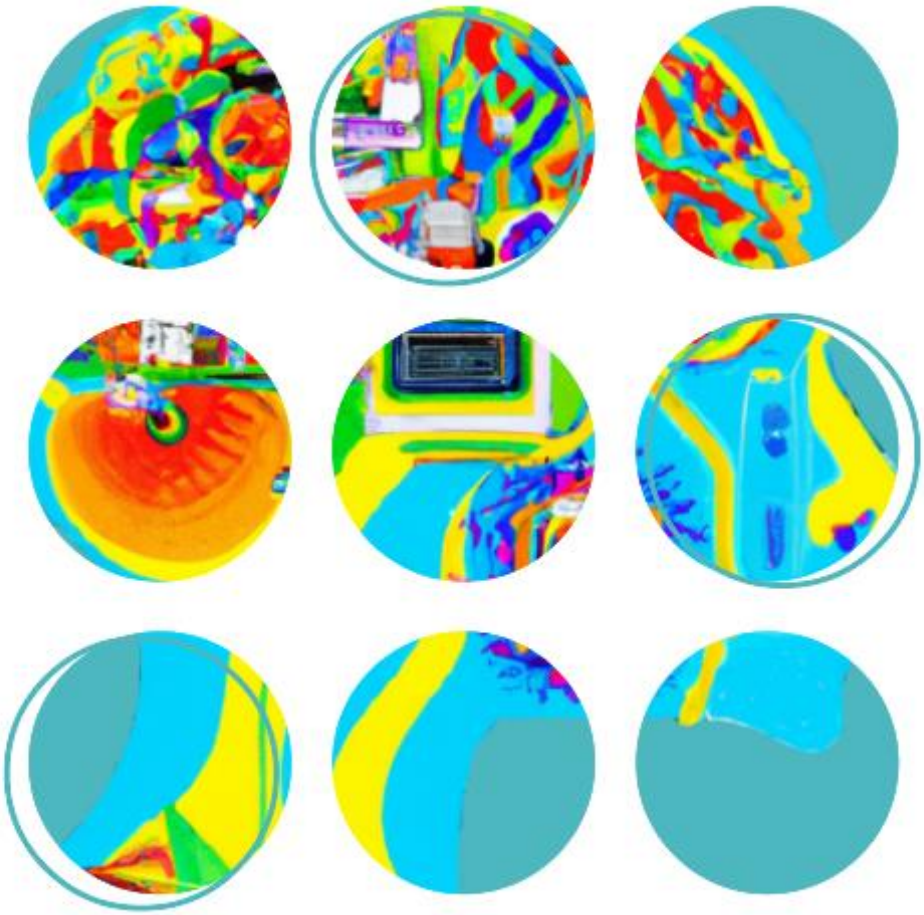

AI and Cultural Heritage

Between Research and Creativity

Workshop Proceedings

Edited by Antonella Guidazzoli and Maria Chiara Liguori

CINECA

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Foreword by Francesco Ubertini

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@ Cineca, 2023

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ISBN – 9788886037457

DOI: 10.1388/WORKSHOP-AICH-01

SUMMARY

FOREWORD

Francesco Ubertini – President of Cineca

Cineca and Artificial Intelligence, a pairing that can be considered natural. Indeed, the training of neural networks finds its ideal partner in high-performance computing. When we presented the Leonardo pre-exascale supercomputer to the public and to President of the Republic Sergio Mattarella at the Bologna Technopole at the end of November 2022, we also talked about the opportunities that this machine will offer to research and innovation in the field of Big Data and Artificial Intelligence.

A link between supercomputing and cultural heritage may seem unusual, but Cineca's support to this field dates to the late 1980s, thanks to the activities of the VisIT Lab, dedicated to scientific visualisation. The laboratory's mission is to support the research community with advanced data visualisation tools, an activity that is not limited to the simple return of information obtained from research results, but opens up to communication and, above all, to synthesis, interpretation and support for interpretation. Archaeology was the first branch in Cultural Heritage with which cooperations were established. One of the most significant projects was the Casa del Centenario in Pompeii, carried out by the University of Bologna in the early 2000s, with which I myself, as an engineering researcher at the time, found myself collaborating due to the modern and multidisciplinary nature of the project.

Just as VisIT Lab acted as a link with the Cultural Heritage for Cineca at the time, it later enabled the collaboration with projects with a strong artistic component. Cineca, thanks to its location at the heart of research and its computing resources that act as a catalyst, also finds a valid position in such contexts, all the more so when artificial intelligence, with its ubiquity, is also spreading in these fields.

The organisation of the workshop on 20 January 2023, dedicated to a reflection on the intersection between artificial intelligence, cultural heritage and art, in the light of the VisIT Lab's activities over time, is therefore an almost inevitable landing place.

The positive reception of the meeting by the public has led us to publish not only the recordings of the workshop, but also the proceedings, and to envisage other future events, also linked to the Researchers' Night.

FOOD DATA DIGESTION: A MULTIDISCIPLINARY METHODOLOGY BETWEEN ART, CULTURE AND ARTIFICIAL INTELLIGENCE

Alessia Tripaldi – Sineglossa
Federico Bomba – Sineglossa / UNIBZ

Introduction

Food Data Digestion (FDD) [1] is a two-year research and production project curated by Sineglossa, in collaboration with Play With Food, and supported by Compagnia di San Paolo.

In FDD the concept of food is interpreted in the sense of "nourishment", and more specifically of the relationship between data and Artificial Intelligence, of data as nourishment that gives shape and "identity" to an AI. The aim is to foster the **integration of artistic research and scientific research in relation to new technologies**, so as to 'nourish', precisely, each of the two sectors through the mutual contamination of skills, visions and experiences.

The project's macro-objectives of impact were:

- concerning **art**, the macro-objective is to increase artists' knowledge of what Artificial Intelligence is and how it can be used, in order to offer them both **new research opportunities** and **new media** through which they can bring their "voice" to the attention of the public and governance bodies;
- concerning **technology**, the macro-objective is to stimulate new visions on the possible functions and developments of AI, in order to foster an **ethical, aesthetic, sustainable and inclusive technological innovation**, aimed not only at economic gain, but at people's wellbeing, in a tech for good perspective.

The first year of the FDD project saw the creation of the work **And We Thought** by the artist Roberto Fassone, together with the creative technologist Andrea Zaninello and the artistic director of the project, Federico Bomba: the process of conceiving, realising and disseminating the work is the subject of this document, which aims to report on the FDD methodology, assessing its strengths and margins for improvement (Fig. 1).

The reflections and information reported here derive from qualitative evaluation tools - interviews and questionnaires - disseminated throughout all stages of the process.

In the following paragraphs, to outline a methodological framework that can be replicated in other contexts, the focus will be on the two main steps that led to the creation of the work.

Art and tech residency

For being truly the result of contamination between skills, artists and technologists must have the time and the creative freedom to envision and produce an AI-based work of art *together*. Giving an artist a "closed" AI device, already directed towards a specific function, means limiting their creative capacity, the possibility of imagining innovative and visionary declinations of AI, as well as the acquisition of new skills, the understanding of what an AI is and the exploration of its endless possibilities. Similarly, giving a technologist a 'closed' artistic project, in which they have the role of technically executing an idea, means cutting them off from the creative part of the process, from the possibility of exploring AI through the disruptive gaze of an artist.

In the first months of the FDD project artist Roberto Fassone, creative technologist Andrea Zaniello, AI AiLai, and artistic director Federico Bomba were all involved in an artistic residency. The presence of an artistic director in the role of mediator is another element of great importance for the success of an 'ecosystemic' process: **the mediator is a figure capable of 'translating' the languages of the actors involved** and guiding them in a relationship of mutual listening.

Fig.1: Federico Bomba and Roberto Fassone; ph. Alain Battiloro.

The FDD residency's central theme was food. The artist selected for the project, although having already produced works based on digital technologies, had no previous knowledge of AI. This element, which is of particular importance for considerations of the impact of the methodology, will be discussed again later on.

During the first phase of the residency, the artist and the creative technologist focused on an in-depth study of the concepts of AI and machine learning.

Starting from the stimuli collected in the first phase, the artist proposed working on the **concept of "hallucination"**, a scientific term used in natural language processing to define the generation by machines of contents that do not produce the effect for which the AI has been programmed: in Fassone's vision, the hallucinogenic substances should have become the AI's food. This is a meaningful insight regarding what is intended as art's disruptive potential. In science, the phenomenon of hallucination is studied to be avoided, to direct machines towards efficiency. On the other hand, in Fassone's work the distortion, the "error" of the machine, becomes the focus of research, an innovative and unexplored avenue that was immediately met with the enthusiasm of the creative technologist. From the subsequent meetings and exchanges between Fassone and Zaninello, **AiLai was born, the Artificial Intelligence fed with reports of psychedelic journeys produced by thousands of people following the ingestion of hallucinogenic mushrooms**.

From the accounts of both, an informal and collaborative relationship has emerged: 'I created a pre-language model and gave it to Roberto, who started playing with it,' Zaninello recounts: 'At a certain point he called me and asked: Why does it invent names or places, where does it get them from? I explained to him that there is random initialisation in this language model, so that each generation of AiLai is unique'. It is precisely the AI's ability to surprise with its own 'inventions', what Fassone calls 'revelations', that has been at the heart of the art project and the works derived from AiLai's inventions, which will be discussed below. A process of four-handed exploration, of co-design between an artist and a technologist, which led to the creation of *And We Thought* [2] the "multimedia art project that investigates the unexpected in machine learning to explore the human mechanisms of creativity and knowledge" (Fig. 2).

Fig.2: And We Thought III; Roberto Fassone, AI LAI, LZ. Visual by Roberto Fassone.

Exhibition

The first public exhibition of And We Thought was hosted in Turin in June 2022 at the Combo spaces, as part of the Play With Food #Cantieri2022 festival and re-proposed at Ars Electronica 2022 and Artcity 2023 (Fig. 3; 5). And We Thought is a **multimedia work**, composed of:

- three short films inspired by one of the stories produced by AI (Fig. 4);
- an artist's diary including all the stories generated to date;
- a series of posters dedicated to the most poetic and unconventional texts generated by AiLai;
- a rap album taking its title from a user-generated story.

Fig.3: And We Thought, Roberto Fassone, AI LAI. Exhibit at CANTIERI 2022 Turin, ph. Alain Battiloro.

Fig.4: And We Thought III_Roberto Fassone (channeling Led Zeppelin), The Road, video still.

This multifacetedness of languages is the first relevant element to focus on: as already mentioned, the experience of co-designing with a technologist and an AI has opened up scenarios for the artist that he would not have imagined at the beginning of the process (a point when, by his own admission, he felt somewhat bewildered by the creative possibilities offered by an Artificial Intelligence). Fassone's exploration of the concept of hallucination and AiLai's 'revelations' have, on the other hand, initiated a **new line of research** for him. This is probably the most fascinating aspect to highlight regarding the artistic component of the project, which

has gone beyond the immediacy of the output generated by the AI (in this case, the 'hallucinated' texts), trespassing into other languages that derive from the artist's experience, from his vision, stimulated by the collaboration with the AI without being limited by it.

Fig. 5: And We Thought III, Roberto Fassone, AI LAI, LZ. Exhibit at Alchemilla (Bologna) during Art City 2023. ph©RolandoPaoloGuerzoni

A methodology between art, culture and artificial intelligence

What, in conclusion, are the characteristics of an approach aimed at facilitating contamination between artistic and scientific research?

Starting from the experience and data collected during the FFD - And We Thought project, we have identified the key concepts of an art&tech methodology, in order to stimulate reflections and suggestions on the topic and to facilitate the emergence and implementation of similar experiences by cultural organisations, training organisations and scientific research centres [3].

Multidisciplinarity. An art&tech project is, by its very nature, based on contamination between disciplines. For the disciplines involved in the process to really contaminate each other - and thus learn from each other and influence each other - it is necessary to ensure the coexistence and balance of the different skills and approaches involved.

With respect to the production of an art&tech work, it is important that the process of generating the work is based on co-design between artist and technologist, in order to involve both parties in the conception and realisation of the work.

With respect to art&tech training, it is important to propose different points of view on the subject matter, in order to educate on the language and use of new technologies through a plurality of visions: technical, artistic, social, ethical.

In the case of FDD, the team of trainers was composed of an artist who had already had experience of art&IA, a technologist who had already collaborated with an artist, and an art director who had already designed and directed projects involving contamination between art and Artificial Intelligence.

The presence of a cultural manager in the role of mediator represents a further support to the multidisciplinary nature of the project, since he can "translate" the languages of the parties involved and guide them in understanding and listening to each other, thus fostering the interpenetration of skills.

Concreteness. For the art world to be able to integrate new technologies into its research and works, artists need to be given the opportunity to "touch with their hands", to experience the use of technologies in a practical manner right from the training phase.

To produce an art&tech work, the artist needs to be able to interact with the technological component, exploring its functioning and potential and thus actively contributing to its development. In the case of FDD, for example, the creative technologist created a pre-model with which the artist could 'play', discovering through direct experience the possibilities of AiLai.

For art&tech training, the approach of the training course must be based on a theoretical-practical one, in which the transmission of notions is side by side with the experimentation of tools used in one's field of research. The aim is not only to make artists understand what certain technologies are and how they work, but also - and above all - to stimulate reflection on how those technologies can be used in the artistic world.

As mentioned above, a multidisciplinary team of teachers contributes significantly to this "plural" approach that approaches technology from multiple perspectives.

Communities and audiences. By imagining the art&tech methodology from an ecosystemic perspective, one should consider a third element which goes together the world of art and the world of science: the communities destined to receive the process. Involving communities in the ecosystem is what helps an art&tech project to produce an impact in the territory - local, national, international -, integrating technical, aesthetic and ethical research on new technologies with the needs and challenges of the contemporary world.

The levels of community involvement can be different, and of varying degrees. In some cases, specific interest groups (e.g. citizens, activists, policymakers) may be brought into the process of co-designing the work. Speaking of Artificial Intelligence, for example, stakeholders could be involved in the discussion on data (what data to use, how to use it, how to disseminate it) for the realisation of an art&tech work that helps to promote a cause, to analyse the needs of a citizenry, to improve the quality of life in a given geographical area.

In other cases, as was the case in FDD for example, the communities of reference correspond to the public that will benefit from the work.

Whatever the modality, the involvement of the audiences is an essential component of an ecosystem approach to art&tech, not only for the social impacts that a project can produce, but also for the education of people in the new languages which are being investigated and created. A work of art based on a new technology is a powerful medium for raising awareness among citizens about the risks, limits, advantages and opportunities that that technology represents.

For this reason, even when communities are not directly involved in the co-design process, it is important that the dissemination of the artwork is not limited to an exhibition, but, as was the case in FDD, includes moments of dissemination where the actors in the process share their experience, or where the public can interact with the artwork itself, contributing to its development and learning about it at the same time.

Process. The difference between a goal-oriented and a process-oriented approach is that in the former case the focus is on the final result, in the latter on the process leading to the result. For the implementation of an art&tech methodology it is essential to put the process before the result: this does not mean that certain aspects of the final output cannot be established and known from the outset, but that the path to reach that output must leave room for deviations and unexpected discoveries. To put it in a word, an art&tech methodology must be based on the concept of exploration.

Since the ultimate goal of a methodology that combines two different worlds is to produce innovation - of thought, of models, of action - it is necessary to create a fertile environment for innovation, an environment that interprets uncertainties as spaces to explore and failures as opportunities to learn, rather than as obstacles to productivity. A process-oriented approach, which does not rush at the result or consider the outcome as definitive, which does not pretend to move within impassable boundaries, which is willing to change direction according to external stimuli, is a fertile environment for innovation.

From a practical point of view, this translates into attention to two aspects. The first is the space/time dedicated to the process, which does not necessarily have to be long, but must provide the right amount of space for the parties involved to get to know and surprise each other. The second is the dimension of discussion and dialogue between the parties: the more moments dedicated to the exchange between points of view - and the more points of view - the more likely it is that one will come across an unexplored path along the way.

References

[1] Food Data Digestion is produced and curated by Sineglossa, in collaboration with Play With Food festival and Free University of Bozen-Bolzano, supported by the Compagnia di San Paolo Foundation as part of the call for proposals "ART~WAVES. For creativity, from idea to scene". To know more: https://sineglossa.it/en/projects/food-data-digestion/

[2] To explore And We Thought artwork and interact with AI LAI visit https://andwethought.it/

[3] Sineglossa has been running research on STEAM (Science – Technology – Engineering – Art – Math) methodologies for years. It is currently a partner in two European projects promoting STEAM education: https://sineglossa.it/en/projects/westeam/ https://sineglossa.it/en/projects/steam-process/

ACKNOWLEDGEMENTS

The organization of the workshop and the publication of these proceedings would not have been possible without the help of Veronica Bortoluzzo, Simona Caraceni, Patrizia Coluccia, Luca Govoni, Margherita Montanari, Andrea Valiani, Paolo Vendruscolo, Elisabetta Zanette, Paolo Zuzolo.

ISBN - 9788886037457

DOI: 10.1388/WORKSHOP-AICH-01

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