Proposal for WG2: Collective Intelligencies – Audience Science

COST Action CA23158 – Artistic Intelligence
Submitted by: Kateryna Kononova
Affiliation: Kyiv National Economic University Science Park
Contact: kateryna.kononova@gmail.com
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Audience-Led Worlds: An Experimental Platform for Collective AI-Driven World-Building

1. Abstract

This project introduces a novel platform for studying collective intelligence as it emerges in AI-driven creative environments. Drawing inspiration from the collaborative dynamics of projects like Reddit's *r/Place* and the VR-world co-created by *NL12 | Lab VR* with young artists in Kharkiv, Ukraine, this platform facilitates a unique form of community-driven art.

The system's innovation lies in two key features. First, participants contribute AI-generated content to a shared digital space. Second, the platform automatically organizes these contributions based on their semantic meaning, leading to the spontaneous formation of visual clusters. Thus, we can observe how collective imagination evolves in the context of indirect communication through AI.

This process transforms the platform into a dynamic laboratory for observing how communities collaboratively build meaning and a shared consciousness. As a result, the project will not only generate a valuable dataset on collective behavior but also produce a constantly evolving audio-visual artwork that documents the community's creative journey.

2. Conceptual Framework & Research Questions

Grounded in Audience Science, the project positions cultural participants as co-researchers. A core idea of this project is to study how individuals who create narratives can engage in visual dialogue through an AI mediator that generates images from these narratives. We operate on two levels: individual human imagination versus social imagination, which is characterized by the techniques, styles, and fantasies of earlier forms of media production (Ervik, A. (2023). *Generative AI and the Collective Imaginary: The Technology-Guided Social Imagination in AI-Imagenesis*).

Since AI acts as a mediator that indirectly shapes individual strategies, we can also examine whether, as when AI participates directly in the creative process, it leads to a homogenization of the collective output. (Doshi A., Hauser O. (2023). *Generative AI enhances creativity but reduces the diversity of novel content*, Ashkinaze et al. (2024). *How AI Ideas Affect the Creativity, Diversity, and Evolution of Human Ideas*).

This framework is designed to address two core questions:

- What behavioral patterns (e.g., collaboration, competition, niche-seeking) emerge in AI-mediated co-creation?
- How do clusters form and evolve (emergence rate, lifespan, uniformity, tolerance for noise/outliers)?

3. Core Objectives

- **Develop a functional prototype** of a web-based platform for collective, AI-driven image generation.
- **Investigate how audiences become co-authors** of aesthetic meaning and ethical norms in a decentralized creative environment.
- **Analyze the adaptive strategies** participants employ in response to the actions of others and the system's evolving state.
- **Generate a novel, anonymized dataset** and a final audio-visual artwork from the collected interaction data.

4. Methodology: An Evolving Digital Canvas

A. The Platform

The environment is a 2D digital canvas, accessible through a web interface for broad participation. Each user prompt generates an image that is automatically placed within the infinite zoom-and-pan canvas. To maintain dynamism, the canvas has a capped capacity: once full, the oldest images are systematically replaced by new ones, ensuring continuous turnover and evolution.

B. The Participation Cycle

Interaction follows a simple cycle designed to encourage emergent dynamics:

- **Prompt & Generation**: Users submit a text prompt, which is embedded using a transformer model and used to generate an image. For each submission, the system records the prompt, embedding, image, layout position, and timestamp.
    - *If the AI declines to generate an image for a prompt, the system still stores the text in the database, computes its embedding, and assigns it a position on the canvas. At that position, a solid black circle is rendered, ensuring the rejected prompt remains part of the collective record while visually marking its absence.*
- **Automated Placement:** Images are placed automatically on the canvas using cosine similarity of embeddings. Placement combines incremental KNN-based positioning, UMAP projections, and force-directed relaxation, so conceptually related images cluster together.
- **Generational Turnover**: When the canvas reaches capacity, the oldest entries are removed. This ensures the canvas evolves over time rather than becoming static.

C. Data Collection and Analysis

The platform captures anonymized data to study collective behavior:

- **Cluster Dynamics**: Tracking how clusters emerge, grow, merge, and decay over time, based on embeddings and layout algorithms.
- **User Behavior**: Observing whether participants reinforce existing clusters or initiate new ones, and how they respond to the “black holes” created by rejected prompts.
- **Text vs. Image Layers**: Analysis operates on both user prompts (intent) and generated images (outcomes). This dual layer allows comparison of what participants *write* versus what the system *renders and arranges*, forming both research data and artistic material.

5. Technical Stack

- **Generative AI:** Open-source models (Stable Diffusion or DALL·E 3) for image generation.
- **Embeddings & Clustering:** SentenceTransformer (all-mpnet-base-v2), UMAP (cosine), force-directed relaxation for spatial layout.
- **Backend:** Flask API managing prompts, images, embeddings, and placement.
- **Database:** PostgreSQL for storing prompts, embeddings, images, and layout coordinates.
- **Collective Output:** Endpoint to generate “collective” images by aggregating frequent words across prompts.
- **Sonification Tools:** Libraries for mapping data parameters to musical notes and timbres (e.g., MIDI, Tone.js), with optional integration of AI music generators (e.g., Suno) for higher-level composition.
- **Safeguards:** Ethical content filters and moderation protocols.

6. Anticipated Deliverables

- **Platform:** A functioning, open-source prototype for participatory AI art creation.
- **Research:** A public, anonymized dataset on collective creative behavior; research articles and conference presentations.
- **Generative Film and Soundtrack:** A short, data-driven film that serves as the project's primary artistic output. The film's visuals will be generated from the top keywords and images evolving over time. This will be accompanied by a unique soundtrack created through the sonification of the data.

7. Relevance to WG2: Collective Intelligencies – Audience Science

This project directly embodies the principles of WG2 by:

- **Treating the audience as a collective intelligence** whose emergent behaviors are the primary subject of research.
- **Using AI as a tool to reveal** and mediate human interaction, rather than as an autonomous creator.

- **Generating empirical, quantitative data** on the social and ethical dimensions of co-creation in digital spaces.
- **Fostering cultural diversity** through an open-ended framework where meaning is driven entirely by its participants.

8. Innovation and Strengths

The project's innovation lies in its unique synthesis of artistic practice, AI implementation, and social science.

- **Novel Methodology:** The combination of generative AI, semantic placement, and a generational life-cycle is a new model for studying emergent behavior.
- **Bridging Disciplines:** The project produces dual outputs: a work of collaborative art and a rich sociological dataset, making it relevant to both artistic and scientific communities.
- **Artistic Output:** The creation of a generative film with a data-driven soundtrack is a powerful example of *Artistic Intelligence*, transforming raw analytical data into a rich sensory experience.

9. Challenges and Mitigation

- **Challenge:** Significant technical development required for both the platform and the generative film.
    - **Mitigation:** We will leverage established open-source models and plan a phased development, beginning with a minimal viable prototype.
- **Challenge:** Onboarding non-technical participants effectively.
    - **Mitigation:** An intuitive user interface will be developed alongside a clear, concise user guide and project FAQ.
- **Challenge:** Scaling the project beyond the initial experiment.
    - **Mitigation:** The prototype and film developed through this COST Action will serve as a proof-of-concept to attract external funding.

10. Conclusion

Audience-Led Worlds is more than an art project; it is a research instrument. It functions simultaneously as a collaborative artwork and a sociological experiment, documenting not only *what* a community creates with AI, but *how* and *why* it organizes itself in a shared cultural space. This process will be captured not only in research papers, but in a generative film that gives voice and form to the platform's collective intelligence, delivering novel insights into our evolving relationship with AI.