Dream Painter: an Interactive Art Installation bridging Audience Interaction, Robotics, and Creative AI

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ABSTRACT

Dream Painter is an interactive robotic art installation that turns the audience's spoken dreams into a collective painting. By telling one's past dream, a participant guides the interactive robotic system in the latent space of the AI model that results in a multicolored line drawing. The artwork consists of several parts: an interaction station, a painting robot, a kinetic and animated mechanism that moves the paper roll when a drawing is finished, and the deep learning model that transforms a spoken word into a painting. All these interconnected components of hardware and software are arranged into an autonomous and interactive robotic art installation. The main aims of this project are to explore the interactive potential of AI technology and robotics, and trigger discussion over the deep learning applications in a wider sense. More precisely, this case study is primarily focused on the translation of different semiotic spaces as a trigger for creativity and audience interaction method.

CCS CONCEPTS

• **Applied computing** → **Media arts**; • **Computing methodologies** → **Artificial intelligence**.

KEYWORDS

interactive art, co-creative AI, robotic art, speech-to-image, human-centred interface, latent-space

1 INTRODUCTION

We all dream. Some dreams we remember in the morning, some are just gone. Often, the ones we record we hardly understand until the end. A well-known psychoanalysis Sigmund Freud was convinced that dream analysis is the key to understanding human unconsciousness. In his famous book Interpretation of Dreams, he

Figure 1: Audience interacting with the installation.

states the following: "The interpretation of dreams is the royal road to a knowledge of the unconscious activities of the mind." [1]. Hence, the artwork discussed here poses several important questions regarding a limit to trust when it comes to the relationship between humanity and technology, especially if it could potentially read and understand human unconsciousness.

Regarding creativity, AI and robotics have been inspiring artists for decades. Now, when technology becomes more widely accessible and reliable, we can note very creative and complex scenarios embedded in art installations and performances. On the other hand, AI had brought back discussions over authorship from the 1960s, when computer art emerged. Although we all know that an algorithm cannot be creative on its own, surprisingly, we still hear the same old question: But who is the artist here, machine or human? As Pau Waelder writes: "It was never about replacing the authors" [11] and Hertzmann similarly states that AI is not making art without the artists and that it is just a new tool [6].

However, it is understandable that in the case of real-time robotic art installations wherein the center of attention is the machine and not the artist (except in the human-robot collaborative projects), especially in the examples where a robot is re-enacting the art-making process, we are confused about who is the artist. There are many examples of drawing robots. Maybe the most famous ones are AARON by Harold Cohen [3], portrait machines by Patrick Tresset [10], and collaborative performances with a robot by Sougwen Chung [1]. Other art projects that are concerned with human-robot interaction include Manus (2018), a robotic installation of ten industrial machines by Gannon and Sandoval that explores the artificial behaviour of robots to connect to humans in a meaningful way [5].

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[1]Sougwen Chung website: https://sougwen.com

hello robot we thought that you had already heard us but

Floating in the waters of the Mediterranean in Mallorca

I walking on the street Via Rocco lying on the floor

A girl skating

I dreamed of two robots killing each other

We climbed upstairs Installer

Figure 2: Generated drawings with their input prompts

However, there are not so many artworks that would bring together interaction, machine body language, co-creative AI, and collective creation of the participants into a single robotic art installation, which this art project Dream Painter aims to do.

2 THE ARTWORK

Dream Painter is an interactive robotic art installation that explores the creative potential of speech-to-AI-drawing transformation, which is a translation of different semiotic spaces performed by a robot. We extended the AI model CLIPdraw [4] which use CLIP encoder [9] and the differential rasterizer diffvg [7] for transforming the spoken dreams into a robot-drawn image. The painting process is rather hypnotic to the audience since during the process that lasts a few minutes, the interpretation is unveiled. The collective dream-stories are all painted on a motorised paper-roll that progresses with each shared dream creating a collective dream space of drawings.

The artwork consists of multiple software and hardware parts working together: interaction station, painting robot, a kinetic and animated mechanism that moves the paper roll when one drawing is finished, and speech-to-image AI-aided software application that transforms a spoken word to a multi-coloured painting. All these interconnected parts need to be orchestrated in real-time to make this interactive art installation run autonomously. Also, we developed a smaller version of the artwork by removing the paper-roll kinetic part and using a smaller robot for enabling touring exhibitions. The original sized art installation used Kuka industrial robot and premiered at Tabakalera Art Center in December 2021 where it was running autonomously without human supervision, except the maintenance like refilling the markers.

Figure 2 demonstrates interaction results as AI-generated images from the audience's input. The emphasis was on audience interaction, not on the drawings' visual aesthetics. Therefore, robot's body language and holding up the microphone for a participant (see Figure 1) were the vital parts of the artwork. It is essential to understand that in the case of interactive scenarios, like Dream Painter, the artists cannot curate visual output until the end. Instead, the artists provide a framework for the audience to interact with

and experience the processes. Translation of semiotic spaces, such as spoken dreams to AI-generated robot-drawn painting, allowed us to deviate from image-to-image or text-to-text creation, and thus, imagine different scenarios for interaction and participation. Or as mentioned previously, "in terms of interactive art, the "illegitimed" imprecisions [8] of the translation of semiotic spaces enables the artists to come up with novel interactive experiences." [2].

3 CONCLUSIONS

Dream Painter is an example of the artistic use of AI and bridging this technology with audience interaction and robotics. The translation of semiotic spaces, such as speech-to-image, and interactivity, are the two elements that make this artwork stand out among similar projects in the field of drawing robots.

The interactive robotic art installation offers an experience of navigating the latent space of cultural meanings embedded in the dreams drawings created by our AI model with a given text prompt input by the audience. This way, we provide drawings that can have multiple interpretations of participants' dreams that can help to unveil new dream interpretations. Also, we present them as a collective painting of dreams of the place exhibited. Thus, it is a unique example of achieving artistic human-robot collaboration by re-purposing multiple AI models, using speech as an interaction method, and creating a meaningful embodied audience experience.

ACKNOWLEDGMENTS

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