaction between the wearable devices and the images.

DETAILS



Variant version

THE DETAILED EFFECTS OF TOUCHDESIGNER

Demonstrated the effect of controlling the flow of fluid surfaces through the collection of tactile information.

Wearing effect

TACTILE FEEDBACK COLLECTS HAND-HELD DEVICES

WEARABLE RENDERING EFFECTS

Shows the ideal effect after wearing

PHYSICAL PHOTOS OF WEARABLE DEVICES

The original product form before wearing

Product rendering