H.Om.E Project: An Intercultural Dialog between Computers and Traditions around the Concepts of Home[1]

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New computational technologies for creation and production offer interesting aesthetic and creative possibilities to be explored, particularly in its respectful dialogue with traditional crafts (textiles, crafts). For this project, the concept of "home" or "genealogy" is taken as a common ground, for free creative interpretation and exploration, from on its different meanings: as a place where we live (house), as a text for social interactions (constitutions), as the sky over us (astronomical data), among others. H.Om.E project aims to create bridges between cultures from South America and Asia, exploring the potential of the encounter between technologies and traditions, methodologies, and scales: from local traditions to global digital culture; from handcraft to computer-generated artwork; among others. Artists from Chile, Taiwan, and Japan will develop different kinds of pieces; data physicalization in textiles; data for parametric and generative design; and visual pattern creation based on legal texts; among other explorations. This paper seeks to briefly describe the H.Om.E Project, the main concepts used, its methods, complexities, and troubles of the process, with attention to the free exploration of the possibilities of computational and technologically mediated tools in its encounter with traditions and crafts. Also, some description of the current stage, next steps, and possible outcomes of the project are commented on.

1. Introduction

This paper aims to briefly describe the H.Om.E Project, a collaboration among artists, designers, and programmers from Taiwan, Japan, and Chile, initiated in 2022 with the support of the [National Culture and Arts Foundation (NCAF)] in Taiwan. As of January 2024, and following some modifications to its goals and methodologies, this ongoing project enters a second stage of development.

The project serves as a space for the involved artists to freely explore aesthetic, conceptual, and methodological possibilities offered by recent computational and technologically mediated tools to delve into traditional creative practices of each creator's respective country, such as crafts, textiles, and drawings.

During meetings among the creators, an open interchange of ideas and concepts from different fields is discussed. Some of these ideas become relevant, while others are discarded, sometimes revealing cultural differences, yet ultimately aiming to find common perspectives for

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2. https://tribe-against-machine.
org/

3. http://wiki.tribe-against-ma-
chine.org/Greenhouse+Project

4. https://vestibles.cl/proyec-
tos/i_c-interconexiones/

the project. From this standpoint, these discussions are as valuable as the artworks themselves.

Subsequently, the main concepts, methods, and developments thus far will be described, allowing room to address some of the complexities and challenges that arise in the process.

1.1. Origin of the Project

The H.Om.E project has its roots in previous creative experiences. The first stage of our collaborative project encompasses the integration of three previous projects: Tribe Against Machine[2] (Taiwan, 2017-2018), The Mind of a Greenhouse and Tashi Gatsen Charity School[3] (Tibet, 2018), and the I_C Project[4] (Chile, 2021-22).

Tribe Against Machine, a 10-day annual summer camp in Taiwan, facilitated collaboration among artists, hackers, and activists, exploring the fusion of smart materials with ancestral cultures through workshops and fieldwork.

The Mind of a Greenhouse emerged from a greenhouse project in 2018, aimed at providing year-round food for orphan children in the Tashi Gatsen Charity School in Tibet. This project evolved into a multidisciplinary endeavor, incorporating scientific research, artistic programs, and technology implementation in high-altitude agriculture.

Finally, the I_C Project initiated in 2022 in Chile delves into the intersection of wearable technology and textiles, emphasizing the transformative potential of merging indigenous clothing culture with new technologies, and exploring the relationship between individuals, communities, and the environment through the lens of astronomy.

These three projects collectively laid the groundwork for a cross-cultural, interdisciplinary collaboration in the next project, bridging art, science, technology, and social impact, and fostering new intercultural artistic dialogue.

1.2. Original Motivation: Goal

One of the ideas behind the project was to create bridges between recent computational technologies and traditional cultures. Consequently, a name that encompasses this idea was necessary. The name H.Om.E. was created, containing the Sanskrit word Ō and referring to heritage, earthship, and the idea of "home" itself, with different possible interpretations.

There were two major reasons why we considered integrating the three previous events. Firstly, it was due to community formation, aiming to impel the knowledge exchange of e-textiles, smart wearables, digital crafts, and heritage culture. Secondly, it was to enhance the goal of bridging traditions and modern technologies by gathering communities. For example, the greenhouse project in Tibet was inspired by Tribe Against Machine, and the I_C project in Chile sought ways to reconstruct ancient cultural astronomy with modern astronomy data. We expected to gather our resources and experiences to better achieve our purposes, which was the origin of our attempt to build international connections within three projects.

Members of the project believe that exploring an innovative planetary view of our living environment is crucial for reviewing our past,

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particularly from technological and anthropological perspectives. From here, some initial objectives were developed:

To empower the Mapuche, Atayal, and Tibetan cultures by facilitating their collaboration with contemporary art and science institutions at the data level.

To examine how global and interdisciplinary art projects can work together and how this network benefits each minority culture in the project.

To generate interdisciplinary artworks that encompass astronomy, textiles, and architecture.

The aim is to create a harmonious narrative that incorporates ancestral and modern perspectives, recognizes the relationship between ancestral and modern technology as complementary, and brings these various disciplines together.

At present, this is an ongoing project, and this paper presents an overview of its current process of exploration in the intersection between technologies, design, art, and traditional craftsmanship. Depending on the research interest of each creator, the outputs are open to different formats, ranging from woven architecture, videos, generative design, and textiles, among other possibilities.

A challenge started to appear related to the development of a method to integrate all the different topics discussed in the meeting into a coherent framework. For example, how to bridge generative design and heritage preservation coherently, at the same time meaningful and respectful with heritage preservation purposes.

1.3. First-stage challenges and modifications in the project

Throughout the process, several changes were made due to unforeseen challenges arising from our initial aim to integrate people from original cultures into the project. Despite initial sufficient communication with Atayal and Tibetan agents, differences related to paperwork, actions, and artwork creation proved difficult to reconcile. The language barrier further complicated matters, resulting in time-consuming iterations with limited results. Consequently, we opted to redefine the research scope, reducing fieldwork and refocusing on a more closely-knit group of artists.

1.4. New Motivation, goals, and Final Team

Following these complex situations, the project's focus shifted towards representing the current world as a home interconnected by sociocultural and technical systems, utilizing data from both Asian and South American cultures to develop speculative art-design proposals. The project now serves as an interdisciplinary space encompassing various creative disciplines, including architecture, textiles, generative design, media art, visual arts, and graphic arts.

The current participants of the H.Om.E project include:

Shih Wei Chieh: Founder and coordinator of the project, an artist and technologist from Taipei, Taiwan.

Satoru S: An architect and programmer from Tokyo, Japan, specializing in the intersection of code and complex systems.

María José Ríos: A Chilean artist focusing on textiles, wearables, and technology.

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Ricardo Vega: A Chilean artist, designer, and programmer, exploring various modes of visual data representation.

The collective organization is collaborative, with one coordinator. The groups hold online meetings every two weeks to discuss relevant concepts, current developments, and new proposals.

The first stage of the project commenced in November 2022, primarily consisting of dialogues about the different concepts involved and the sharing of opinions. Subsequently, some participants began creating initial proposals for discussion. During this initial stage, initial contact with local individuals was established to explore potential speculative collaborations, which, as previously mentioned, was ultimately discarded.

2. Current Developments, Art pieces, Results and Analysis

The second stage commenced in January 2024, to refine the project's concept and create artwork. Given that H.Om.E is an exploratory project, its objective is not limited to materializing in a particular format, such as an exhibition or catalog. However, various options, including those discussed during group meetings, are being considered for future stages.

For this stage, drawing from lessons learned in the previous phase, project participants have developed a brief text summarizing the main concepts they are working on. While the overarching concept of "home" remains central, interpretations have become more personal, varying depending on the creator's discipline, research interests, or aesthetic approach. Original texts expressing each creator's intentions will be presented in quotation marks, alongside brief descriptions of the explorations undertaken in the first stage.

Shih's Conceptual Approach:

At the project's outset, he grappled with the challenge of discovering hidden relationships connecting three culturally disparate yet project-oriented entities. Initially, he sought to create a coherent narrative capable of bridging the mindset gaps between different topics, ultimately translating mindsets. While this idea was speculative, inspiration struck during an online discussion on autopoiesis, offering a potential framework to integrate generative design, data science, art, and our social system as life systems.

Employing generative design to simulate our complex reality, he explores the concealed connections between the diverse landscapes of the Andes, Tibet, and Taiwan's Atayal region. This work parallels research in artificial intelligence's latent space, a realm where researchers aim to uncover hidden patterns and relationships among datasets. By visually mapping potential relationships between these landscapes, our project may unveil hidden planetary connections, albeit in a manner challenging traditional logic.

Shih's Creative Developments:

His current practice within the project encompasses two main endeavors. Firstly, he focuses on material science, aiming to create crafts addressing environmental issues in the Tibetan greenhouse while

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potentially facilitating generative design collaboration. This involves developing a solar cell prototype with Tibetan calligraphy-shaped electrodes, inspired by the region's reliance on solar energy and intended for educational purposes at a local elementary school. Additionally, experiments involving dye-sensitized solar cell technology on woven substrates have been conducted with support from the Hackteria hacker residency program.

Secondly, he explores the relationship between heritage and environmental data (e.g., weather, astronomical data) using deep learning tools. Leveraging Real-time Audio Variational autoEncoder (RAVE), he applies deep learning techniques to environmental data in waveform format, inspired by previous attempts to illustrate hidden relationships between heritage and surroundings. Future work aims to map these connections to latent space, akin to data visualization within deep learning tools.

Fig. 1. A prototype of a woven DSSC made with heat-resistant mineral fiber substrate. The electrodes can be patterned and dyed with plants, making it potentially suitable for data visualization purposes and the textile-oriented research in the project. This research about DIY solar technology originated in the greenhouse project in Qinghai.
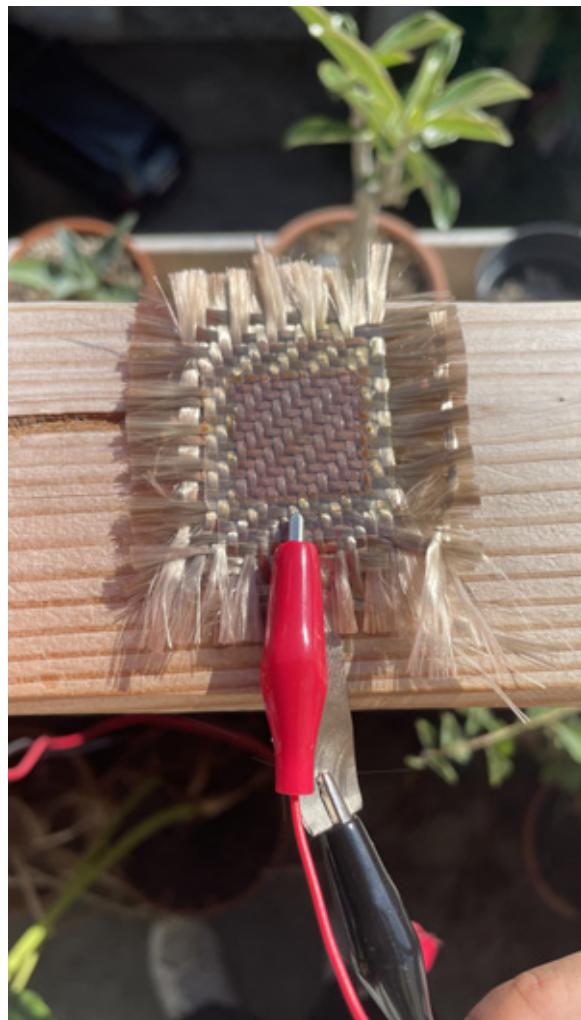
Satoru's Conceptual Approach:

In systematic design thinking, two major approaches emerge: typological and generative. The former involves analyzing existing designs and categorizing them, while the latter focuses on developing rules to generate designs. Despite their differences, he sees them as ultimately interconnected—the typological system could evolve into a generative system. By pursuing highly sophisticated rules yielding emergent ty-
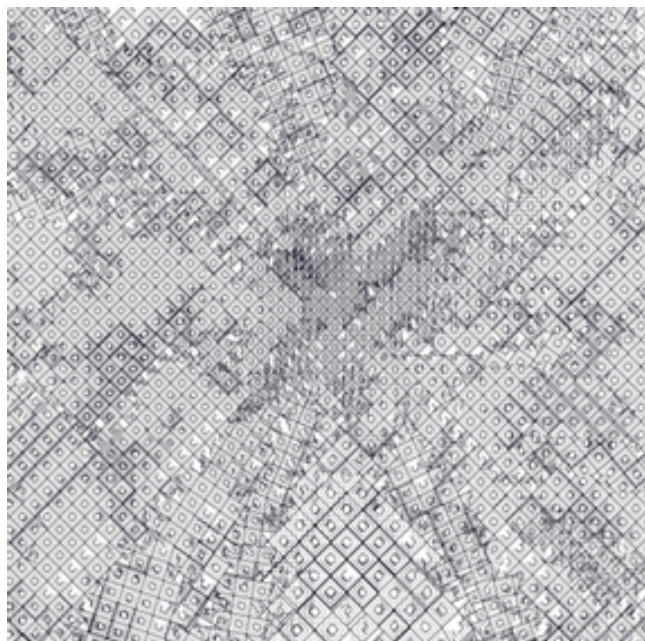
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5. https://youtu.be/GlQuBfKu1iw

pological qualities, he believes designers can navigate complex design challenges in our era.

Satoru's Creative Developments:

Within this project, he confronts challenges at the intersection of science, art, and heritage, particularly within architecture. By introducing a hierarchical relationship within a bottom-up agent algorithm, he aims to maintain a bottom-up approach while infusing organization into chaos. This hierarchical control system introduces a sense of order, with actions at different levels contributing to the overall geometry. The resulting forms exhibit patterns and randomness, reminiscent of ancient Middle Eastern dwellings, offering a unique integration of disparate forms.

Fig. 2. Prototype work made by Satoru Sugihara, generated in Processing based on the Atayal diamond pattern and the stepping zigzag pattern known as the Andean symbol[5].

María José conceptual approach:

María José delves into textiles and their ancestral weaving crafts as not just artifacts, but as intricate information systems and structures. On another front, she explores wearables, which, through upcycling transformations of textiles, acquire the capacity to embody specific states and projections. This is made possible by the myriad combinations arising from the interplay of subjectivity and information, alongside the materiality of matter, situating wearables as interactive spaces between physical and digital-virtual realms. Especially in her conceptual work, fabric serves as a system capable of transmitting and displaying information.

Project Focus:

This project fundamentally explores the intersection of astronomy and textile techniques, leveraging their cultural significance in traditional cultures. Through the integration of new digital technologies for visualizing astronomical data, including those available at the ALMA Data Observatory, textiles become mediums for visualization and connection. This approach not only offers new avenues for data visualization but

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also underscores the importance of textiles in our history and cultural identity, a legacy that endures through millennia.

Implementation and Methodology:

María José's approach encompasses a blend of traditional textile techniques with modern technology to visualize and connect with astronomical data through textiles. This innovative fusion expands the horizons of data visualization by leveraging the enduring craft of loom weaving in conjunction with contemporary digital, analog, and mechanical implementations.

The implementation process involves the utilization of a Norwegian mechanical-digital loom, specifically chosen for its compatibility with the project's objectives. This sophisticated tool serves as the canvas for weaving astronomical data into tangible forms, bridging the gap between ancient weaving traditions and cutting-edge data visualization techniques.

The woven surfaces, measuring 70 cm x 90 cm each, serve as visual representations of astronomical phenomena, translating complex data into tactile and visually captivating artworks. Through meticulous craftsmanship and technological integration, María José transforms raw data into tangible expressions that resonate with cultural significance and contemporary relevance.

This description underscores the project's multidimensional approach, highlighting María José's pioneering efforts to merge heritage craftsmanship with modern data visualization methodologies. By imbuing textiles with astronomical data, she not only expands the boundaries of artistic expression but also fosters a deeper understanding of our place in the cosmos.

This comprehensive implementation strategy showcases María José's commitment to pushing the boundaries of traditional art forms, demonstrating how textiles can serve as powerful conduits for conveying complex information in accessible and engaging ways.

Fig. 3. Prototype from I_C Project, astronomy data being woven into textiles with, prototype photo from Barcelona.

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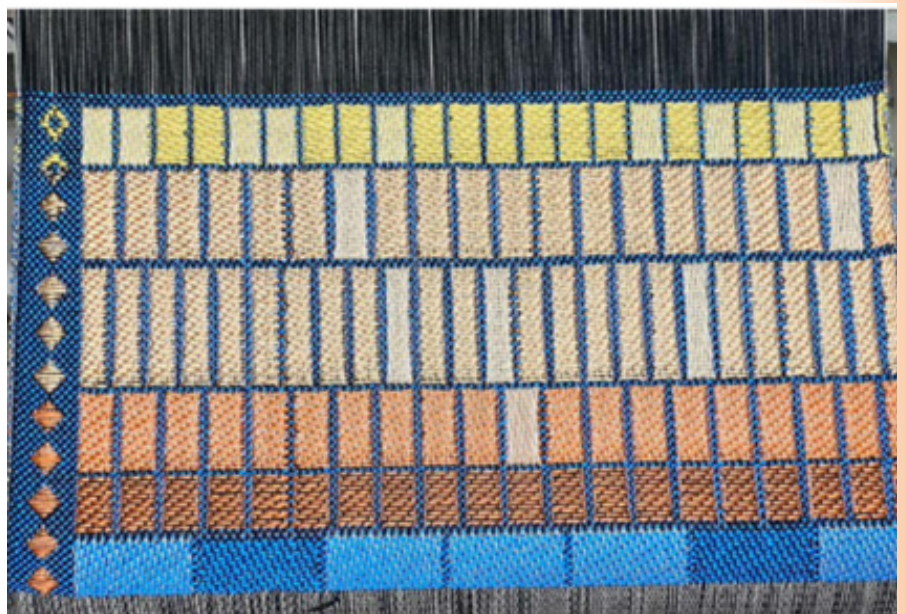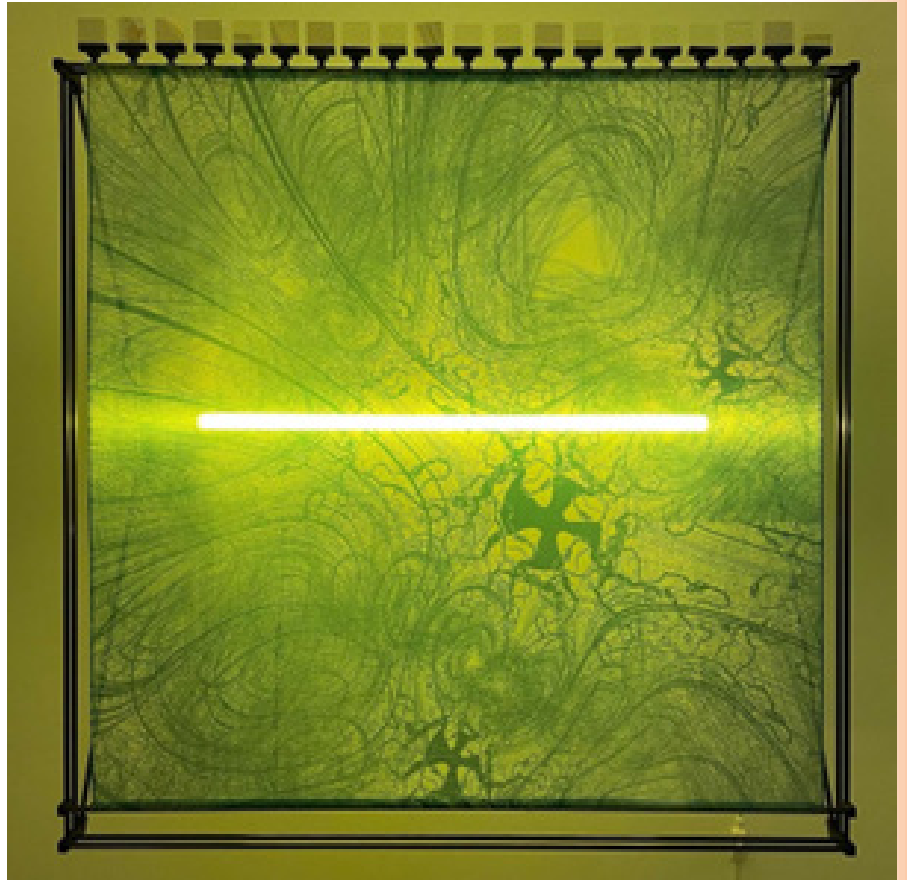2024.xCoAx.org

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Fig. 4. A textile work made with laser exposure and a New Cyanotype. The design was generated in Max/MSP and was converted from the ADQL code of one celestial within the Incan dark constellation in the Gaia library.

Ricardo's conceptual approach:

In the contemporary environment, the dissolution of the individual is evident in the face of vast amounts of data characterized by its massiveness, speed, and abstraction (Manovich 2002). Typically, data is presented in visualizations geared towards functional and analytical representations, employing common graphic resources like bars, dot plots, and curves to facilitate rational and efficient comprehension of data features.

However, this project represents an opportunity to diverge from traditional data representation strategies and explore alternative forms of expression. By drawing from two primary sources of data—astronomical data and the text of the Chilean constitution—the project aims to generate images that transcend traditional analytical representations. The celestial realm serves as a metaphorical backdrop, symbolizing our shared living environment encompassing humans, nonhumans, and living and nonliving elements. Meanwhile, the text of the Chilean constitution serves as a foundation for creating drawings, reflecting the societal framework that establishes common rules for coexistence.

In both cases, the project emphasizes visual exploration over analytical analysis, appealing to the senses and fostering aesthetic and subjective experiences. Through these visual mediums such as images, videos, and graphics the project endeavors to reclaim the subjective character of the individual within the realm of data representation.

Ricardo's creative developments:

For the project, he primarily relies on two sources of data. Firstly, astronomical data, including exoplanets and galaxies, serves as a foundation for exploring visual representations, drawing inspiration from previous textile projects. Additionally, initial explorations into data sonification are underway, always in conjunction with visual imagery. Among these explorations, the most developed efforts revolve around utilizing the constitution as a data source. This choice is motivated by the material characteristics of the text, which are represented as discrete symbols, as well as the symbolic significance of these documents, particularly in light of recent events in his home country, Chile.

Drawing inspiration from historical precedents, such as the Quipús used in Inca domains for communication and data storage, he incorporates elements of their mobile structure and textile-based data representation, characterized by lines and dots. Another significant reference for the project, both visually and conceptually, is the illustrated chronicles of Felipe Guaman Poma (Peru, 1534-1615), which provide a rich source of inspiration for visual explorations. He extends his gratitude to individuals who contributed to his research, including G. M., an anthropologist, and C. M., a linguist.

Examples showcased in the project demonstrate the utilization of the constitution's text to create drawings using simple software written in Processing. By assigning letters as parameters to manipulate and color elements such as dots and lines, the drawings yield unexpected and visually compelling results.

Fig. 5. Iteration for a proposal called "ladder". Some words were used as parameters to prototype the following images.
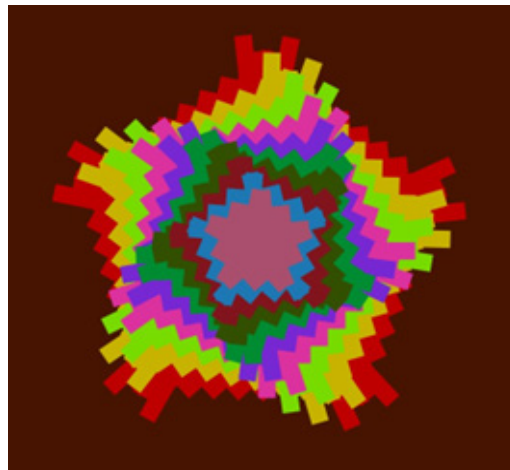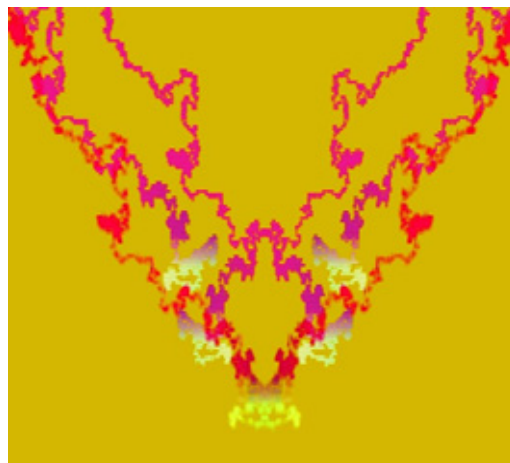

Fig. 6. This series takes text (constitutions) drawing lines or points and depending on the letter detected, the position is conditioned by the text. Made in Processing and Python.

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Context and Project Concept:

In our current environment, characterized by the overwhelming presence of data, there's a tendency for individuals to dissolve before the sheer massiveness, speed, and abstraction of this data (Manovich 2002). Typically, data is visualized in functional and analytical representations, emphasizing rational and efficient comprehension through common graphic resources like bars, dot plots, and curves. However, this project presents an opportunity to diverge from traditional representations, allowing for the expression of individual subjectivity through aesthetic motivations.

Data Sources and Exploration:

The project aims to create images derived from two primary sources: astronomical data and the text of the Chilean constitution. The celestial realm represents our ultimate shared environment, encompassing all living and nonliving elements. Conversely, constitutional texts serve as the foundation for societal rules and norms, akin to a communal dwelling for specific societies. These explorations prioritize visual experiences over analytical analysis, embracing the subjective essence of individual expression.

References and Collaborations:

Inspiration for the project extends to historical references such as Quipús, known for their mobile structure and textile-based data representation, and Felipe Guaman Poma's illustrated chronicles, which inform visual explorations. Special acknowledgment is extended to Gerardo Mora from Chile, Anthropologist, and Constanza Martínez G, Chilean Linguist, for their invaluable contributions to the research process.

Visual Examples and Methodology:

Examples showcased here demonstrate the project's utilization of the constitution's text to generate drawings using a simple software developed in Processing. By assigning letters as parameters to manipulate and color elements like dots and lines, unexpected visual outcomes emerge, reflecting the project's emphasis on unconventional representations and subjective expression.

This revision captures the essence of the project's divergence from traditional data visualization methods, highlighting its focus on aesthetic experiences and subjective expression.

3. Discussion

The collaboration between diverse cultures and disciplines within the H.Om.E Project has been a significant achievement, marked by four key iterations. Firstly, Tribe Against Machine (2017-2018) initiated the fusion of e-textile artistry with traditional craftsmanship, pioneering the integration of smart materials into indigenous attire. Secondly, the greenhouse project in Tibet expanded beyond textile design, incorpo-

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rating fields such as generative design and solar cell technology in architectural applications.

Thirdly, the I_C Project (2022) laid the groundwork for connecting ancient celestial knowledge with modern data, influencing the global collaboration and planetary perspective of the current project. Lastly, the initial stage of the H.Om.E Project provided a platform for experts in generative design and heritage preservation, fostering the adoption of systems thinking within the project's social science context.

A central challenge for the H.Om.E Project has been balancing heritage preservation without the invasion of techniques and ancient culture with artistic objectives. Approaches like systems thinking offer the potential to navigate the complexity of this endeavor by emphasizing holistic understanding over reductionism. Further exploration into this framework is warranted to align generative design tasks with social science contexts effectively.

Nonetheless, the project encountered communication barriers with Atayal and Tibetan community representatives, resulting in a loss of cultural connection and a shift towards design-focused and arts development. While the reasons for this disconnection may be multifaceted, it underscores the complexities of working with cultural agents and navigating issues of authority and representation.

Nevertheless, this setback presents an opportunity for introspection and learning. Bridging traditions with modern art offers opportunities for promoting heritage culture but also raises questions about equity and funding distribution. Addressing these conflicts requires open dialogue and consideration of cultural sensitivities, akin to the immune system of social systems as proposed by Luhmann (2008).

By addressing these challenges and embracing the complexities inherent in cultural collaboration, the H.Om.E Project can continue to evolve as a dynamic and inclusive platform for exploring the intersection of tradition, technology, and art. Through ongoing dialogue and reflection, the project can navigate cultural sensitivities while advancing its overarching goals of cultural exchange and creative innovation.

4. Conclusion

The H.Om.E Project, rooted in the collaboration between interdisciplinary and media artists from Chile, Taiwan, and Japan, aims to bridge cultural divides through the exploration of the concept of 'home' in conjunction with technology and cultural origins. Despite the initial challenges, the project enters its second stage in 2024 with a renewed focus on creative interpretation and dialogue with local social, and cultural traditions. Anticipated outcomes include diverse artworks ranging from data physicalization to generative design, incorporating various data sources such as astronomical and legal or national constitutional texts.

Moreover, the project strives to deepen its integration with computational arts, leveraging technology to enrich and preserve cultural heritage and their interconnections. Future steps may involve exhibitions, catalogs, or cross-country exchanges to expand the project's reach and foster interconnectedness among diverse elements and concepts. Continued support is essential to sustain the exploration of the relationship between tradition and computational arts, paving the way for broader

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integration of people and places into the interconnected home envisioned by the project.

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