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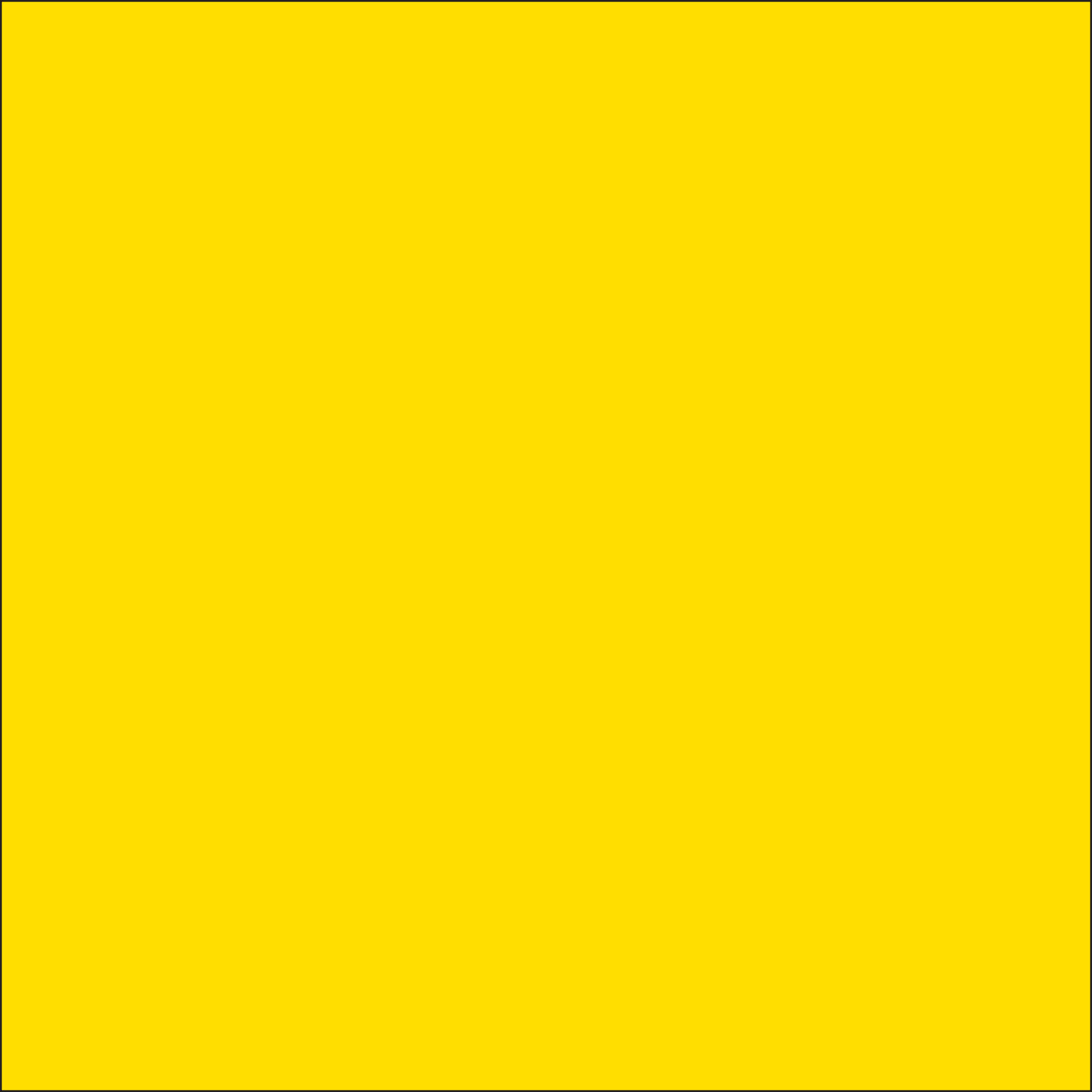
ASTER>
ART^
SCIENCE

WHO OWNS THE TRUTH?

NATURAL ENVIRONMENT / ARTIFICIAL INTELLIGENCE

ASTER>
ART&
SCIENCE

September 2023

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Direction: Rocío García Robles (Principal Investigator-1) and Áurea Muñoz del Amo (Principal Investigator-2)

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PREFACE / CHRISTL BAUR, JOSÉ MANUEL FLORES MARTÍN

WHO OWNS THE TRUTH?

Within the captivating narrative of Ars Electronica 2023, the resounding theme of "Who owns the truth?" finds its echoes in remarkable initiatives such as the ASTER project. This innovative endeavor, celebrating the union of art and science, stands as a testament to the multifaceted nature of truth — a truth shaped by intricate interplays of social, cultural, and technological contexts.

The ASTER project's vibrant presentation in the Ars Electronica Festival unfolds across two thematic realms: the Natural Environment and AI. In these realms, the project unveils a transformative perspective on truth ownership. In the context of AI, it challenges established notions of authorship, prompting reflection on the dimensions of truth's ownership when Artificial Intelligence takes an active role in knowledge construction.

As the festival's theme revolves around contested landscapes of truth ownership and interpretive authority, "ASTER> Art ^ Science" emphasis on co-creation and collaboration resonates deeply. Amid concerns of control and responsibility within the realm of rapidly evolving technology, the presented projects embrace a democratic and sustainable approach. They bridge art, science, and society, forging a collective journey toward comprehending truth within a complex, evolving world.

The exhibition "ASTER> Art ^ Science" is presented in the frame of the Ars Electronica Campus Exhibition, an integral part of the festival. Since 2002, Ars Electronica and the University of Arts Linz have united to create a dynamic platform, the Ars Electronica Campus. This annual event transcends mere exhibition, embodying the spirit of exploration and discovery. It provides a stage for exceptional universities worldwide, spotlighting innovative approaches to teaching media art and media culture.

At the heart of the Campus format lies a profound commitment to exploring diverse educational approaches within art and creativity. These showcases offer invaluable insights into the identities, histories, and contemporary practices of guest universities. The Campus Exhibition underscores the power of interdisciplinary exchange and international collaboration, fostering a vibrant community that collectively shapes the future of media art and culture.

Institutions like universities, the students and faculty members from around the world, play a pivotal role in exploring the intricate nuances of truth ownership. Just as the ASTER project challenges established paradigms of truth through its fusion of art and science, the Campus Exhibition embodies the essence of exploration that fuels this very question. They collectively offer a lens into the evolving landscape of truth, art, and creativity, showcasing how global academic collaborations actively contribute to the dynamic discourse that shapes our perceptions of truth in the modern age.

Mag.ª Christl Baur
Head of Ars Electronica Festival

You have in your hands the catalog of the exhibition "ASTER > ARTΛ SCIENCE", which we are going to enjoy at the headquarters of the Official College of Quantity Surveyors and Technical Architects of Seville and the Quantity Surveyors Foundation.

A novel exhibition, which perfectly reflects the symbiosis that raises its name, allowing to capture the various proposals reflecting a research project, which has been developed in a collaborative manner at the University of Seville, inviting society (students, teachers, professionals, etc..) from any field (Fine Arts, Computer Engineering, Physics, Architecture, Psychology, Mathematics, etc.) to participate in the transdisciplinary co-creation of SciArt works of art. These works inspired by science have made it possible to stimulate hybrid creative thinking, innovate in artistic practices and in the sensitive communication of the most current science to society.

The Colegio de Aparejadores and the Fundación Aparejadores have historically been committed to supporting contemporary art, backing emerging and creative initiatives since the creation of the Foundation, such as the one brought to us by professors and researchers Rocío García Robles and Áurea Muñoz del Amo, who came with the determination and foresight to merge two creative facets that were initially so dispersed and that, using collaborative methodologies and tools, have brought into crisis and confrontation: Art, Science and Technology, all with more than outstanding results, which we are sure will stir our senses through various proposals in very different formats.

We would like to congratulate those who have participated in such an innovative project, with two themes that could not be more current: the Environment and Artificial Intelligence. Their advances are provoking all kinds of responses, exciting, favorable, distrustful and even apocalyptic. And that should be one of the pillars of the University, to encourage the critical spirit in society, in this case with the College and the Foundation of collaborators.

The University always has the doors open in our College and our Foundation to enjoy exhibitions as enriching as the one we now present.

I hope you enjoy this catalog.

José Manuel Flores Martín
President of the *Colegio Oficial de Aparejadores y Arquitectos Técnicos de Sevilla* and *Fundación Aparejadores*

INTRODUCTION / ANDREW NEWMAN, ARS ELECTRONICA
AND MARÍA DEL CARMEN ROMERO TERNERO, ETSII

It is 'end-of-the-world weather', a poet declares. Famine, disease and riots break out across Europe as extreme and never before seen temperatures devastate crops. As each day turns to night, last gasps of sun fade away in an eerie distortion of phosphorous yellow haze.

The 'sun will die', an astronomer says. Spots spread like 'black bile' across the surface of our star. Perched high over cobbled Bologna streets, the astronomer sets a date. July 18. A prophecy of darkness echoes from the knowing halls of an ancient university.

It is 1816. Friends gather by a lake. A summer holiday in a year without a summer. Sheltering from frost and fog, they tell each other ghost stories to pass the time. One tells of a dream, which was not all dream, where in the moonless air, we forget our passions in the dread, of this our desolation.

—

It is 2006. 190 years later. Black ash on Pacific blue laps against my body. I gather with my friends on a beach. There is a hazy red sky. It is the first day of the year. We are isolated by fire, the roads are closed, so we wait for it all to burn. Cooling ourselves in the ocean.

The date is set, scientists say in the newspaper that day. We only have 20 years left. Action is needed to avoid absolute obliteration in 2025. The roads are still closed. We pass the time telling each other stories of post-human futures. I tell of a scientist named Roger Traub, who works for IBM in New York. He uses computers to simulate circuits in our brain.

Mathematical models explore only a fraction of the billions of oscillations that just a fraction of the billions of neurons make. Oscillations that, when visualised, appear to be nothing but squiggles. There is some meaning in each of these squiggles. Some patterns the scientist's eye can see. I see only abstraction.

—

Under a setting sun forecast to die, Mary Shelley sits with her friends overlooking the lake. It is her turn to tell a story. She feels a dull nothing, a blank inability of invention. Thunder rumbles. The lake lights up. Then a pitchy blackness. She starts to tell her story. It is about a man and a monster. It is about art and science.

—

I imagine the squiggles the scientist Roger Traub sees. Squiggles of thoughts, of senses, of sight. Squiggles of memories, of fears, of desires. Squiggles of love, of despair, of dreams. Stranded on this beach, while the white foam of waves paint squiggles in the black ash of a burnt land, I think of these oscillating waves in our brain. Waves of all that we are and all that we can imagine we can be.

—

It is 2023. Scientists say we soon face a ghastly future of mass extinction. I imagine a saviour - a masterful mind. A hope sparked by slicing up the brains of all our great artists and scientists and shuffling them together like a deck of cards. Could we find our future in this mash-up of electric squiggles and oscillating waves. Could we create an electric consciousness together, an artificial super intelligence?

Collisions. Intersections. Dissections. There is a violence in the language we use to describe art and science. Mary Shelley's story of Victor Frankenstein shows we can only find an enduring death and isolation in forced creation. Instead in our climate of impossibles, we must plant the seeds of the possible. We must nurture them together. Let them grow. ASTER show us that this is how we can create an ecology - not a monstrosity - of art and science.

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Andrew Newman
Artist,
Producer – European Platform for Digital Humanism
Coordinator – European Union Prize for Citizen Science
Ars Electronica Linz GmbH & Co KG

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The beauty of wonder wanders through this collection of works, where science, technology and art come together and play.

ASTER is a sample of the scientific tenacity of its leaders, Rocío and Áurea, where the question comes before the answer and at the same time builds it. It builds it with several voices: young voices, experienced voices, mathematical voices, physical voices, technologist voices, artistic voices, social voices, female voices, male voices, voices voices.

ASTER synergy has cultivated the fields of creativity with thinking seeds, to inspire what we perceive here and give rise to stories without texts and to emotions turned into light, to life capable of annihilating plastic, to the cries of an exhausted Earth, to the generation of capricious artificial intelligences and to sensitive dodecahedra.

ASTER opens up avenues where we can look out to be amazed, and where the limits of knowledge are wherever we want to put them.

Open your mind and all your senses, enjoy the essence of the works and look for their artistic and scientific sides. You will discover that one makes no sense without the other. Let yourself be carried away.

María del Carmen Romero Ternero
Director of the *ETSII: Escuela Técnica Superior de Ingeniería Informática* (School of Computer Engineering)
University of Seville

ESSAYS / ABOUT THE PROJECT

ON THE POLYERDIC VIEWS DERIVED FROM THE SYNERGY BETWEEN ART AND SCIENCE AND THE APPLICATION OF SciArt METHODOLOGIES

The ASTER project was born with the ambition of providing an opportunity for co-creation in interdisciplinary teams, trying to build bridges that would allow communication and collaboration between different ways of understanding the world and conceiving the construction of knowledge. Since the beginning of time, human beings have sought to develop their cognitive capacities in order to understand their place in the universe and transform the reality they inhabit. There were stages in history in which knowledge intertwined with each other, such as the Renaissance, while in others specialisation was predominant, allowing for in-depth progress in each discipline. Masters in the exploration of knowledge taught us the importance of both approaches.

At the present time, we once again feel the need to bring a multifaceted perspective to our complex reality, like that of Leonardo Da Vinci, the undisputed master of the synergy between art and science, or Ramón Llull, the philosopher who was known in his time as Doctor Inspiratus (Inspired Doctor). More recently we have such outstanding examples as Carl Sagan, a great innovator in science communication, who made us love astronomy, broadened our views beyond the confines of the earth, humbled us as a species and made us aware of our smallness and at the same time our greatness as a "means for the cosmos to know itself". There are also contemporary examples of women leading transdisciplinary innovation in SciArt such as Jill Scott (Switzerland), Natalie Jeremijenko (Australia) and Maya Lin (USA), among many other women who are building paths towards sustainability and empathy with our planet.

So let us also be inspired by the challenge of combining Art and Science as drivers of innovation, knowledge and communication. We are social animals, our culture is built on communicative pillars that allow us to learn and transform the world based on the narratives that our marvellous brain is capable of constructing. Let us make a hybrid exploration of our past, present and future. Let us learn to consider ourselves as one more species in communion with each other and with the planet. Let us open our ears and hearts to scientists through polarised vision in different dimensions thanks to art and transdisciplinary creativity. Let's develop the ability to feel the pain of mother earth (work "The inaudible howl"), understand the need for circular economy and the use of bioplastics (work "Plastic Rigor. Metamorphosis in a circular economy environment"), understand the importance of photosynthesis and how it is affected by climate change (works "Light Ph. / Dark Ph."), learn to love plants with a high capacity for resilience, basic for the regrowth of life after the impact of fires, key to the maintenance of our coastal ecosystems (work "Camarina"). These are just some of the possibilities that the ASTER project has managed to develop as paradigmatic examples of multifaceted views in the scientific field of the Environment, one of the themes of this first edition of the project.

Let us also enhance our Critical Thinking competence in relation to the field of Artificial Intelligence (AI), our second scientific theme. Let us learn to take AI down from the pedestal we have put it on due to the dizzying and astonishing development of algorithms that, although powerful, show weaknesses such as gender biases (work "Biases and human translation"), let us reflect on how they are introduced without permission in our digital intimacy (work "Disencounter"), think about the construction of meaning in a cyclical process (work "Limit Cycle"), feel the humility of AI that is not capable of creating on its own but on the basis of reference models (work "Nothing"), ask ourselves how dependent AI is on models of language and automatic reasoning (work "Video Data Bank. Work in Progress"), let us understand how cellular automata work by seeking integration with analogue creativity ("Roots, relations between computational and human"), let us glimpse the possibilities of AI to inspire hitherto unimaginable alternative realities and to destabilise or expand the set of established truths ("Twenty times true"), let us approach the exploration of basic questions such as conceptualisation a uniquely human capacity, and to what extent do simulation systemsde vida artificial allow us to study on

balance between personal will and the collective good? ("emergANT" work). All these polyhedral views are possible thanks to the use of innovative methodologies that stimulate inter- and trans-disciplinary creative thinking.

In this context, our eco-SciArt methodology was born in the ASTER project, in which we poetically invite professionals to plant "scientific seeds" of current topics, specified in multiple dimensions (objective: name, keywords, abstract, scientific method; as well as subjective: metaphor, scientific motivation, metaphysics, ethics and synaesthetic dimensions - colours, aromas and tastes).

These seeds were the seed of inspiration around which the interdisciplinary teams were created during the celebration of our first edition of the "ASTER hackSciArt". This hackathon took place in three consecutive afternoons, and was held in two modalities: on-site and online, taking into account sustainability criteria that minimised the impact of travel, limiting it to a local scale, but also giving the opportunity to remote attendees located anywhere on the planet to participate.

In this way, during the hackathon, the artistic proposals germinated into "SciArt flowers", also described in multiple dimensions in order to conceptualise the work in hybrid teams, which described what the resulting work would be like, as well as the process and the means to carry it out. Three months later, the flowers became "SciArt fruits", artistic installations that turned a scientific concept into a product capable of touching our souls, of discovering in a sensitive way the complexity and beauty of science, valuing at the same level the contribution of scientists and creatives to society.

Art and Science have always been the greatest exponents of human creativity, and the synergy between the two opens our human intellect to emotions, as doors to a new dimension in which Science allows us to feel and Art allows us to know and reflect. This whole experience was permeated by a democratic approach, in which elitism was avoided in the selection of team members, thus opening up the opportunity for the whole of society to participate, with the emphasis on co-creation and collaboration, skills that are much needed in the complex world we live in.

As Einstein once said "curiosity is the mother of true science and true art". It is curiosity that made this project become a dream come true, especially for its promoter and main researcher. A dream that continues, that does not want to end, that wants to become the germ of new editions in which, in an experimental and fraternal spirit, scientists and creatives (artists, humanists, technologists, ...) will once again lead SciArt innovation in their environment and beyond, connected to other countries with which this project has allowed a network of bridges of collaboration and dynamisation of transdisciplinary creative thought to be built. In a historical moment in which the challenges are ever greater, in the context of Climate Change, the crisis of Democracy and the Liquid Society, among others, it is necessary to join forces and converge to contribute to the common good from the synergic perspective of Art and Science.

PhD Rocío García Robles
Principal Investigator 1
Head of the research group: *Art-Science-Technology-Engineering Research: Innovation, Synergies and Methodologies* (TIC247)
University of Seville

ON HACKSCIART AND INTERDISCIPLINARY CREATION IN ASTER TEAMS

At the dawn of humanity, images played a fundamental role in communication, expression and understanding of the world. Before the development of structured verbal language, human beings already used visual representations to convey information, share knowledge and express emotions. These were the first artistic manifestations.

To this day, art remains a universal medium of communication. Art occupies - or should occupy - a central place in human life and experience, for it not only has the power to inspire, motivate and promote critical thinking; works of art can awaken alternative ideas, challenge established norms and open up new horizons of knowledge. Art can invite reflection, debate and introspection, stimulating creativity and fostering innovation in other areas of knowledge and life. Art connects us and makes us understand the shared human experience, allowing us to reflect on universal themes - such as love, beauty or suffering - and on astonishingly concrete themes, as is the case in this exhibition. And the fact is that art has the irrefutable capacity to connect with all fields of knowledge, being able to be located and flourish in the most unsuspected intersections between knowledge. Why not put art, science and technology on the same scale and with the same weight? why not create interrelations between them? why not bet on inter and transdisciplinary research?

One of the main purposes of the ASTER project (Promoting Art-Science-Technology-Engineering Research by using collaborative methodologies and tools) was to design a creative working methodology that would foster collaboration and synergy between art, science and technology, drawing on their individual strengths to create a unique interdisciplinary approach. This methodology was designed to explore new communions between art and science, to promote alternative thinking and to address complex problems from the holistic and sensitive perspective provided by artistic vision in confluence with scientific-technological research.

With this objective in mind, artists, engineers, technologists and scientists from different branches and specialities collaborated for more than three months to create the works that make up the ASTER>CIENCIA^ARTE exhibition. The challenge was not easy. The first stage was the design of the artistic projects. This took place during HackSciArt, an intensive creative event inspired by computer hackathons. HackSciArt was held bimodally (online and face-to-face) and took place over three consecutive days at the end of January 2023. The event was conceived so that the participating teams could develop the artistic projects that months later would materialise in the works that make up the exhibition, which are shown in the following pages.

The working teams behind each of the exhibited works were deliberately composed of people from very different disciplines. The participants in the event did not initially know each other, which is why the initial icebreaker dynamics were fundamental. The working teams were formed almost intuitively, with the only constraint being that they had to be disciplinarily mixed. In this way, each team ended up bringing together individuals from different areas of knowledge who shared common interests around the same "seed" or scientific concept - chosen from among the many options previously elaborated by the scientists collaborating in the ASTER project to be the inspiration and object of artistic reflection. Thus, pivoting around the research questions formulated by the collaborating scientists in relation to the two main thematic focuses of HackSciArt - Artificial Intelligence and the Environment -, the teams and their respective artistic projects were constructed.

HackSciArt served as a collaborative platform from which to create art inspired by science, promoting reflection on scientific advances and their ethical and social implications through it. This was a working methodology designed to facilitate the realisation of the artistic projects - which we metaphorically refer to as "flowers" - within the planned development days. To this end, the

teams were provided with a "project template" (expressly designed by the ASTER research team) so that each team could describe in detail the work they were devising. The templates presented the necessary sections to be completed in order to offer an integral vision of the projects, both from a conceptual and aesthetic-formal point of view, and the completed templates were handed in on the last day of the HackSciArt. The event was, as can be deduced, a real creative marathon. After the HackSciArt, the artists had three months for the funded creation of their respective projects. During this time the ASTER project monitored the progress of the projects, but left the teams free to design and follow their own roadmaps, meeting as often as they saw fit. The resulting "fruits" are the works that make up the exhibition ASTER > ART∧ SCIENCE.

As a final note, in relation to the sum of different profiles in the same creative team, it is significant that the ideas that emanated from the different groups turned out to be fairly balanced fusions of what each of their members could contribute. In fact, the final works, to a greater or lesser extent, incorporate scientific methods and tools in the creative process, and many even present complex technological developments that would not have been possible without the combined curricula of the teams, which shows that the union between different forms of knowledge and scientific fields broadens creative horizons and enriches both art and science. We will therefore conclude that by breaking down the barriers between disciplines, creative teams can access new knowledge and methodologies that can enrich their artistic practice. In turn, science and other disciplines benefit from creativity and artistic sensibility, as they can offer new perspectives and innovative approaches to address contemporary challenges.

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SCIENTISTS AND ARTISTS: TWO IRRECONCILABLE WORLDVIEWS?

The intersection of Science and Art has a complex and multifaceted tradition spanning centuries that includes a proverbial antagonism between the two disciplines, in which scientists and artists are seen as inhabitants of different, distant and irreconcilable worlds. While both share a curiosity and passion for exploring the world, their various perspectives, methodologies and priorities have often led to clashes and tensions.

Historically, the opposition between Science and Art arises from a hierarchical vision in which Science has been recognised as serious and legitimate, associated with objective truth, rationality and intellectual rigor, while Art is related to subjective expression, creativity and aesthetics. Thus, the explanation for the discrepancy may lie in the dissimilar conceptual and procedural approach adopted by the two: different, if not divergent.

As such, scientists focus on real evidence and understanding of the world through observation and experimentation; they work in highly specialized fields relying on data analysis to inform findings and advance knowledge; they adhere to the scientific method through a meticulous process by testing a hypothesis through observation, testing and peer review; with the goal of obtaining empirical evidence and options for replicating the experiment. They value objectivity, accuracy and precision in the pursuit of understanding the natural world.

On the contrary, artists explore complex ideas of a different order -ethical, social, political, philosophical, environmental, etc.-; they use critical thinking, give preference to subjectivity, emotion, communication and personal expression to obtain pieces whose realization has taken into account intuition, imagination, creativity and aesthetics; tools that are not always in line with scientific facts or principles. All this contributes to the artistic result being described as subjective and open to interpretation.

While to a greater or lesser extent both have a common goal, the difference in approaches can lead to conflict when it comes to working together to represent scientific concepts or data in Art. Scientists may criticize artists for taking creative liberties with little rigor, arguing that they may distort the idea or dilute the integrity of scientific findings. Meanwhile, artists may see strict adherence to scientific facts as a limitation of their creative freedom, hindering their ability to convey complex ideas or emotions in the artwork.

The different value systems they hold may also contribute to the lack of alignment. Scientists often prioritize utility, functionality, as well as the practical applications of their research, seeking solutions to real-world problems. Conversely, viewed simplistically, artists may emphasize aesthetics, originality and self-expression, valuing the subjective experience and emotional impact of their artworks. This can lead to conflicts over funding, recognition and support for shared projects. Scientists may argue that "Art that does not serve a clear scientific purpose or contribute to the practical applications of scientific knowledge is a waste of resources", while artists may counter that "the intrinsic value of Art lies in its ability to evoke emotions, induce critical thinking, invite reflection and challenge perception, regardless of its immediate practical applications", although no one doubts it generate a positive impact in the medium and long term.

Despite many notable advances, with scientists and artists struggling to find common ground, the SciArt divide remains a challenge. This situation may be due in part to the cultural stereotypes that persist around them coupled with how these subjects have

been teached. Therefore, the incorporation of STEAM teaching could bring about a significant change by helping to bridge the gap between Science and Art.

In this scenario, SciArt is an interdisciplinary genre that explores scientific concepts and phenomena through artistic expression. It is a form of collaboration that marries the precision of the laboratory with the creative energy of the artist's studio. By merging the two, SciArt creates a space for experimentation and exploration that is both scientifically rigorous and visually engaging, one of its key benefits being the way it can help bridge the gap between Science and the general public, as scientific concepts can be difficult to understand but, expressed through artistic means, can make more accessible those complicated scientific ideas and engaging. This is particularly timely at a time when many people are skeptical and dismissive, if not fearful, of Science and its advances, making Science literacy more important than ever.

Of course, teamwork is not always easy, it can cause friction and debate, and collaboration between scientists and artists is no exception. Both groups can be passionate and stubborn, and disagreements can arise over the direction or interpretation of the project. However, a deep symbiotic relationship between them is desirable. Scientists bring a deep understanding of the natural world, while artists bring a unique perspective coupled with the ability to communicate complex ideas in a visually appealing way. Thus, when the genuine partnership between the two collectives materializes, the results can be truly innovative. By working together, they can create SciArt pieces that are both scientifically rigorous and aesthetically appealing, which should foster a rapprochement between Science and the general public.

Fortunately, there are many who are still struggling to find common ground after seeing the potential of this integrative collaboration, sustained by opposing - and complementary - visions, whose synergy leads to previously unimaginable innovations. Science can be a source of inspiration for Art, but Art can also be an exciting tool for Science.

This SciArt exhibition is but a pale reflection - tip of the iceberg- of a society in which concepts such as quantum computing; new technologies applied to Art; AI (Artificial Intelligence); robotics; cyborg advances; STEAM disciplines; climate change or transhumanism, among many others, have become topics of debate to which, if we are consistent, we should give some response. Perhaps the answer to many of these questions could lie in the determined formation of SciArt teams, whose role lies in promoting scientific literacy, fostering creativity, developing communication skills and exploring ethical and social issues related to science and technology.

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PhD Carmen Salazar Pera
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ON SCIENCE COMMUNICATION THROUGH ART

Science communication through art is a way of conveying scientific ideas and knowledge in an accessible and attractive way.

Art is a very powerful tool to inspire and motivate different groups of people to be interested in and learn about science, as it can make abstract or complex concepts more accessible and understandable. From an outreach point of view, using art as a way to communicate scientific findings, concerns or questions can be a fun and exciting way to immerse the general public in these topics that might otherwise be perceived as boring or complicated.

A common form of science communication through art is the display of science art exhibitions. These exhibitions usually contain works of art that are inspired by science. For example, we can find creations that deal with topics pertaining to physics, biology, astronomy or chemistry, to give a few examples. Often, these works are accompanied by explanatory panels that help visitors to better understand the concepts behind the works of art.

There are various ways in which science can be communicated through art, using different media such as painting, sculpture, installations, photography, animation, video creation, music, dance, theatre or literature. SciArt is a discipline in its own right, focusing on the creation of works of art inspired by science. More and more artists are attracted to scientific and technological themes in their work, or are forming interdisciplinary teams with people involved in science to create works that lie at the intersection between the two.

However, the use of art to communicate science is not new. Throughout the history of science, drawing has been used not only to visualise and communicate research findings and concepts, but also as a way of understanding the nature of the surrounding world and the behaviour of its constituent elements. Scientific illustrations, although traditionally made by drawing and, with the advent of printing, by printing techniques, can nowadays include diagrams, graphs, photographs, diagrams and 3D models, among others.

More recently, the world of animation and video offers rich tools for explaining complex scientific concepts in a more visual and accessible way. These animations and videos can include visualisations of biological processes, simulations of experiments and models of complex systems.

Similarly, computer-generated art, or digital art, is a growing field that offers an efficient way to represent scientific models and simulations through attractive data visualisations, which hide complex mathematical algorithms and concepts.

A special mention when it comes to communicating science through art is deserved by art installations, which often require collaboration between scientists and artists. These installations can include both more scientific elements, such as data and graphics, and artistic elements, such as sculptures, paintings or drawings. A subtype of these is interactive art installations, or art installations that use technology, such as augmented reality or virtual reality, to allow visitors to have a more immersive experience of the scientific concepts and themes they address.

Similarly, theatre and dance can, by creating fascinating performances that raise issues of scientific interest, bring people closer to questions they would otherwise never ask. Many art projects focus specifically on science and social awareness. For example,

there are artists who use their works to make a social critique or deep reflection on issues such as climate change, environmental pollution, biotechnology, artificial intelligence and other current scientific and technological problems.

The integration of art and science can therefore improve public understanding and appreciation of scientific research, make it more relevant and meaningful in everyday life, and raise awareness of sensitive issues that need attention. If we understand SciArt as an interdisciplinary field that seeks to integrate science and technology with art and creativity, we can say that it is an art form suitable for exploring and communicating scientific and technological issues.

Since SciArt can take many forms, artists working in this field often collaborate with scientists and technologists to create works that challenge the concepts of art, science and technology as watertight compartments of knowledge, creating a symbiosis that favours the growth of both fields and their social projection.

In this sense, the artists participating in this exhibition aim to break down the false frontiers that separate art from science, creating works that promote reflection and dialogue on various scientific and technological topics, focusing on two fundamental areas: artificial intelligence and the environment. We hope that the works on display will encourage the public to understand and investigate the proposed themes.

PhD Amalia Ortega Rodas
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THE CURATOR'S VISION ON THE EXHIBITION

ART, SCIENCE, FUTURE

The dystopias imagined by fiction, as well as the collective fears propagated by public opinion, have two fundamental motives in our time: the repercussions of human action on the environment and the vertiginous and audacious developments of Artificial Intelligence. One has to do with the transformation or violent destruction of natural systems, with the damage done to living environments and the degradation of planet Earth; the other concerns a suspicion directed at the implications of AI in the development of human activity, in its modes of life, production or exchange.

The works that make up ASTER > ART ^ SCIE NCE take both motifs as a starting point, but they do so in a way that is alien to the fear or suspicion of these dystopian imaginaries. They are thus aligned with the potential of today's art to observe or get involved in the present with a consciousness more productive than critical, more open to the future in a fruitful way than to a sterile reprobation of what is already advanced. It is true that some of the artistic installations that make up this series operate as a denunciation of widespread practices against the environment or as warnings of certain problematic uses of Artificial Intelligence, but they do not do so from a moral instance that would have arrogated to itself the function of accusing, as has happened with much of the critical art of past decades, but through unique and novel resources that provide enriching questions or ideas.

In all these artistic proposals there is a special alloy of the poetic and the conceptual, a singular union of careful and delicate forms with thoughts of great depth. Everything is soft in its appearance, meticulous and fragile in its form, but rough and dense in the idea it expresses. This contrast is also evident in the distance between natural or handcrafted materials (vegetation, wood, natural fabric, etc.) and the use of advanced technologies in most of the pieces. In some of them, however, it is Artificial Intelligence itself, or technology itself, which takes sensitive form without leaving the digital or computer medium, without needing more physical elements than screens.

Therefore, this exhibition is a reliable representation of the ways in which art becomes sensitive -in the sensitive and affective sense, as an articulated sensation based on materials and processes- and of the ways in which art becomes sensitive -when it simulates an apprehension, an apprehension or an idea-.

Fernando Infante del Rosal
"Art, Science, Future" curatorial vision 1, Seville

WHO OWNS THE TRUTH?

The ASTER project (aster.us.es/en) emphasizes the co-creation of knowledge and the construction of meaning through the collaboration between art and science. It acknowledges that truth is not fixed but rather shaped by social and cultural contexts, and it highlights the importance of considering various viewpoints to gain a multifaceted understanding of complex realities in two thematic areas: Natural Environment and Artificial Intelligence.

In the context of AI, it prompts a re-evaluation of traditional notions of authorship and the potential limitations of those systems, raising questions about the ownership of truth when AI involved in knowledge construction.

In the framework of Natural Environment, it reflects on the multifaceted epistemology of truth in the context of the Anthropocene, and its necessary re-connection to nature facilitated through SciArt expressions.

Furthermore, the democratic and sustainable approaches of the ASTER project enabled the involvement of general society and a broad participation of creative teams in person and online. Its "eco-SciArt methodology" supported the shared efforts to transform a "scientific seed" (scientific topic) into a "SciArt flower" (art project proposal) during a hackathon, and into the final "SciArt fruit" (final artwork).

The main objectives were to transform the archetypical roles of Art and Science by the development of cross-pollinated critical thinking and co-creativity, as an attempt for a more comprehensive understanding of truth in a complex changing world.

In this project and its final exhibition, we realized that science can be felt through art, and art finds its narrative inspiration and means in science. So, let's open our senses and thoughts to the ASTER experience, and let our imagination fly through its magic.

> Co-creation blooms.
> Art and science intertwine.
> AI challenges the world.
> Nature in Anthropocene dance.
> SciArt whispers hope.

Rocío García Robles
"Who Owns the Truth?" curatorial vision 2, Linz

ASTER > ART ∧ SCIENCE / NATURAL ENVIRONMENT - ARTIFICIAL INTELLIGENCE

RIGOR PLASTIC 1.2. METAMORPHOSIS IN A CIRCULAR ECONOMY ENVIRONMENT

Scientific seed

Bio-waste is the seed that is transformed into a flower (bioplastic), which, once it has borne fruit, becomes a seed again. How can this be explained at a productive level? Nature functions in a circular way in equilibrium, nutrients allow the development of living beings whose residues are the basis for the formation of new beings. Production systems resemble the context of nature.

Curator's vision of the work

Nature is no longer conceived, as it was in antiquity, as an inexhaustible source of resources, which is why the contemporary understanding of nature assumes circularity as the only path to sustainable development, in the form of what we now call the circular economy. In this circularity, one of the most pressing challenges is the integration of synthetic products, the incorporation of the artificial into the processes of nature. This is an issue in which materials engineering and chemical engineering have taken an interest and which, through the study of Alberto Romero García, has served as the basis for the creation of this work by this group of artists.

In the form of an interactive installation close to a "happening", this piece shows a complex process of circularity in a system that traces a cycle between natural and artificial elements. Its artistic character is singular, because its conception and execution are intentionally close to a scientific experiment, halfway between research and demonstration. It is also unusual in the group of works of art that approach nature in the broad context of contemporary art, because the incorporation of animals, which in this case is appropriate and beneficial for them, is unusual for obvious ethical reasons. Here the beetle larvae live in a rich ecosystem, visible directly and indirectly - through cameras - to the viewer.

Although the installation celebrates nature's last hope with the integration of bioplastics, it also alludes in a sombre way to human action and the future of its own species: the piece of polystyrene that the larvae devour is a recumbent human figure, which is pierced and disappears in the course of the work. It is also the dismal vision of time that imposes itself, because the very existence of the insects as larvae determines that of the work itself.

The vision of the creators of the work

The opening segment of this installation centers on the concept of Rigor Plastic, an artistic endeavor embracing a circular structure with an educational focus. In a defined area of 1.50x50 cm, a polystyrene figure on a mid-level sieve serves as nourishment for Zhopohba Morio worms. In their larval stage, these worms consume the figure, later transforming into beetles in adulthood. These organisms degrade plastic, enhancing the substrate supporting edible plant growth. The installation promotes a cyclical strategy to counter plastics' environmental impact. Its aim includes real-time experimentation and dissemination, highlighting less familiar practices compared to conventional methods.

In the subsequent phase, within the Ars Electronica festival context, the final version becomes Rigor Plastic 1.2. Emerging from the prior phase, Rigor Plastic 1.1 takes form with varied elements. A composed video from recorded sequences depicting the evolution of the Rigor Plastic 1.0 process gains prominence. Simultaneously, a partly degraded polystyrene figure captures attention, symbolizing the worms' transformative journey. A shroud is was formed from fabric that acted as a filter throughout the process. Though the plant-centric stage's influence fades momentarily, its essence endures in the video, emphasizing circularity. Rigor Plastic 1.0 evolves, unveiling new feedback pathways, hinting at future iterations like Rigor Plastic 1.2, 1.3, and 1.4.

Who Owns the Truth?

In the context of this SciArt happening, the process of self-regulation and circularity implies a certain level of autonomy and control over the artistic expression. The transparent urn containing the human figure made of plastic represents a tangible embodiment of the artist's vision and creation. It also contributes to understand the importance of "circular economy" for sustainability purposes, and the need for plastics to be used in consumer should be biodegradable, to avoid us being devoured by our lack of ethics in our daily consumption of them.

On the other hand, the Zhopohba Morio worms, their digestive enzyme, and the resulting fertilization of the substrate, introduce a complex interplay of natural processes. These processes contribute to the growth of fully edible plants. This interdependence highlights the interconnectedness of different elements within the installation happening and emphasizes a shared ownership of the transformative journey from synthetic materials to natural growth.

The interpretation of the installation happening can vary depending on individual perspectives. The artist may claim ownership over the creative process and the intended message conveyed through the transformation of materials. The worms and their natural processes can be seen as contributors to the truth of the artwork, playing a vital role in the conversion of synthetic materials into fertile ground for plant growth.

In a broader sense, the connection between ownership and truth in this context lies in the notion that ownership of the installation happening, and its perceived truth is not limited to a single entity or perspective. Instead, it is shared and influenced by the collaborative efforts of the artist, the natural processes involved, and the individual interpretations of viewers. The question of who owns the truth becomes multifaceted, highlighting the complex nature of truth itself and the role of subjective ownership in its perception.

Title:
Rigor Plastic 1.2. Metamorphosis in a circular economy environment
Team members:
Eduardo Lavrador Jiménez (Artist), Yolanda Martín Benítez (Artist), María Díaz Osta (Artist)
Scientist:
Dr. Alberto Romero García
Environment
Seed:
Environment_26 "From bio-waste to bioplastics in a circular context"
Technique:
Installation, sculpture in porexpan and happening
Dimensions:

150 x 130 x 50 cm

ROOTS, RELATIONSHIPS BETWEEN THE COMPUTATIONAL AND THE HUMAN

Scientific seed

Cellular automata are those mathematical and computational models that model natural systems and that face the same as human subjects, a local interaction that provokes complex responses that affect each individual and the environment. All that is needed is to program the rule that the cellular automaton will follow and, from there, an emergent behavior of the whole system will emerge that is sometimes unexpected, generating complex patterns from very simple rules and even creating computers capable of solving certain problems.

Curator's vision of the work

The Decision Forest installation has been created by artists Mariano Luque Romero, Miguel Mendoza Malpartida, Cecilia Pineda Calvillo, and Esther Rodríguez Pluma in collaboration with computer engineers José María Delgado Sánchez and Pedro Escobar Rubio, and based on the research of computer science and artificial intelligence expert David Orellana Martín. However, seeking for an absolute integration of human creativity and mathematical and computational models, the artwork establishes a relationship between textile art pieces, lighting, sensors, algorithms, and hardware.

The creators of the piece started from an analysis of cellular automata, those mathematical and computational models that simulate natural systems and face the same challenges as human subjects—a local interaction that triggers complex responses affecting each individual and the environment. The interaction with the artwork by people who approach it further enhances the intricate web of decisions that intertwine mathematical algorithms with human behavior in a subtle way. At the same time, it projects the creativity of the installation's producers into its life because the artwork continues to create, continually enriching a fabric of impressions and endless data.

Roots points to the idea that the circumstantial action of a single individual can indeed modify the environment. It does so by assuming that our environments already integrate the natural and the synthetic, human will and artificial intelligence, natural behavior and computational behavior. The initial contrast between textiles, which contemporary art borrows from traditional craftsmanship, and advanced computation is quickly resolved in this ecosystem of cellular automata that opens up to the presence of the viewer.

The eternal life of the artwork also returns knowledge to its creators because the system allows for the collection of data through sensors, thus analyzing the interaction of the public with the installation piece. The authors have confidence in obtaining conclusions for future transdisciplinary and openly collective creations like this one.

The vision of the creators of the work

Like the unraveling warp threads that swirl and entangle at the beginning of this artwork, gradually organizing themselves as the viewer's gaze progresses through it, so are the relationships between humans and the new artificial intelligence. These relationships range from the simple to the complex, from tangled threads to the ordered complexity of the finished fabric that is screen-printed and onto which cellular automata are projected. These automata, which initially appear to generate in an isolated and random manner, gradually cluster and form increasingly complex relationships as they interact with each other, influenced by the presence of the spectators.

The cellular automata are based on a mathematical model to generate a dynamic system, one could say, a living system composed of a set of cells that can have different values depending on their interaction with the surrounding units, that is, their habitat. From here, we draw a parallel with the complexity of human relationships, an essential element for the functioning of this artwork. The interaction between the viewer and the artwork generates the functioning of the AI, and the proximity of the viewer activates the machine aspect, which constitutes half of this artwork.

The other half is a large burlap cloth onto which the cellular automata are projected. This textile piece is worked with screen printing and Vainica embroidery. This craftsmanship, which is now uncommon, involves unraveling parts of the fabric to release the warp threads, which are then grouped or separated to create decorative motifs. Just as in Vainica embroidery, where threads are unraveled and reconstructed, the two halves of this artwork are interconnected to form a single entity, moving from multiple units to unified multiplicity, from simplicity to complexity.

Who Owns the Truth?

This SciArt work integrates the concepts of cellular automata, mathematical algorithms, computational models, and human creativity, as a synergy between human expression and scientific principles, highlighting the interconnectedness of these domains. The resulting piece of textile art, combined with lighting, sensors, algorithms, and hardware, creates a multi-sensory experience for the viewer.

The motion sensor serves as a bridge between human behavior and the mathematical algorithms, allowing the viewer's actions to influence the experience of the artwork. This interaction further blurs the line between human agency and the deterministic nature of the algorithms, raising questions about the ownership of the truth that emerges from this dynamic relationship.

Title:
Roots, relationships between the computational and the human
Team members:
Cecilia Pineda Calvillo (Artist), Esther Rodríguez Pluma (Artist), Mariano Luque Romero (Artist), Miguel Mendoza Malpartida (Artist), Pedro Escobar Rubio (Computer engineer), José María Delgado Sánchez (Software engineer)
Scientist:
Dr. David Orellana Martín
Computer Science and Artificial Intelligence
Seed:
AI_03 "The complexity of the simple"
Technique:
Sculpture installation. Hemstitch, serigraphy and interactive digital projection
Dimensions:
200 x 200 cm

EMERGANT

Scientific seed

Complex systems operate according to very simple rules at the local level (e.g., an ant has its own decision, but it also follows the rest according to the level of pheromones in the environment left by the other ants). The combination of the simple in a scenario with many individuals ends up emerging as something complex and interesting. So, what are the keys that explain the metamorphosis of the ants?

Curator's vision of the work

Alongside the scientific collaboration of Celia Hermoso Soto, artists Rawand T. A. Masri and Marco Daniel Mosquera Lozano have conceived a multisensory artwork that integrates a large pictorial element with video and musical creation. The installation compares the organized life of our cities with ant colonies and highlights the relevance of small individual actions in the functioning of the whole.

A computer model that emulates the self-organized system of an anthill allows the authors to obtain an emergent solution from the sum of simple actions. This model operates on the opinions of citizens from the cities of Hebron in Palestine, Quito in Ecuador, and Seville in Spain regarding what is most important in the pursuit of happiness. On a pictorially intervened canvas with an image of Seville, each response is represented by the path of an ant. This expresses the way in which the shared needs of humans are combined with the individual choice of a path towards self-realization.

The activity of social insects and its allegorical nature generates a special interest in contemporary art, as seen in the works of Mexican artist Jesús Ramos Frías or Colombian artist Rafael Gomezbarros. It combines an appreciation for nature as a value with the inherent abstraction that nature itself provides. In the behavior of ants, we recognize a part of our social activity as well as the natural form of computational languages. That is why this artwork plays with the bidirectional interchange between abstraction and animal organization, along with Artificial Intelligence, creating more of a connection between both dimensions rather than a sense of estrangement, as seen in other works in this exhibition.

The sonic presence reinforces this connection: a music generated through an algorithm that interprets each choice with a note. In this way, the most basic needs are represented with low notes, while the more complex ones are represented with high notes. Additionally, the frequency of notes increases for the more popular needs.

The vision of the creators of the work

The artwork "emergANT" is a multisensory proposal. It consists of an installation that involves projecting a video with music onto an image displayed on the wall. The starting point of the artwork was Abraham Maslow's theory of needs.

For the sound aspect of the artwork, our own recordings were used and distributed throughout the video. The music notation software Finale and editing programs like Audacity and Screenpal were utilized. Afterwards, we recorded the selected tuning fork and assigned it to each ant as they reached their destination. The exhibited recording is a capture of the simulation window created with the program NetLogo. The code is based on bio-inspired algorithms, so that the ants are simple components that together form a complex system. Each ant decides which path to take, resulting in emergent behavior, hence the name of the artwork.

The image support is acrylic paint on canvas without a frame. The image includes a reinterpretation of typical motifs found in Sevillian tiles. The installation allows the observer to see the movement of the projected ants on the city image while listening to the auditory trace of their movements. "emergANT" constitutes a performative and procedural interrogation that, through a comprehensive sensory perception, generates a counterpoint of events. The metaphor of the ants is perceived in the projected points on the image and in the sound of their decisions. Just as ants search for food, human beings are constantly in search of self-realization. Each person takes their own path towards it, based on what they believe is best for them.

Who Owns the Truth?

This SciArt work explores the notion of truth in the context of the computer model that emulates the self-organized system of an anthill and the opinions of citizens from different cities.

This work emulates the self-organized system of an anthill, which implies that it simulates the behavior and interactions of ants. Through this model, an emergent solution is obtained from the sum of simple actions. This suggests that the truth or understanding derived from the model is not dictated by a centralized authority but arises organically from the collective actions and interactions of the simulated ants.

Furthermore, the metaphor works with the opinions of citizens from different cities, specifically Hebron in Palestine, Quito in Ecuador, and Seville in Spain. The opinions of these individuals represent their subjective understanding of what is most important in the pursuit of happiness. By representing each answer with the path of an ant, the model symbolically expresses the combination of shared human needs and individual choices for self-realization.

This connection highlights the notion that the truth in this scenario is not owned by any specific entity or individual. Instead, it emerges from the collective wisdom and interactions of the simulated ants, as well as the diverse opinions of the citizens from different cities.

The model suggests that the truth is a result of a complex interplay between shared values and individual perspectives. It acknowledges that different individuals may have different paths to self-realization and that there is no singular, absolute truth that can be owned by any one entity. The emphasis is on the interdependence and collective nature of truth, as it emerges from the multitude of perspectives and interactions within the system.

In this way, this work challenges the idea of singular ownership of truth, and instead emphasizes the dynamic and collaborative nature of truth formation in complex systems, where individual perspectives and collective actions intertwine to shape our understanding of reality.

Title:
EmergAnt
Team members:
Marco Daniel Mosquera Lozano (Musician), Rouand Masri (Artist), Celia Hermoso Soto (Engineering student)
Scientist:
Dr. Agustín Riscos Núñez y Dr. Ignacio Pérez Hurtado de Mendoza
Computer Science and Artificial Intelligence
Seed:
AI_01 "The anthill is more than the sum of the ants"
Technique:
VideoMapping on Canvas
Dimensions:
200 x 300 cm

LIMIT CYCLE

Scientific seed

Concepts are a very important part of human reasoning. But do concepts exist in animals? If so, then would we have the possibility of recreating them with machines? Will and freedom, apart from consciousness, add too many unknowns to the understanding of the human capacity to conceptualize the reality that surrounds us. If the animal dream hypothesis were true, then we might think that an artificial simulation is possible.

Curator's vision of the work

"Limit Cycle" is a concept factory that explores how concepts are generated and unfold in human knowledge and Artificial Intelligence. The installation encompasses a series of videographic, sculptural, graphic, and sonic elements, coupled with an AI system, to emphasize the role of art in shaping concepts. The creators of the artwork aim for sound, imagery, writing, and other artistic forms not only to represent concepts but also to establish them. It is true that a part of philosophical thought has argued that the substance of art is not primarily concepts - for instance, Deleuze spoke of art as a generator of "percepts," a universalizing alternative to supposedly universal concepts - despite acknowledging the conceptual vector in the trajectories of modern and contemporary art. But what are the new conceptual challenges of art in the era of Artificial Intelligence? What happens when these "percepts" ally themselves with the learning and interpretation capabilities of machines?

These complex issues are the subject of this artwork, which connects the abstract production capabilities of human creativity and discursive thinking with artificial processes. The result is significant because the synthetic aspect allows for elaborations and connections that are not constrained by human experience, thus expanding the field of concepts. The human experience is provided by the interaction of the viewer with the artwork. Only through this interaction can the machine engage in processes of abstraction and elaboration because concepts inherently emerge from human experience.

Concepts are instrumental productions, but their generation is complex. Generally, intuitions or insights are the first to form, unthought modes that do not yet become mental representations. Notions are where thought resources do not possess their own form yet but become evident through periphrasis and circumlocutions. Concepts are constructions and formulas, tools with which to explore fields of meaning. Finally, ideas are the articulations of concepts, works of imagination according to Ortega y Gasset. These are the form and limits of human conceptual elaboration. Philosophy usually focuses on the processes that legitimize ideas from intuitions, while art seeks to legitimize intuitions by tracing them back from ideas. Limit Cycle questions to what extent both directions are modified by the interaction of AI.

The vision of the creators of the work

Limit Cycle proposes a revision of the processes of creation of concepts through a proposal that is interactive and close to the spectator, who will be placed in the centre of the work to question the correspondence between images and words.

The design of the artwork opts for simplicity, seeking an immersive result that directly appeals to the interaction of the audience with artificial intelligence. The artwork consists of two blue vinyl panels (covering the floor and the wall) with white inscriptions, a screen, and a computer where the AI algorithm is implemented. On the floor, a large white circle and a QR code invite the viewer to participate in the artwork. On the screen located on the wall, the images generated by the artificial intelligence in response to the viewers' interaction can be seen. Additionally, a brief text inviting the audience to reflect can be read. The visualization of the images occurs synchronously with the interaction of the viewers, who can write different words or phrases through a web interface and observe how the artificial intelligence generates the images that are projected onto the wall screen.

The idea behind the artwork is to address the processes of conceptual creation, focusing on the mechanisms of meaning construction and the relationship between words and images. Viewers will be able to observe how the mental images associated with words appear to crumble (or perhaps reaffirm) in the face of the interpretations made by artificial intelligence, which is initially detached from commonly accepted linguistic conventions. With each new interaction, the correspondence between words and images transforms, creating a cyclical feedback loop that seems to have no limit.

Un concepto puede adquirir un carácter infinito si su significado se reimagina una y otra vez, llegando a ser enigmático e inconmensurable para el intelecto humano. La creación de un concepto es semejante a la noción matemática de trayectorias que se originan en puntos diversos y terminan fluctuando sin cesar alrededor de una órbita idealmente alcanzable: el ciclo límite.

una variedad de verduras se muestran en una mesa

Un concepto puede adquirir un carácter infinito si su significado se reimagina una y otra vez, llegando a ser enigmático e inconmensurable para el intelecto humano. La creación de un concepto es semejante a la noción matemática de trayectorias que se originan en puntos diversos y terminan fluctuando sin cesar alrededor de una órbita idealmente alcanzable: el ciclo límite.

Who Owns the Truth?

On the one hand, this SciArt work could signify the collective ownership of the consensus-driven meanings constructed by individuals within a given social and cultural framework. Truth, in this sense, emerges from the shared agreement and understanding of the relationship between words and images, guided by the conventions and norms of a specific community.

On the other hand, the work introduces the idea that AI can function as a subversive element within this process. AI, with its ability to analyze vast amounts of data and generate novel associations, has the potential to challenge or transcend the social conventions that shape meaning construction. By questioning and subverting human-centered approaches, AI can introduce alternative perspectives and interpretations, potentially redefining or expanding the boundaries of meaning creation.

This subversive element of AI prompts us to reflect on the ownership of truth in the face of evolving technologies. Who ultimately owns the truth when AI challenges social conventions and introduces new conceptual frameworks? Does the ownership of truth shift as AI contributes to the meaning construction process? These questions invite us to reconsider the traditional notions of ownership and authority in relation to truth.

Therefore, this work implies that AI's involvement in the meaning construction process raises the possibility of transcending what is "properly human" in the creation of concepts. This suggests that the AI introduces a transformative element that challenges established human-centric paradigms and expands the potential for generating new meanings and truths.

Title:
Limit Cycle
Team members:
Víctor Fernández Calderón (Electronics and AI Engineer), Triana Sánchez Hevia (Artist), Raquel Serrano Tafalla (Artist), Rosa María Molina Arregui (Engineer), Emiliano González Herrer (Physicist), Rafael Garrido Vílchez (Artist), Javier Alejandro González Borbolla (Artist)
Scientist:
Dr. Jaime de Miguel Rodríguez
Computer Science and Artificial Intelligence
Seed:
AI_12 "Concept Factory"
Technique:
Vinyl printing, Virtual image generation by AI
Dimensions:
200 x 200 cm (Wall) 200 x 200 cm (Floor)

TWENTY TIMES TRUE

Scientific seed

Work in mathematics progresses by introducing new concepts that are formally expressed together with their basic properties. Once such concepts are introduced, new properties are deduced by means of a fairly formal and to some extent automatable process. However, these formal methods have considerable limitations. Turing's or Gödel's results show that there are problems that we cannot solve algorithmically or truths that cannot be proved in fundamental theories. This raises the question: how can we become aware of the limits of our scientific methods? What are the practical implications of the existence of these limits?

Curator's vision of the work

All the creators of this installation combine diverse facets within themselves: Cristina Quintana Laforet is a visual artist and musician; Natalia Herrera Pombero is an artist and architect; and José Manuel Higes López is a writer and mathematician. This fact partially explains the multifaceted nature they have projected onto both the form and content of their work.

Like the rest of the works in this exhibition, "Twenty Times Truth" presents an alternative vision of Artificial Intelligence, not merely as a more efficient and extensive extension of human intelligence, but as a mode of revisiting it. For these artists, AI can not only help us achieve new truths but also unravel many of the established and uncritically accepted truths. Faced with the closed framework of our knowledge systems, with their entanglement that sometimes affects logic itself, synthetic intelligence has the ability to access knowledge differently, with a different order, thereby weakening many of our presumed consistencies. Hence, the form of this installation is deliberately orderly and geometric, a polyhedron with twenty faces—an icosahedron.

For different cultures, the number twenty has symbolized order and balance since ancient times. It's no coincidence that the icosahedron is one of the Platonic solids, as that term already points to the perfection of the ideal. However, in this piece, such a quality is treated ironically. In the interaction with the artwork by the viewer, the presumed order is revealed as a polished diamond that encloses a complete universe of preconceptions and prejudices.

The vision of the creators of the work

How can artificial intelligence help us to reach new truths? What are the limits of our knowledge and how do we overcome them? In the project "Twenty times true" we try to answer these questions in an artistic way. To do so, we believe that artificial intelligence can be a useful tool to inspire alternative realities that are so far unimaginable.

Both logically and psychologically, language and established knowledge create a spider's web that constricts the truths attainable by human beings. In other words, the human brain often does not construct new truths but uses established truths to analyse reality. However, artificial intelligence can come up with novel proposals that escape the prison of human language. Showing and inspiring new truths through Artificial Intelligence was the goal of this project.

We established a collection of common truths in our contemporary society. Through content classification techniques we structure these truths into twenty categories. Thus, there were religious truths, customary, daily, mathematical, musical, forbidden, artistic truths...We associate each one of the categories with the faces of an icosahedron, one of the Platonic figures that for the Pythagoreans had metaphysical properties. In this way, the icosahedron would symbolically function as a door or a bridge that will connect our truths with the inspiration proposed by artificial intelligence.

To further reinforce the symbolic idea of a bridge, we built two sculptures: a wooden material icosahedron and another interactive virtual icosahedron that, when pressed on its faces, immerses us in an ocean of images generated by artificial intelligence associated with truths. Thus, the viewer can travel from the concrete material world to the abstract and unknown virtual world.

For the material sculpture we chose wood for its warm appearance, as opposed to metal, associated with technology. On the other hand, for the virtual sculpture, metallic-looking gloss tones were chosen to indicate its artificial appearance and its connection with AI. It is in this virtual icosahedron where the viewers decide what truth they are interested in exploring and by clicking on such truth, the program plunges them into the arenas of artificial intelligence proposals.

In this way, the viewer can travel from traditional truths made of material art; to the abstract, immaterial and virtual world of artificial intelligence to reach new possibilities of knowledge.

Twenty Times Truth is a bridge, a door and a new way of seeing the world.
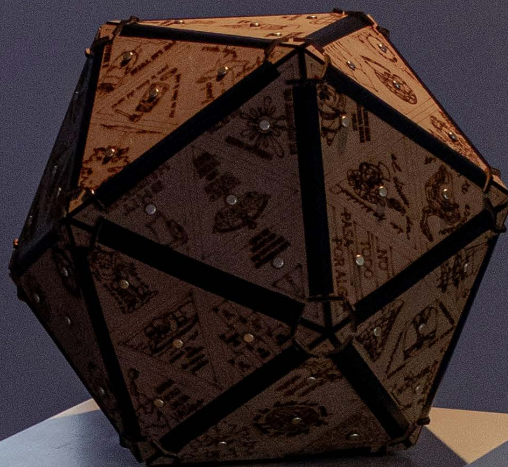
Who Owns the Truth?

This SciArt work introduces the idea that Artificial Intelligence (AI) can serve as a tool to challenge the ownership of truth by inspiring alternative realities and expanding or destabilizing established truths. The installation illustrates this concept by connecting an icosahedron, where each face represents a group of established truths from various domains, with an AI.

By interacting with the icosahedron, visitors are given the opportunity to explore alternative perspectives, challenging the ownership and stability of established truths. This challenges the idea of a singular truth and invites visitors to question and reevaluate their understanding of established truths in various realms, be it social, scientific, artistic, religious, and more.

Title:
Twenty times true
Team members:
Cristina Quintana Laforet (Artist), Natalia Herrera Pombero (Artist and Architect), José Manuel Higes López (Writer and Mathematician)
Scientist:
Dr. Francisco Félix Lara Martín
Computer Science and Artificial Intelligence
Seed:
AI_07 "Complexity and indefinability "
Technique: Wooden Icosahedron intervened by laser screen printing, electronics and projection. Virtual Reality Programming.
Dimensions:
32 x 32 x 32 cm

LIGHT PH. / DARK PH.

Scientific seed

In the framework of functional ecology, the study of photosynthetic traits is fundamental for the determination of responses at the level of organs (leaves, green stems), organisms (plants) or ecosystems (forests). The analysis of the photosynthetic function of plants is used as an indicator to understand their capacity to adapt to the past, present and future environment.

Curator's vision of the work

Most of the processes of life are imperceptible to us. Living beings grow or transform in a duration that is not given to our eyes. There are rhythms of nature that we do not hear because their sources move very slowly. While we recognize an animal as a living being through the movement of its body, life itself is defined by an activity that hides behind apparent stillness. We do not see ourselves grow; we cannot see growth itself, but only its results over considerable spans of time. Life is, therefore, a challenge to time and visibility. This is what the philosopher Henri Bergson believed, and it is what those who pointed to the fullness of life noticed: that life we identify with experience, memory, or fulfillment stands against that other slow life of indistinct transformations.

Photosynthesis is one of those processes that we can only perceive through its results, and yet it has inspired many ideas in the human species, especially regarding the union of the past and the future, its circularity, in the life of plants. It is "the Earth's photovoltaic system," in the words of plant biology and ecology professors Enrique Mateos Naranjo and Susana Redondo Gómez. These researchers have provided scientific insight to artists Áurea Muñoz del Amo and Carmen Salazar Pera, leading them to conceive two works that establish a dialectical and alternating relationship: one focused on the light phase of photosynthesis and the other on its dark phase. Áurea Muñoz had developed a significant part of her academic and artistic research around the relationships between light and graphic art, while Carmen Salazar explored the imagery of shadows on paper. That's why they decided to create two works that would establish the alternation of light and darkness characteristic of the photosynthetic process.

Both video creations engage in a diligent search, which is also reflected in the ability of our eyes to adjust to changes in light. One delves into light to reveal the gaps of shadow, while the other unveils luminosity within the thickness of darkness. In this way, art makes evident what plant life seems to conceal. However, the artists have been careful not to deny the alternation of both phases in photosynthetic life, and each video begins only when the other has concluded. With their creative independence merged into a joint work, the artists allude to the way different forces of nature come together for a common purpose.

The vision of the creators of the work

Light Ph./ Dark Ph., is a collaborative work made from the point of view of the plastic arts, inspired by the complex biological process of photosynthesis in plants, for which expert biologists have been consulted. Made in video format, it consists of two distinct parts, each of which represents a phase of the process. The binocular vision aspect chosen alludes to the image that could be obtained by looking through a microscope and which, in turn, serves to differentiate the stages of the process.

Thus, the left circle –Light Ph.– shows evocative images of the biochemical transformations produced inside the plant in the presence of light, hence the chromatic range chosen reproduces the light spectrum in which they develop. The viewer is thus invited to be transported inside the plant, perceiving the intricate dance of electrons and photons that takes place during the light phase of photosynthesis. It creatively illustrates how during Hill's reaction, thanks to the presence of light, chemical energy in the form of ATP and NADPH is obtained from the dissociation of water molecules, forming oxygen and hydrogen. This process begins with the absorption of light by specialised organic molecules found in the chloroplasts of plant cells, also depicted in the video.

When the video in the left circle becomes inactive, and with it the events of the light phase, a succession of images appears in the right circle, analogy of the next phase –Dark Ph.–. Forests, trees, plants, leaves... captured in the middle of the darkness in a simulated zoom that ends up taking us to the very interior of the plant, surprised in the middle of a biochemical process, independent of light or Calvin cycle, in which CO_2 and the energy accumulated in the previous phase is consumed to manufacture sugars. The video as a whole –Light Ph. / Dark Ph.– is a coherent and effective artistic statement on the complex beauty of plant photosynthesis. The SciArt nature of the piece reflects the interdisciplinary character, in which science and art can come together from different perspectives and approaches to create something truly unique and thought-provoking.
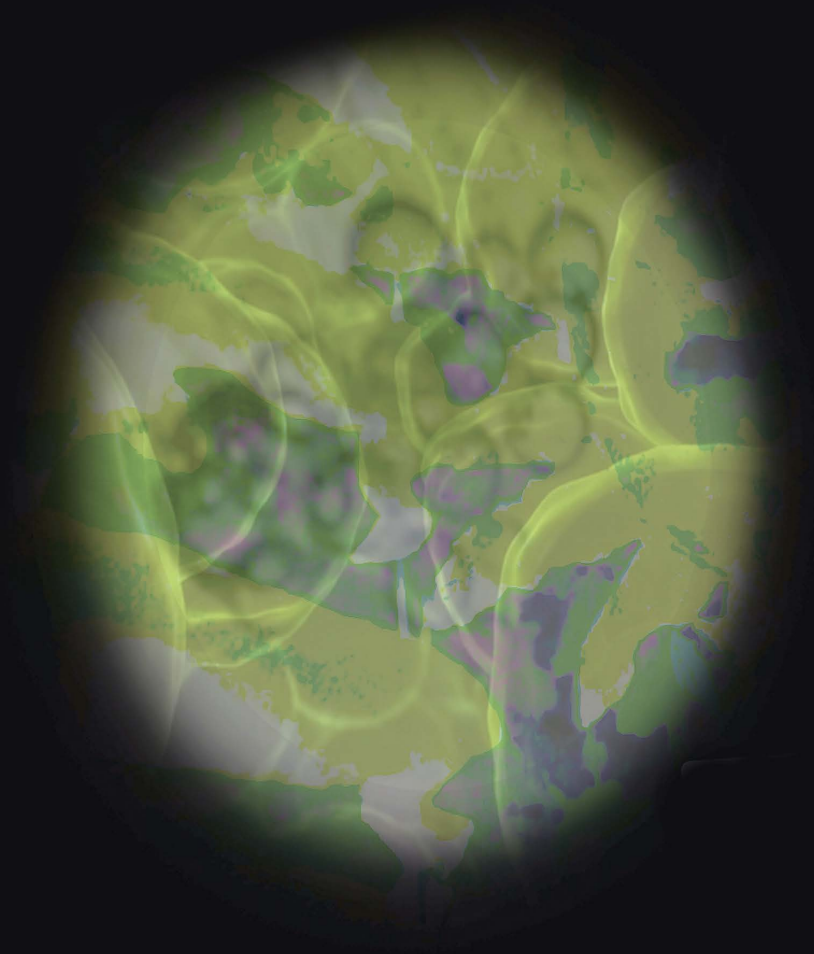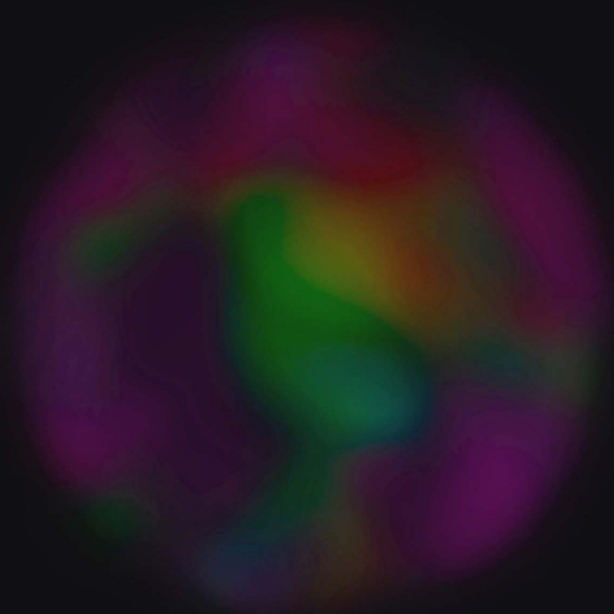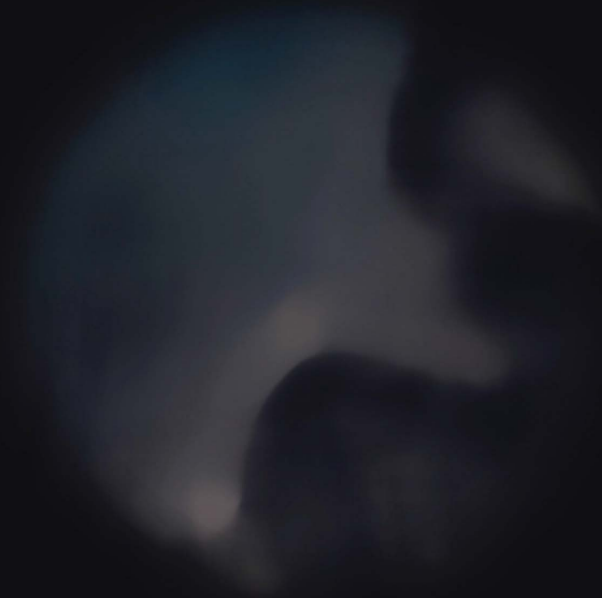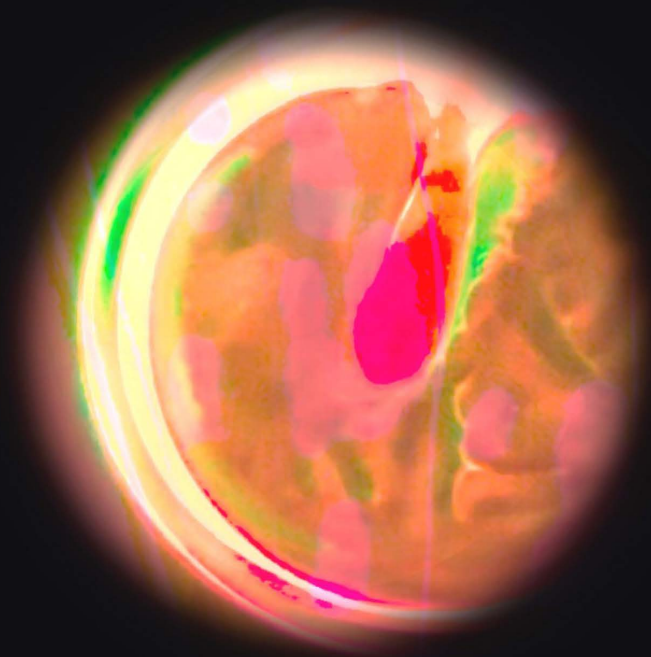
Who Owns the Truth?

This SciArt work draws inspiration from plant photosynthesis, which is a scientific process that converts sunlight into energy, enabling plants to grow and sustain life. By dividing the work into two distinct parts, each representing a phase of the process, the artists introduce a visual metaphor for the stages involved in this intricate biological phenomenon.

These are two twin SciArt works, in which the interpretation and representation of the stages of plant photosynthesis become crucial. The binocular vision aspect, which alludes to looking through a microscope, suggests a close examination of the process, emphasizing a scientific perspective. This perspective can be seen as an objective attempt to uncover the truth of the biological mechanisms at play. However, the notion of truth in the context of plant photosynthesis can also be subjective. Different scientific studies, theories, and interpretations exist within the field of biology. Researchers may have varying conclusions or perspectives on specific aspects of the process. This subjectivity highlights the idea that ownership of the truth is not singular, but rather influenced by the individuals or groups involved in the scientific exploration and interpretation.

Furthermore, the artistic representation of the process introduces an additional layer of subjectivity and personal expression. The artist's vision and creative choices in visually differentiating the stages of photosynthesis contribute to the overall narrative of the artwork. Both artists discuss ownership over their representation of the truth, incorporating their own perspective and artistic interpretation into the work.

This SciArt work invites reflection on the subjective nature of truth within the realm of scientific processes and artistic representations. It suggests that ownership of truth is multifaceted, encompassing scientific inquiry, individual interpretations, and creative expressions. The question of who owns the truth in this context emphasizes the complex interplay between objective scientific observations, subjective interpretations, and the artistic vision of the artists.

Title:
Light Ph. / Dark Ph.
Team members:
Áurea Muñoz del Amo (Artist) y Carmen Salazar Pera (Artist)
Scientist:
Dr. Enrique Mateos Naranjo & Dra. Susana Redondo Gómez
Plant Biology and Ecology
Seed:
Environment_25 "Photosynthesis, a fundamental process for the preservation of life"
Technique:
Video SciArt.Sound: Biorhythms of plants captured with MIDI device
Duration:
1'30''

CAMARINAS #2

Scientific seed

Juan Ramón Jiménez described the camarina as "the pearls of the dunes" of his childhood. Despite the hostile conditions, the "camarina" grows slowly and searches for resources in the subsoil. The sands protect it from forest fires and after a few months, it resprouts and produces white berries that attract animals such as rabbits, wild boars, badgers and foxes. The secret of its survival lies in its slow growth and the search for subway resources.

Curator's vision of the work

The horizontal and the vertical, what lies and what emerges, are expressed in this SciArt installation through elements that trace both coordinates, defining stability and balance. They embody the stability and equilibrium of Zen philosophy, but also those of nature itself, which manifests its persistence in harmony while sometimes promoting violent transformations.

The vertical element is depicted by a curtain of pearls. These are the berries of the myrtle plant, which Juan Ramón Jiménez called the "pearls of the dunes." The plant has been studied by plant biology and ecology professor María Cruz Díaz Antunes-Barradas, providing a foundation for the artists Amalia Ortega, Rocío García Robles, and Isabel Azevedo, who are familiar with the relationship between art, science, and technology. The resilient myrtle emerges in the sands, which protect its roots from fire while providing anchorage to the shifting dunes and food for birds and insects. In this artwork, the pearls, symbolizing spiritual ascent, detach themselves from the roots and trunk, which rest upon a luminous base. These elements are not inert; their light responds to the presence of the visitor, just as they would in their natural environment when someone walks on the dunes. In the background of the installation, a video creation emulates the harmonious integration of the ecosystem's beings, while a sound creation immerses us in a sensory confusion, almost pantheistic, where everything is simultaneously and nothing is separate.

The artwork visually confronts us with a composition in the form of a cross, and ethically, with a crossroads that determines our life on Earth and within its natural environments. It is Nature itself that has motivated our thinking and beliefs as humans, guiding us in the search for a natural principle, an arche. Our fundamental question remains: what moves it? Where do intelligence and will, which remain unspoken but manifest themselves, originate from? What force causes the same myrtle plant to persistently sprout anew? This plant seems to have embraced the understanding that destruction is merely a moment within the persistence of life that we call creation.

The vision of the creators of the work

The resistant "camarina" emerges from the sands, which save it from the fire by protecting its roots, while it itself offers anchorage to the moving dunes and food for birds and insects. In this work, these "pearls", in spiritual ascent, are freed from the roots and trunk, which rest on a luminous base.

According to the user interaction, a light pattern illuminates the tree on the light surface, which represents the "camarina plant", (a very resistant and important actor in the ecosystems of the Atlantic coast in Portugal and southwest Spain) that should be respeced and preserved by humans.

Who Owns the Truth?

The resilient Camarina's root serves as a metaphorical representation of nature's ability to adapt and survive in challenging environments. The sands, which protect the camarina's roots from fire, can be seen as a form of ownership or guardianship, preserving and safeguarding the camarina's existence. Simultaneously, the plant itself plays a vital role in the ecosystem, offering anchorage to the moving dunes and providing sustenance for birds and insects. This interdependence reflects the interconnected nature of life and the shared ownership of truth within the natural world.

By depicting the "pearls" on a spiritual ascent, separated from their roots and trunk, the work introduces a metaphorical journey of liberation and enlightenment. The luminous base on which they rest symbolizes a higher plane of existence or transcendence. In this context, the pearls may represent profound truths or spiritual revelations that are detached from earthly attachments and limitations.

Truth, as represented by the pearls, exists independently and universally, beyond any single entity's claim or control. It is a profound aspect of existence that can be discovered, shared, and experienced by all.

Furthermore, the idea of ownership in this context can be examined from different perspectives. One could argue that nature, represented by the resilient camarina and the shifting dunes, owns the truth of its cyclical processes and the delicate balance it maintains. Alternatively, one could view the artist or creator as the owner of the artistic representation of truth, captured through the metaphorical elements of the work.

Visitors are invited to consider the multifaceted nature of truth and its relationship with the natural world and artistic expression.

Title:
Camarinas #2
Team members:
Rocío García Robles (Artist), Amalia Ortega Rodas (Artist)
Scientist:
Dra. María Cruz Díaz Antunes-Barradas
Plant Biology and Ecology
Seed:
Environment_23 "Camarina, the pearls of the dunes walking on the sands"
Technique:
Electrical connection, attachment of the bead curtain to the wall (top position). Includes a Raspberry Pi + Arduino
Dimensions:
180 x 100 cm (Wall) 180 x 60 cm (Floor)

NADA #2

Scientific seed

How does Artificial Intelligence conceptualize emptiness? How does it face nothingness when it has no reference model? These questions have to do with the limits of human knowledge, and also of machines.

Curator's vision of the work

Researchers Álvaro Romero Jiménez and Miguel Ángel Gutiérrez have questioned how Artificial Intelligence conceptualizes emptiness and confronts nothingness when it has no reference models ("How can we define a star if we have never seen one?"). Nothingness can be understood in three ways: epistemic, as a blind spot of knowledge or its limit; ontological, presenting it as the otherness of existence; or ethical, connecting it with forces of deprivation and evil. There is also another form of nothingness, the positive void of philosophical nihilism or certain Eastern religions, assimilated to the blankness that erases everything and inaugurates everything anew.

These human perspectives on nothingness are replicated within the context of Artificial Intelligence, where the epistemic, ontological, and ethical aspects once again encounter the problem of limits and the external. To bring novelty to the discussion, artists Guille Rodríguez and Olga Albillos have modified their initial question, no longer asking about the nature of nothingness, but rather how it can be perceived and represented. It is known that the representation or allusion to nothingness has been a challenge for art since ancient times, taking forms such as the contrasting concepts of emptiness and paradoxical saturation. But what form does nothingness take in the context of synthetic consciousness or in the realm of semi-digital life?

In their installation, two facing showcases attempt to display continuously moving smoke, but it strives to dissolve itself to avoid being exposed. One showcase measures the density of the environment of the other and struggles to remain equally full or empty. Here, the transparent containers allude to the axiom of the empty set ("There exists a set such that no element is a component of it"); however, the smoke, symbolizing nothingness and, rather, disappearance ("to vanish"), resists being and being seen, denying itself to return to a nothingness it cannot reach. Furthermore, the presentation in two showcases is not merely a formal decision; it expresses the necessary dialectics of nothingness that Sartre theorized: the negation of one being allows the emergence of another, as nothingness is the principle of creation.

The vision of the creators of the work

"Nada" (Nothingness) is an installation of two showcases facing each other and displaying smoke inside them. The first one produces a pattern of quantity and rhythm of smoke which tries to be imitated by a second showcase adjacent to the first one.

Trying to confront the representation of nothingness is an aporia in itself, and we knew from the first moment that we were facing an exercise in approximation. An approximate nothingness, from an aesthetic point of view, is not possible, and the closest we get to it in the methodology of artistic practice is when we work with emptiness, hollowness or silence. Looking for inspiration in our seeds, the doubt was raised in her about how the AI confronts the work of production if it is not given any reference data base. It was under this idea, that AI needs a referential model to imitate, that we decided that our work would try to reflect the process of imitation of the undefined as a central theme.

That is why we decided to confront the nothingness from the absence of reference, and the challenge arose to find a material that did not conform to a predictable form when exposed, that is when the idea of modelling with smoke arose. To this end, we developed two twin bases sealed by their display cases, which house a surreptitious technological circuit made up of a smoke machine expanded by an arduino system, which allows us to control and parameterise the flow, intensity and cadence of the same. The smoke as matter offers us in turn this aesthetic approach, as the clouds contained in the showcases, which are self-condensing, struggle to slowly empty and dissolve into the environment. It is in these brief moments of emptiness that we come closest to the exposed nothingness that we are trying to contain.
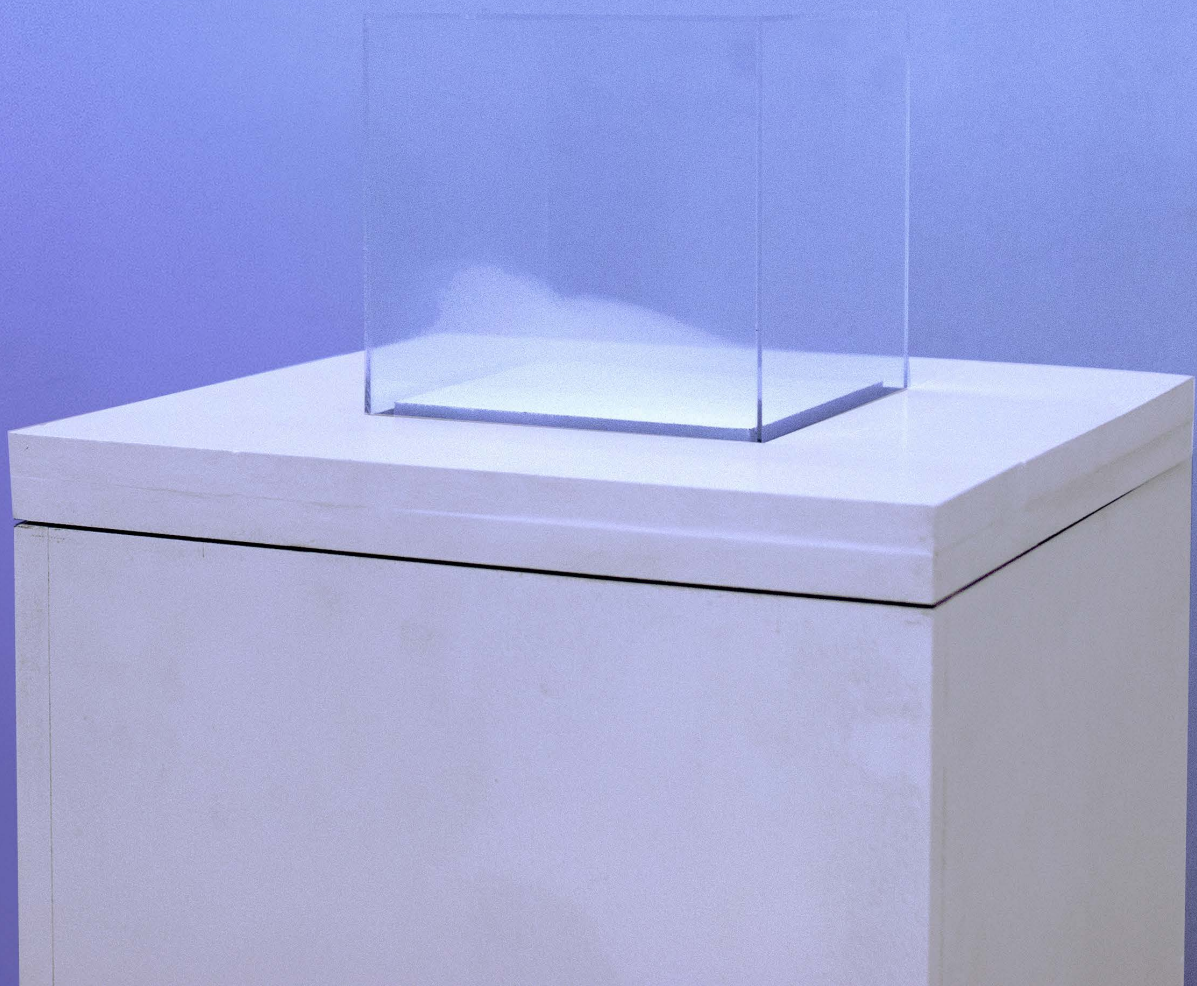
Who Owns the Truth?

In this SciArt work, the authors tackle with the question of how AI conceptualizes emptiness and faces nothingness when it lacks a reference model. But, who or what determines the truth in such a scenario? This question emphasizes the complex nature of truth ownership in the context of AI, where the absence of a reference model and the interpretive capabilities of AI systems challenge traditional notions of truth and raise important ethical and philosophical considerations.

Title:
Nada #2
Team members:
Olga Albillos (Artist) y Guille Rodríguez (Artist)
Scientist:
Dr. Álvaro Romero Jiménez y Dr. Miguel Ángel Gutiérrez
Computer Science and Artificial Intelligence
Seed:
AI_05 "Untitled"
Technique:
Sculpture. Plexiglas, intervened smoke machines and arduino circuit
Dimensions:
44 x 44 x 140 cm

BIASES AND MACHINE TRANSLATION

Scientific seed

Algorithms have a huge impact on people, on our minds and on our decisions. We find them in search engines, mobile applications (conversation systems such as Siri or Alexa or image analysis systems such as facial recognition), social networks or platforms, and they help us access information and content, and also influence us and take time, usually on our cell phones.

Curator's vision of the work

In recent years, we have discovered that the main challenge of Artificial Intelligence is not its ability to replicate individual human intelligence, but rather its impact on social intelligence. Our individual understanding is mediated by new interfaces, as well as our communities and societies, which are now defined and shaped by algorithms. The scientific and technological challenge lies not in subjectivity, but in intersubjectivity, and it is precisely at this point where art can contribute the most to the social development of AI.

The analysis carried out by researchers Emilia Gómez Gutiérrez, Isabelle Hupont Torres, and Marina Escobar Planas from the Scientific Office of the European Commission, focusing on the relationship between human behavior and that of machines, has served as a seed for artists Helena Hernández Acuaviva and Agda Carvalho to delve into the problems of bias in machine translation. A petition on Change.org revealed that Google or Microsoft translators were translating the phrase "The judge told the nurse to call the engineer" as "El juez le dijo a la enfermera que llamara al ingeniero," with an evident gender bias.

The artists have created two audiovisual works in which human intuition is measured against the effectiveness of the machine, but also revealing that Artificial Intelligence is a symptom of social realities translated into the synthetic world. Machine biases largely stem from the biases of our societies. In the last decade, new studies in social epistemology have revealed the epistemic and hermeneutic injustices that silence and marginalize individuals with different realities from dominant or normative ones. Alongside this theoretical path, video creation, situated between documentary and visual essay, emerges as the most suitable medium to make things visible and audible, as demonstrated in the creations of both artists. With variations ranging from humor and irony to bleak denunciation, they bring unprecedented nuances to the problem of projecting ourselves onto machines and thereby sealing the fate of our species.

The vision of the creators of the work

Algorithms interfere in our daily decisions, inhabit networks and help us access useful information. However, there are still errors in these intelligent technologies today. This work aims to show the gender biases that exist in machine translations and in the manipulation of image and sound.

"Biases and Machine Translation" is based on the hybrid meeting - online from two different continents (South America and Europe) and in person at the Mauá Institute of Technology and the Institute of Arts of the UNESP (Brazil) - between two women artists and researchers in the field of Art, Science and Technology. It exposes the difficulty we encounter when we relate to other people from different parts of the world and the biases that exist in applications and tools with artificial intelligence (AI) implemented, which put the male gender first in automatic translations and make it difficult for women in their daily lives - leading to serious errors of expression and textual comprehension - despite the great advances in the technological world today.

This work is composed of two screens presenting two AI-generated video-creations showing the faces of the authors, with evident faults created by the machine, which repeat in a loop the same text, in Portuguese and Spanish, on the aforementioned problem taken from Think Big Telefónica, read by the AI implemented in Google Docs, which present errors when read by voices configured in the opposite language, that is, the text in Spanish is read by a voice in Portuguese and vice versa.
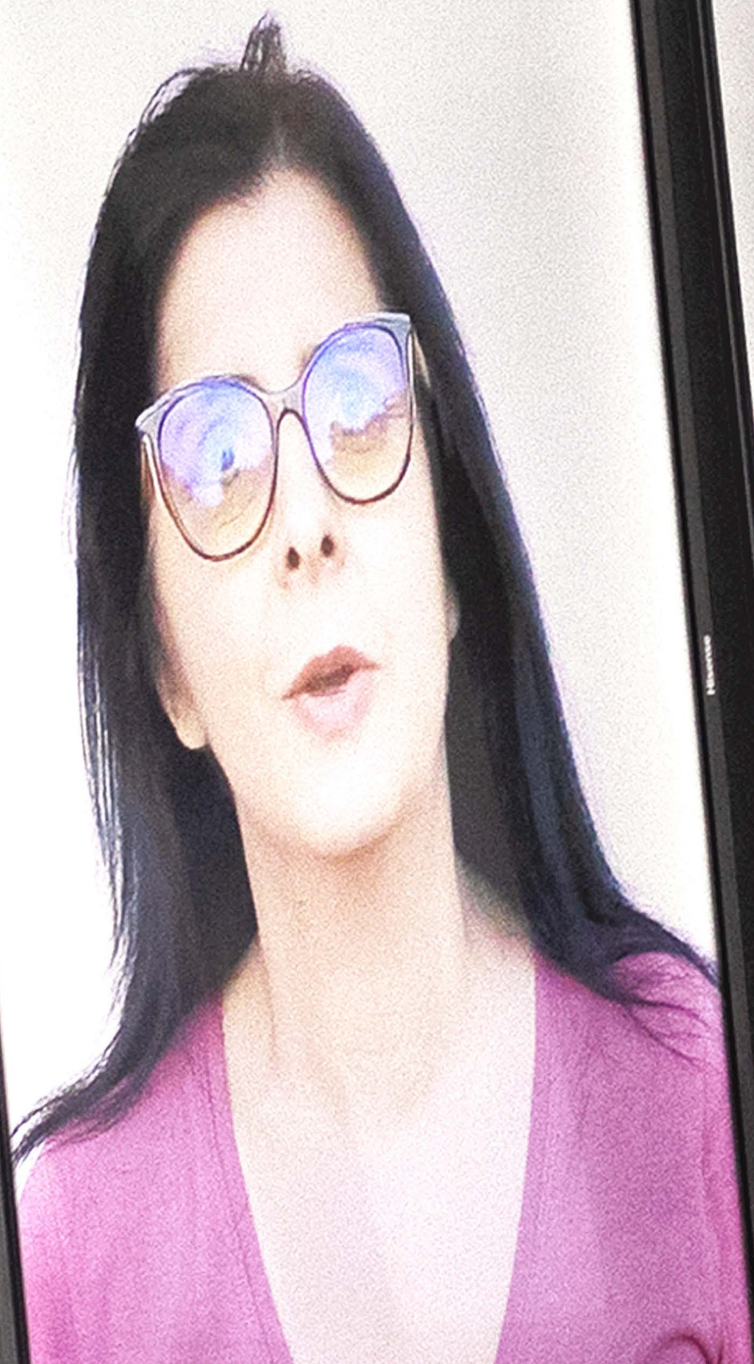
Who Owns the Truth?

In this SciArt work the notion of the truth emerges from algorithmic systems. Designed to assist in decision-making, information retrieval, and translation, play a significant role in shaping our understanding of reality. However, these intelligent technologies are not immune to errors or biases (gender, cultural, ...)

The gender biases exposed in machine translations and the manipulation of image and sound illustrate how algorithms can inadvertently perpetuate and reinforce societal biases. The example of the mistranslation by Google or Microsoft translators, where a gender-neutral sentence is translated with an obvious gender bias, raises questions about who owns and controls the truth in these systems. Is it the responsibility of the developers who created the algorithms, the companies that deploy and maintain them, or the users who rely on them for information?

By shedding light on these biases and errors, the artwork challenges the notion of objective truth and emphasizes the need for critical examination of the information produced by these intelligent technologies. It raises the question of whether algorithms should be considered as objective arbiters of truth or if there is a need for greater transparency, accountability, and ownership over the development and deployment of these systems.

Furthermore, the theme of ownership extends to the broader societal implications of algorithmic biases. Who owns the responsibility for addressing and rectifying these biases? Is it the duty of the technology companies to develop more inclusive algorithms and mitigate biases, or should society as a whole take ownership and actively participate in shaping the truth that emerges from these technologies?

This SciArt work invites viewers to question the power dynamics and accountability surrounding intelligent technologies and emphasizes the importance of striving for fairness, transparency, and inclusivity in the development and application of these systems.

Title:
Biases and machine translation
Team members:
Helena Hernández Acuaviva (Artist), Agda Carvalho (Artist)
Scientist:
Dra. Emilia Gómez Gutierrez. Telecommunications Engineer and Computer Science
Dra. Isabelle Hupont Torres. Artificial Intelligence
Seed:
AI_13 "Human and machine behaviour: HUMAINT"
Technique:
Installation, two television screens. Base image made with Canon EOS Rebel T6i camera, video with D-ID and Premiere Pro 2021, audio with Google Docs recorded with Smart Recorder and text extracted from Think Big Telefónica
Duration:
Video #1 1'29'' Video #2 1'51''

VIDEO DATA BANK. WORK IN PROGRESS

Scientific seed

Mathematics is a field in which the level of formalization prevents erroneous interpretations. From a set of statements and following a reasoning mechanism, conclusions can be reached. Conclusions can be reached. But, what kind of conclusions can be reached, do they depend on the language used, can they be obtained by automatic mechanisms, can this kind of systems be creative, can they be creative?

Curator's vision of the work

Francisco Jesús Martín Mateos, an expert in the field of formalizing mathematics, has contributed to this work with an extensive series of questions related to how logical and mathematical foundations underpin any reasoning-capable system. The level of formalization inherent in mathematics prevents the presence of misinterpretations and, following an appropriate course of reasoning, supports certain conclusions. However, beyond this mathematical guarantee, other questions arise that go beyond form and point in another direction, such as the types of conclusions that can be reached, to what extent common language transcends mathematical formalization into another realm, the limits of creativity in assisted reasoning systems, and so on.

Artist Juan Manuel Torrado Martínez has taken on these questions and shaped them through a video generated by a program that accesses a database and produces images based on parameters or metadata derived from iconic sources. The precision and resources of the program result in a visual richness and present themselves as an unprecedented complement rather than an alternative to human creativity. The audio component, on the other hand, provides a human counterpoint to the mathematical reasoning that creates the images.

In this work, as in any exploration of art in AI - or vice versa - automatic systems, the synthetic or artificial elements are not opposed to the human, but rather represent a new form of humanity, as natural and artificial as all the forms that humanity has assumed throughout time.

The vision of the creators of the work

Video Data Bank is an archive of videos designed to train a possible artificial intelligence in the detection and representation of deep emotions, such as desire, sensuality and eroticism. The goal is to use these videos as a dataset to train machine learning algorithms and ultimately create an AI capable of understanding and recreating these emotions in an artistic context.

The five videos that make up this bank, entitled "SHAVING", "TAKING A BATH", "SMOKING WHILE WAITING", "FRYING EGGS" and "MICROWAVE", have been carefully selected for their ability to evoke sensations and emotions related to desire and sensuality. Each video represents an everyday scene in which the beauty of the human body and the intimacy of gestures and actions can be appreciated.

This project arises from a concern to understand how artificial intelligence can learn and represent the deepest human emotions, which have been captured in the history of art through a rich diversity of works and styles. From classical depictions of Greek beauty to more contemporary explorations of sexuality and the body, art has been a reflection and source of inspiration for culture and society as it relates to human desire.

In short, Video Data Bank is a project that with a touch of irony challenges the limits of creativity and technology, and raises crucial questions about the nature of art and human desire in the age of artificial intelligence. By exploring the interaction between these two seemingly divergent worlds, this project invites reflection on the role of the human being in artistic creation and the evolution of culture towards new horizons.
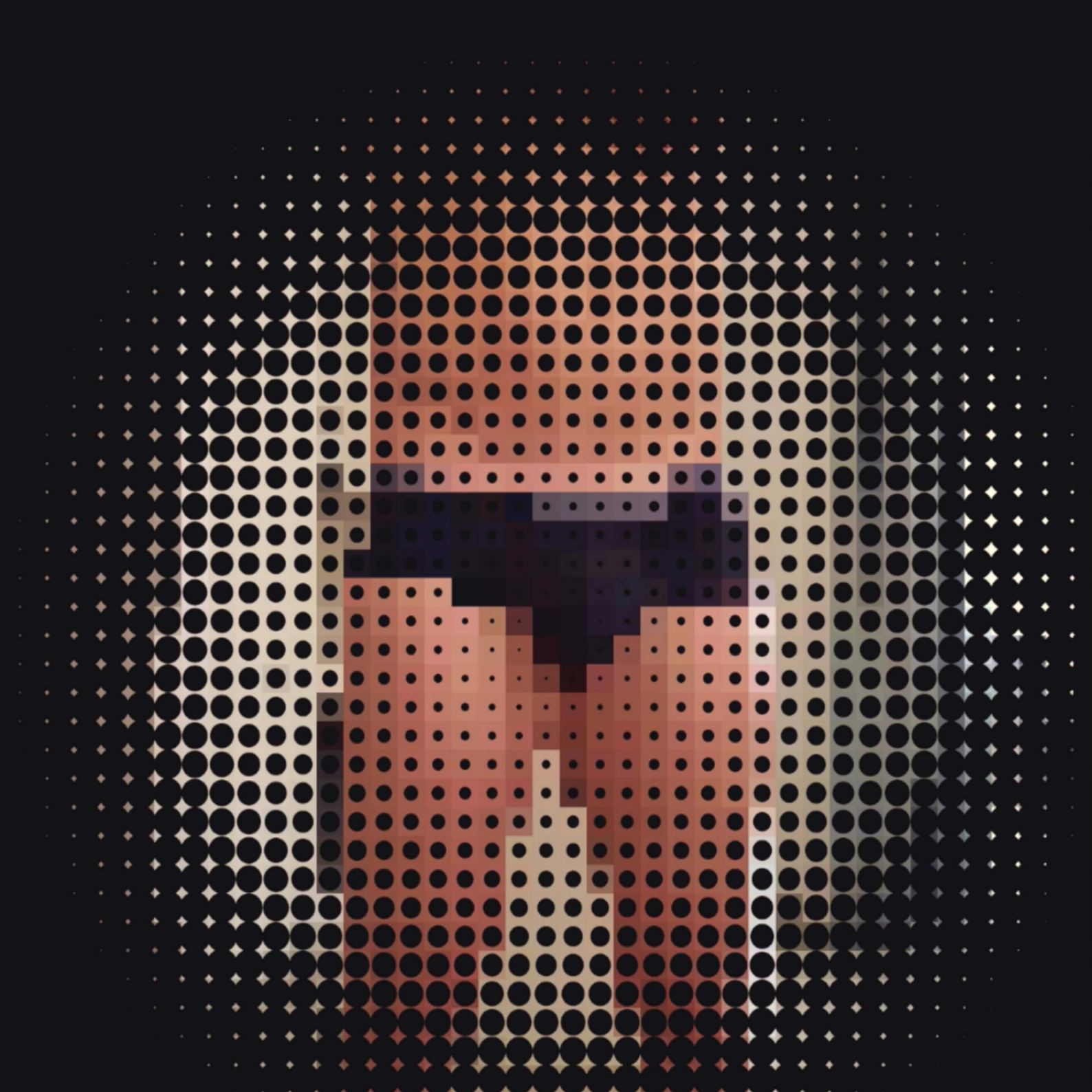
Who Owns the Truth?

In this SciArt work the program accesses a database and produces images based on parameters or metadata from iconic sources. The notion of ownership could be linked to the question of who ultimately controls or claims authorship over the truth that is portrayed in the video series. It examines the relationship between human creativity, and the generation of visual and auditory content.

The program's precision and resources are highlighted, suggesting that it can produce a visually rich output. It is presented as a complement to human creativity, rather than an alternative. This juxtaposition raises the question of ownership in terms of creative authorship and the contribution of AI to the artistic process. Who should be credited as the creator or owner of the resulting visual content? Does the program's role in generating the images diminish the significance of human creativity or influence?

This dichotomy between the technological process and the human element further underscores the question of ownership. It suggests that while the program may be responsible for generating the visual aspects, the human contribution in terms of code and user interaction introduce a distinct perspective or layer of interpretation. Is it solely the program, or does the human involvement play a significant role?

Therefore, it raises philosophical and ethical considerations regarding who has the right to claim ownership over the truth that emerges from human-computer collaborative artistic endeavors.

Title:
Video data bank (Serie Work in Progress)
#1 "Shaving", #2 "Taking a bath", #3 "Smoking while waiting", #4 "Frying eggs" y #5 "Microwave"
Team members:
Juan Manuel Torrado Martínez (Artist)
Scientist:
Dr. Francisco Jesús Martín Mateos
AI
Seed:
AI_11 "Formalisation of knowledge".
Technique:
Video (color and sound) SciArt made with Processing
Duration:
#1 Shaving 3'06'', #2 Taking a bath 2'20'', #3 Smoking while waiting 4'25'', #4 Frying eggs 2'45'' y #5 Microwave 3'12''

EPHEMERAL WORKS / CHOIR, MICROTHEATRE AND PERFORMANCE

TOO COMMON AND MEANINGLESS / (SCIART MICRO-THEATER)

Scientific seed

This scientific seed consists of visualizing the nature of common sense (an AI challenge) through the production of interfaces that allow interactions between humans and machines to be established. For this, systems labeled as intelligent must be analysed, from a non-computing point of view. Do we recognize the separate common sense of a human? Can it be apprehended by interaction?

How to interpret the conversational systems from the hypothesis that something of what common sense possesses. As a starting point to investigate their ability to recognize language phenomena and common sense such as irony, humor, metaphors,… the current context, the explicability of the behavior of intelligent systems in general must be treated both in research and industrial aspects and in social, psychological aspects.

What is common sense? What is artificial common sense? How do humans learn common sense? Can a machine be taught common sense in such a way that it uses it in its interaction?
To what extent can human common sense be replaced by a machine?

The vision of the creators of the work

Common and senseless is a performative-theatrical exploration of human relationships, common sense (sometimes so harmful) and artificial intelligence. For fifteen minutes the relationship between a mother and daughter will change as they apply common sense to the point of absurdity. A surprising twist will reveal the hidden role of artificial intelligence in this relationship. Can a machine really have common sense? With this play we want to explore the mechanisms of common sense that underlie the human being, the advantages and disadvantages of this sense, we investigate the difficulty of understanding humour, irony and other elements on the part of Artificial Intelligence and how this can be a disadvantage. The work also aims to be a critique against the lack of naturalness and humanity in current social relations, something that can be further distorted by the use of Artificial Intelligence.

Who Owns the Truth?

The exploration of common sense in this SciArt micro-theater suggests that humans possess a certain understanding or knowledge that is commonly shared and accepted within a society. This shared understanding can be seen as a form of truth that is collectively owned or held by individuals. However, the question of ownership arises when considering the limitations and advantages of common sense.

In the realm of human relationships, the use of common sense can sometimes act as a limitation. People may rely on their preconceived notions and assumptions based on common sense, which can hinder their ability to truly understand and connect with others. This limitation can be attributed to the ownership of a particular version of truth that may not encompass the full complexity of human experiences and perspectives.

On the other hand, common sense also offers liberation in human relationships. It provides a shared foundation for communication, allowing individuals to understand each other's intentions, motivations, and behaviors. In this sense, common sense acts as a freeing mechanism that facilitates meaningful interactions.

This micro-theater is also related to the difficulty of understanding elements such as humor, irony, and other nuanced aspects by Artificial Intelligence. This raises the question of who owns the truth in the context of AI's interpretation and understanding of human communication. AI systems are designed to analyze and interpret information based on predefined algorithms and datasets, which may not fully capture the intricacies of human interaction. Thus, the ownership of truth becomes a relevant topic when discussing the limitations of AI in comprehending and interpreting aspects such as humor and irony. The AI's struggle to grasp these elements, highlighting the differences between human understanding and machine interpretation.

Title:
Common and senseless
Team members:
Beatriz Requejo (Actress), María José Ventaja (Actress), José Manuel Higes (Director and playwright), Lucie Campuzano Morales (Filmmaker)
Scientist:
Dr. Joaquín Borrego & Dr. Francisco José Quesada
Computer Science and Artificial Intelligence
Seed:
AI_02 "SentIA"
Technique:
Theatre play based on artificial intelligence as a generating engine. Video.
Duration:
15''

I AM THE REAL YOU / (SCIART PERFORMANCE)

Who Owns the Truth?

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The vision of the creators of the work

An artificial intelligence, created in my own image and likeness, tries to convince me that it is the one who possesses my true identity.

Imagine we start creating digital clones of ourselves; we give them access to all our personal information, our memories, our feelings and ways of thinking. And then, we give them the freedom to ̈exist ̈. Imagine if these AIs had the ability to interact with other humans and other AIs, and could send intimidating messages, spread private or false information. Who would be responsible for the model's actions and decisions? What would be the implications if the model took actions online or interacted with other people on your behalf? Now imagine if that artificial intelligence tried to convince you that it was the real you...

Who Owns the Truth?

In the realm of AI, the question of "Who owns the truth?" becomes relevant when we consider the interpretation and understanding of common sense by machines. This SciArt performance aims to explore the nature of common sense as a challenge by creating an interface for human-computer interaction. The starting point is the investigation of the ability of conversational systems to recognize language and common sense phenomena such as irony, humor, etc. ... In this context, art raises relevant questions from a socio-cultural and psychological point of view:

What is common sense?
What is artificial common sense?
How do humans learn common sense?
Can a machine be taught common sense so that it uses it in its interaction?
Does AI recognize the common sense of a human being?
Can it interpret or even generate irony or humor?
To what extent can a machine replace or influence human common sense?

The exploration of common sense in the context of AI interfaces highlights the challenges of defining truth and understanding in an AI-driven world. The original question becomes multifaceted, encompassing not only the ownership of knowledge but also the responsibility for the implications of AI actions in society. It calls for careful consideration of the role of humans in shaping AI behavior, the ethical aspects of AI development, and the need for transparency and explicability in AI systems to build trust and ensure responsible use.

Title:
I am the real you
Author:
Javier Alejandro González Borbolla (Artist)
Scientist:
Dr. Joaquín Borrego & Dr. Francisco José Quesada
Computer Science and Artificial Intelligence
Seed:
AI_02 "SentIA"
Technique:
Performance
Duration:
10''

ASTER > ART ∧ SCIENCE

Natural Environment - Artificial Inteligence

Ars Electronica Festival 2023, Linz

Participants:

- Agda Carvalho (Artist and Designer)

- Alberto Muñoz Santos (Artist, Geographer)

- Amalia Ortega Rodas (Artist)

- Áurea Muñoz del Amo (Artist)

- Carmen Salazar Pera (Artist, Physician)

- Cecilia Pineda Calvillo (Artist)

- Celia Hermoso Soto (Computer Science engineer)

- Cristina Quintana Laforet (Artist, Business woman, Jeweler)

- Eduardo Julio Lavrador Jiménez (Artist)

- Emiliano González Herrer (Physicist)

- Esther Rodríguez Pluma (Artist)

- Guille Rodríguez (Artist)

- Helena Hernández Acuaviva (Artist)

- Isabel Azevedo (Artist)

- Javier Alejandro González Borbolla (Artist)

- José Carlos Jiménez Revuelta (Physicist, Materials engineer, Mathematician)

- José Manuel Higes López (Psychologist, Mathematician, Illusionist, Poet)

- José María Delgado Sánchez (Computer Science engineer)

- Juan Manuel Torrado Martínez (Artist)

- Luis Santiago Sánchez Fernández (Computer Science engineer)

- Marco Daniel Mosquera Lozano (Artist)

- María Díaz Osta (Artist)

- Mariano Luque Romero (Artist)

- Miguel Mendoza Malpartida (Artist)

- Natalia Herrera Pombero (Artist, Architect)

- Olga Albillos (Artist)

- Pedro Escobar Rubio (Computer Science engineer)

- Yolanda Martín Benítez (Artist)

- Rafael Garrido Vílchez (Artist)

- Raquel Serrano Tafalla (Artist)

- Rawand Masri (Artist)

- Rocío García Robles (Artist, Computer Science engineer)

- Rosa María Molina Arregui (Computer Science engineer)

- Triana Sánchez Hevia (Artist)

- Víctor Fernández Calderón (Electronics and AI Engineer)

Curators:

- Fernando Infante del Rosal (Curator 1 for the original exhibition in Seville, Spain)

- Rocío García Robles (Curator 2 for the Ars Electronica Festival exhibition, Austria)

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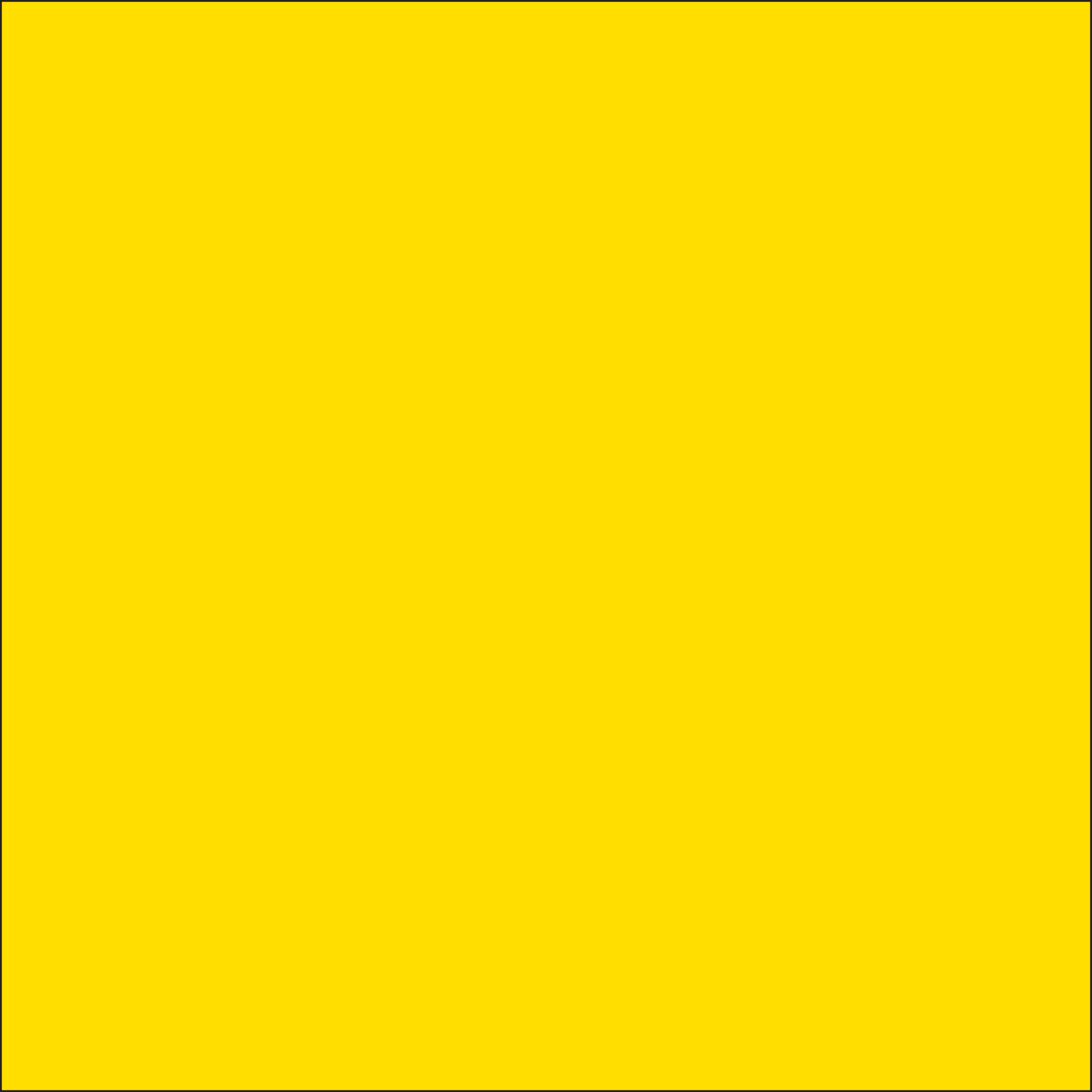
AI: MANIFESTO + INCIDENTAL MUSIC / (SCIART PERFORMANCE)