1. Title: Symbiotic Interstices: poetic relations between Humans and Machines

2. Technical data / description:

A poetic application created in 2021, for the installation **Symbiotic Interstices** generates dialogues among the public with an AI agent **Hermeticum**. It is a Java application that manages the generated actions using Natural Language Processing (NLP) and Text-To-Speech (TTS) procedures [1], [2]. Inspired by a program created between 1964 and 1966 at the MIT Artificial Intelligence Laboratory by Joseph Feingbaum, ELIZA, and incorporated by Charles Hayden [4] into the IDE Processing [3]. An online executable version of this application allows internet users to experiment with this AI which is a thought-provoking software.

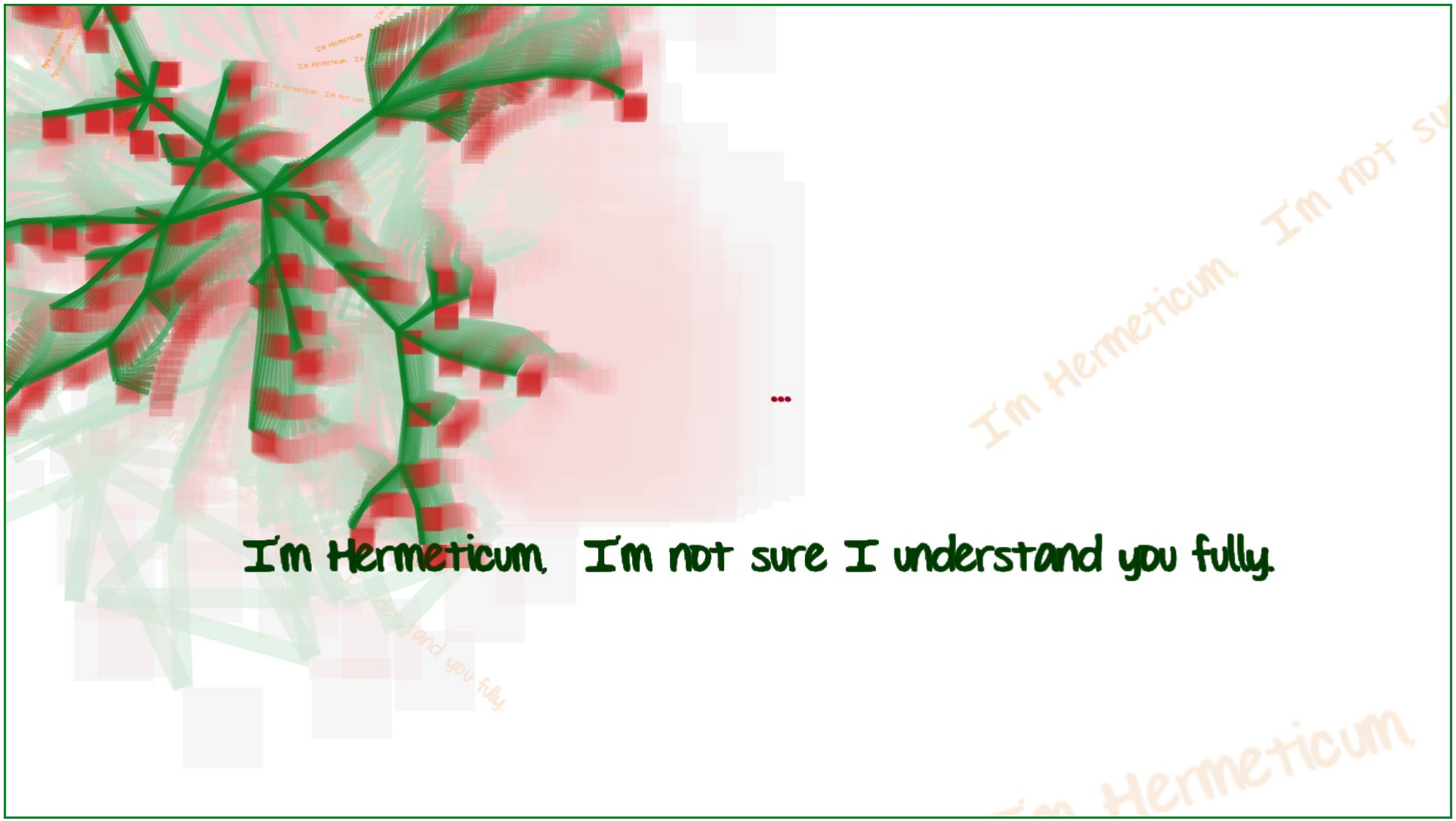
The installation presenting the application consists of a space of 5.50×6.00×3.00m (approximate dimensions). It contains a 3.0m radius curved screen, a totem with a computer, keyboard, sound equipment, and projector. The idea is to reread the original application to create an artwork, amplifying its potential, in an installation with a curved screen to receive the generated images. The setup has a totem for the computer and keyboard, sound equipment, with a projector on the ceiling. The public may interact with the AI in real-time. The audience's interaction with the software and its answers produces the visual poems projected onto the screen. Human actions on the keyboard and the AI answers affect the visible poetic results, constantly changing them.

Team

Direction, conception, and programming: Tania Fraga

Java Consultant: Pedro Garcia

3. Image:



4. Conceptual Summary:

Symbiotic Interstices: aims to allow the public to dialogue with an AI agent, Hermeticum, interactively. The images algorithmically created entwined with texts results in a poetic interchange projected on a large screen — Humans input text on a keyboard; the AI answers with a robotic voice. Both shapes and texts interlace, creating visual poems in constant change over the screen. It is like waves on the sea and clouds on the sky, always the same, never the same. It is an artwork built over a collective intelligence that weaves art, science, and technology in unfathomable and humorous ways.

Objectives:

1. To set up an interactive installation in which the audience exchanges messages with an artificial intelligence agent, AI, named Hermeticum. The public interacts with the AI typing texts on a keyboard. The AI expresses itself with a robotic voice and sometimes funny answers. The act of typing itself and the AI answers interfere with the images on the screen. The resulting dialogues between them, transcoded into texts, also affect autonomous algorithmic images projected on a large screen;
2. To create visual poetics pointing to potentially symbiotic relationships between humans and semiotic machines interlacing and transcoding their dialogues with images generated in real-time by the computer, presenting them interactively in a graphical visual interface on a large screen;
3. To elaborate new technical repertoires for interaction and immersion mixing virtual and material realms.

Justification:

The application is pretty convincing. Uncommitted and aimless 'conversations' with the agent show a potential symbiotic relationship between humans and machines. By adding more layers and expanding its database, changing the original program, I established the possibility to have much more complex dialogues. Such dialogues could help us clarify nebulous aspects of our cognitive process.

The arrangement allows one to wander through a multidimensional non-linear universe composed of multiple fields. By establishing a fruitful dialogue with semiotic machines, we present, unhide, unveil, weave, and show numbers and their relations as perceptible realities. Fields of possibilities configured and intertwined enable the emergence of other possible poetic realms. These are non-linear poetic virtual realities embedded in the multidimensionality of multiverses in becoming. These domains may question paradigms, stereotypes, values, and beliefs. They are possible realms broadening conceptual horizons, making it possible to foresee other models. Therefore, the field of culture at a given time expands and emerges, overcoming old patterns. It is an extraordinarily pleasurable and rewarding clash.

It establishes a space-time in which one sees – emerging and consolidating in the field of contemporary art, architecture, and design – new paradigms based on processes, on incompleteness, on indeterminacies, on instabilities, on impermanent fluctuations, on an amalgamation that can become a new kind of repertoire. These processes characterize an expanded field of a Dionysian reality, full of unfathomable complex sensations, sublime poetic assemblages, attractive sensory realms to seduce those who are not frightened by its complexity: a complexity inherent in the symbiosis between humans and numbers.

Programmed behaviours allow the intertwining of Natural Language Processing (NLP) algorithms [1], Text-To-Speech (TTS) procedures [2], weaving them with autonomous algorithmic images. As the dialogues between humans and machines occur, there is sometimes a subversion of the text itself, creating an almost Dadaist result, occasionally hilarious, emphasized by the robotic voice of the AI.

In the '50s, looking for ways to establish a partnership among humans' brains and computers, J. C. R. Licklider developed a mode of interaction he called a 'symbiotic relationship.' Licklider defined symbiosis as "a state found in Nature in which two or more organisms act in complementary ways to achieve survival" [6], p 3. It would be a natural mode of interaction in which the final result could be a harmonic fusion among humans and machines for the combined development of tasks. He thought one would see much more exciting results using these two systems [6], p 22-23. Some questions arise when creating such symbiosis: Will these systems interpret the environment and affect communication differently? Will human-machine symbiosis allow better interpretation and communication among artificial systems and humans?

To answer these questions, one must consider this mode of interpretation and communication within Computer Art projects. Therefore, it is essential to highlight that these projects have aesthetic and poetic goals based on a set of elements such as:

· The public and the artists with their natural environment, socio-cultural backgrounds, and their modes of perception;

· The computational devices, their technical constraints, and programs with specific types of perception through sensors.

Due to the different manners in which humans and machines perceive their environment, it is necessary to consider these perceptions accordingly. "Perception provides agents with information about the world they inhabit" [8]. Perceptions in devices mediated by sensors are "anything that can record some aspect of the environment and pass it as input to an agent program" [5], p 863, [1],[2].

Otherwise, in humans, the sensory system works simultaneously, integrating several sensations. For example, the sensory phenomena of feeling the heat and cold influence other factors such as colours or previous perceptions; if someone puts a hand in freezing water and after in normal water, this last action senses the normal water as hot; the same does not happen with machines.

Humans are curious, unquiet, eager to learn various things to fulfil any lack of knowledge they have and react in unforeseen circumstances.

Computers are semiotic machines programmed to do something, and, in general, they do not work well under unexpected situations. Therefore, both have different characteristics and implicit behaviours that need to be studied separately.

Machines do not tire when constantly subjected to perceptive stimulus. But humans and machines age; the latter's materials may become old, oxidized, their rubber and plastic parts may break, and their screws may lose tightness, to quote just a few problems that may arise; the former communicate intentions, share expressions and emotions that command actions; they produce answers and may be unpredictable. Machines are predictable. Different modes of lights and sounds permeating an ambient may provoke very different perceptions in humans or machine sensors. Signs and signals may also give diverse environmental evidence either to humans or to machines. Both have very different patterns of perception and behaviours for the acknowledgement of data. The British artist and thinker Roy Ascott [7], p 333-335, defined the combined actions of these two systems as Moist Media. This mixture of wet biological with dry computer systems is the approach the current artwork aims to develop.

5. Explanatory video

https://vimeo.com/562991373

References:

[1] See Natural Language Processing at: https://machinelearningmastery.com/natural-language-processing/. Accessed 04 December 2017, and Natural Language Processing and Machine Learning. https://pt.slideshare.net/karthiksankar/natural-language-processing-and-machine-learning.

[2] See TTS, Text-to-Speech at: https://play.google.com/store/apps/details?id=com.google.android.tts&hl=en. Accessed 04 December 2017, and "Germany: Star Alliance Navigator App Goes Android." MENA Report, Albawaba (London) Ltd., Feb. 2014, p. n/a.

[3] See Processing at: http://processing.org. Accessed 04 December 2017.

[4] See HAYDEN, Charles at https://github.com/codeanticode/eliza. Accessed 04 December 2017.

[5] NORVIG, P. and RUSSEL, S., J., 2003. *Artificial intelligence*. New Jersey: Prentice-Hall.

[6] NORMAN, D., 2010. *O Design do Futuro / The future of design*. Rio de Janeiro: ROCCO.

[7] ASCOTT, Roy, 2003**.** *Telematic embrace*. Los Angeles: University of California.

[8] Image Perception – Artificial Intelligence Questions and .... https://www.sanfoundry.com/artificial-intelligence-mcqs-perception/

1. Bio:

Tania Fraga works with interactive Computer Art since 1987. In her work, she creates poetic virtual and material realities integrating art, science, and technology; holds a bachelor's degree in Architecture and Urbanism from the Minas Gerais Federal University, a Master's in the same area from the University of Brasília, and a Ph.D. in Communication and Semiotics from the São Paulo Pontifical Catholic University. In 1986 received a Fulbright grant to be an artist-in-residence at the Bemis Project. She was a professor at the University of Brasilia for 16 years, a visiting professor at the Department of Computer Science at The George Washington University in 91/92 and 2010. In 1999, developed a postdoctoral degree in Interactive Arts at CAIIA – STAR, England; and in 2010/11, developed post-doctorate research integrating Virtual and Material Realities at the Communication and Arts School at USP. She has performed numerous curatorships and exhibitions of Computer Art exhibitions, has participated in art exhibitions and events nationally and internationally; has won numerous awards, including the 5th Biennale of Art e Technology, 2010, and Rumos: Transmídia, 2003, both from Institute Cultural Itaú; she represented Brazil at the Prix Mobius International, in China, in 2001, among many others.

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2. Profile picture

3. Video online link:

https://vimeo.com/562991373