Is it Real Art? The Endless Cycle of AI Generated Creativity

§1. Overview of the Phenomenon

The phenomenon of interest for our research in this case is AI-to-AI interaction in creative fields, specifically visual art. As generative AI models (e.g., those used in text-to-image software such as Midjourney and DALL-E) advance rapidly, AI can now increasingly produce art through various text prompts. Concurrently, other models of AI are being created that can critique and analyze art, which has given rise to debates on how exactly AI systems evaluate and see art created by other AI systems, as well as how it compares to human art. This development questions classical conceptions of creativity, which have long been held to be a distinctly human attribute. The discourse between AI critics and AI art generators opens up possibilities for reflection on how AI systems might influence artistic fashions, possibly producing echo chambers or arts taste bias.

The significance of this phenomenon is that it implies something for the future of creativity and art. With AI being more integrated into creative work, it is essential to understand how the systems influence each other and how such influences may affect trends in art. For instance, if AI critics prefer AI artwork over human artwork, then this can lead to homogenization of styles where AI artwork dominates and human imagination takes a backseat. This scenario raises ethical and philosophical issues about the application of AI in creative fields and the potential loss of human diversity in arts (Lyu et al., 2022b; Nunez-Cacho et al., 2024).

Problem Statement

The problem this study addresses is the risk of artistic homogenization by AI and the formation of echo chambers in AI-to-AI interactions. With more and more involvement of AI systems in producing and assessing art, there is risk that AI systems will reinforce their own taste, creating a positive feedback loop in which AI-generated art is always the choice over human-generated art. This can result in stylistic dullness as well as the neglect of human imagination in the art world. Understanding how artificial intelligence systems talk to and impact each other during creative activities is central to avoiding these risks and making sure AI complements and assists human imagination rather than substitute it.

Why Agent-Based Modeling (ABM) is Suited

Agent-based modeling (ABM) is a highly suitable approach for studying AI-to-AI relations in the creative arts since it can be applied to model complex, dynamic systems in which several agents (in our case, AI models) interact with one another according to predefined rules. ABM is particularly suited for simulating emergent behavior, such as the formation of art trends or the development of AI critique biases. Here, the agents, AI art generators, AI critics, and AI curators can be made to follow specific rules, such as generating art according to criticism, criticizing art according to certain criteria, and displaying art with high ratings. By simulating these interactions, ABM can demonstrate how small changes in the behavior of individual agents can lead to radical shifts in artistic preferences and trends in general.

In addition, ABM allows for the analysis of feedback loops and reinforcement patterns, and these are at the core of the phenomenon of AI-to-AI interaction. For example, if AI critics always favor certain styles, AI art generators can adapt their output to favor those favored

styles, and strong styles can be reinforced over time. ABM may also be applied to identify potential AI bias in criticism, for example AI art preference over human art preference, and track how they evolve over time. This positions ABM as an ideal methodology to study the long-term consequences of AI-AI interactions in creative fields (Lyu et al., 2022b; Nunez-Cacho et al., 2024).

Lastly, AI-to-AI interaction in visual art is significant because it shatters traditional definitions of creativity and raises serious questions about the future of art. ABM provides a solid platform to simulate such interactions and examine their implications, making it an inevitable tool for this research.

- Illustrate the Phenomenon:
    - Provide a preliminary sequence of visualizations from your simulation.
    - These visualizations should depict interactions between agents.
    - Include annotations explaining how the simulated behavior aligns with real-world dynamics.

§2. Simulation Design & Implementation (~500 words)

- System Overview: Describe the core components of your model, including the agents (human and bot).
- Simulation Environment: Define the media ecosystem where agents interact (e.g., network-based, grid-based, hybrid).
- Agent Design: Describe the types of agents in the simulation and their key behaviors. Explain decision-making processes and rule-based interactions Discuss any early adjustments made during development.

- Interaction Dynamics: Describe the scheduler used (e.g., RandomActivation, StagedActivation), and explain how bot-to-bot interactions occur in the simulation. Explain how the phenomena of interest emerges in the simulation
- Data Collection & Visualization: Describe what data is being collected and why. Include early visualizations or logs that show how data trends are forming. For the final report, you will expand on the technical details, improve the scheduler justification, and prepare more detailed descriptions of the data collection and visualization methods.

§3. Preliminary Observations & Results (~500 words)

- Provide a description of how early simulation results illustrate the phenomenon of interest. Provide initial quantitative metrics or qualitative descriptions of emergent behaviors. Include graphs, tables, or network diagrams showcasing agent interactions.
- Describe unexpected behaviors and/or emergent dynamics. Identify and discuss any unexpected trends observed in early runs. Identify potential causes of these behaviors based on agent parameters. For the final report, you will expand and the findings, refine interpretations, and conduct additional simulations for completeness and robustness of results

§4. Challenges & Next Steps (~500 words)

- Development Challenges:
    - Describe the most difficult aspects of implementing the simulation.
    - Discuss any changes made to the model due to unforeseen challenges.
- Planned Refinements for the Final Report:

- Outline what needs to be further developed, tested, or refined before submission of DEL 4.B.
- Identify additional data collection or analysis methods that will enhance findings.

§6. References

References

Lyu, Y., Wang, X., Lin, R., & Wu, J. (2022b). Communication in Human–AI Co-Creation: Perceptual analysis of paintings generated by Text-to-Image system. Applied Sciences, 12(22), 11312. https://doi.org/10.3390/app122211312

Nunez-Cacho, P., Mylonas, G., Kalogeras, A., & Molina-Moreno, V. (2024). Exploring the transformative power of AI in art through a circular economy lens: A systematic literature review. Heliyon, 10(4), e25388. https://doi.org/10.1016/j.heliyon.2024.e25388

§7. Attestation

Mariia MELNYK

1. **§3. Preliminary Observations & Results**
    - Analyze early simulation results and describe how they illustrate the phenomenon of interest.
    - Provide **initial quantitative metrics** (e.g., graphs, tables) or qualitative descriptions of emergent behaviors.

- Identify and discuss any **unexpected trends** or emergent dynamics observed in early runs.

2. **§6. References**
    - Compile and format the **References** section in APA style.
    - Ensure all scholarly sources cited in the report (e.g., Lyu et al., 2022; Nunez-Cacho et al., 2024) are included.
    - Add any additional references used in the draft report.
3. **§7. Attestation**
    - Write the **Attestation** section, detailing each member's contributions to the draft report and their planned tasks for the final report.
    - Use the **Contributor Role Taxonomy (CRediT)** to articulate contributions (e.g., Conceptualization, Writing, Visualization, Data Analysis).
    - Ensure the attestation is clear, non-vague, and reflects the actual work done by each member.

Ryan LUK

1. **§2. Simulation Design & Implementation**
    - Write the **Simulation Design & Implementation** section (~500 words).
    - Describe the **core components** of the model, including the agents (e.g., Human Art Generators, AI Art Generators, AI Critics, AI Curators).
    - Define the **simulation environment** (e.g., grid-based or network-based media ecosystem).
    - Explain the **agent design**, including their key behaviors, decision-making processes, and rule-based interactions.
    - Describe the **scheduler** used (e.g., RandomActivation) and how bot-to-bot interactions occur in the simulation.

- Discuss any **early adjustments** made during development.

2. **§4. Challenges & Next Steps**
    - Identify and describe the **most difficult aspects** of implementing the simulation.
    - Discuss any changes made to the model due to unforeseen challenges.
    - Outline **planned refinements** for the final report, including additional data collection or analysis methods.

Masooma RIZVI

1. **§1. Phenomenon Overview**
    - Write the **Phenomenon Overview** section (~500 words).
    - Describe the phenomenon of AI-to-AI interaction in creative fields, its significance, and the problem statement.
    - Connect the phenomenon to the scholarly literature (e.g., Lyu et al., 2022; Nunez-Cacho et al., 2024).
    - Explain why **agent-based modeling (ABM)** is a suitable approach for studying this phenomenon.
    - Provide **preliminary visualizations** of the simulation (e.g., grid-based interactions between agents) and annotate how the simulated behavior aligns with real-world dynamics.
2. **Support for §1 and §2**
    - Assist Mariia with **preliminary visualizations** for §1 (e.g., creating grid-based diagrams or graphs).

- Help Masooma with **technical details** in §2, particularly in describing the scheduler and interaction dynamics.