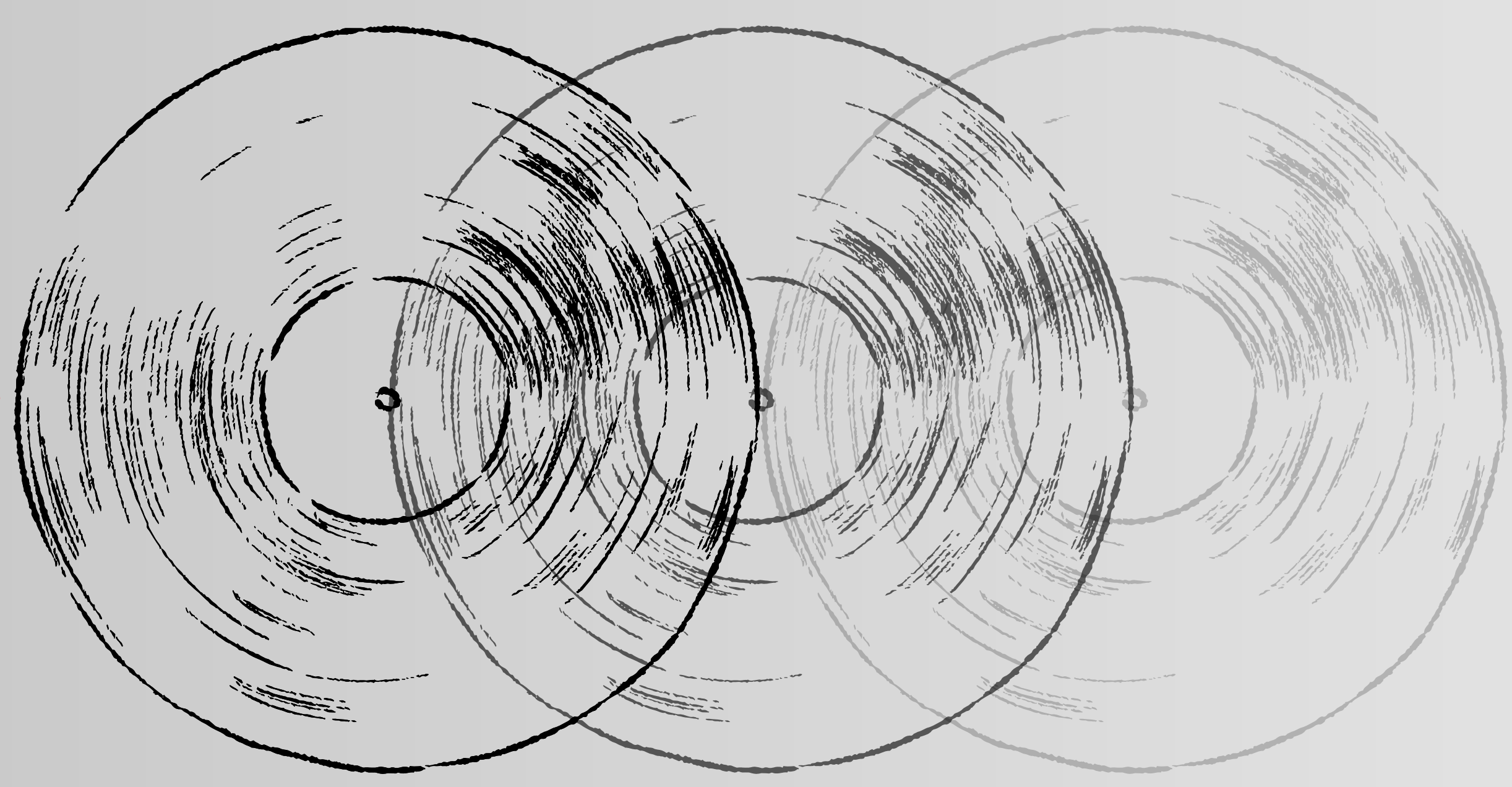


Music and AI: *Imitation* or *Ingenuity*?



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ABSTRACT:

Does artificial intelligence in music function primarily as an imitator of human creativity or as an autonomous creator of original content? Employing a mixed-methods approach, we analyze AI-generated compositions using computational musicology and conduct expert evaluations through double-blind listening tests. Quantitative metrics assess novelty and deviation from training data, while qualitative analyses gauge human perception of creativity. Findings reveal that while AI systems often rely heavily on stylistic patterns present in training datasets, emergent behaviors occasionally yield compositions indistinguishable from or exceeding the originality of human works. However, true innovation remains bounded by the models' input scope and algorithmic constraints. The research infers that current AI demonstrates constrained creativity—capable of recombination and variation rather than independent invention. Implications are discussed in the context of authorship, aesthetic value, and the evolving definition of creativity in computational systems. Further studies are recommended to assess evolving generative capabilities.

MATERIALS AND METHODS:

1. COMPUTATIONAL ANALYSIS

- Quantitative Novelty Metrics: Employed tools like Maximum Mean Discrepancy (MMD) and feature embedding divergence to compare AI-generated music against training datasets.
- Similarity Detection: Used audio similarity tools (e.g., MiRA) to detect near-exact replication in AI outputs.
- Music-Theoretic Evaluations: Assessed AI compositions for structural, harmonic, and melodic complexity using techniques from computational musicology.

2. HUMAN EVALUATIONS

- Double-Blind Listening Tests: Participants rated AI and human compositions without prior knowledge of their source.
- Bias Studies: Participants were told the same piece was human- or AI-composed to assess psychological bias toward AI.
- Expert Reviews: Classically trained musicians provided qualitative assessments of emotionality, structure, and creativity.

RESULTS:

1. QUANTITATIVE FINDINGS

- AI-generated music displayed measurable statistical deviation from training data but also evidence of repetition and motif reuse.
- Music-theoretic analyses showed that AI outputs tended to be repetitive, harmonically shallow, and structurally underdeveloped.

2. QUALITATIVE AND PERCEPTUAL INSIGHTS

- Blind listeners occasionally rated AI compositions as equal to or better than human ones.
- When AI authorship was disclosed, ratings of creativity and enjoyment significantly dropped.
- Expert evaluators often detected mechanical patterns, lack of emotional depth, and absence of long-form thematic development in AI music.

3. CONSTRAINTS ON CREATIVITY

- AI creativity is limited by algorithmic context windows, lack of world knowledge, and a narrow training dataset scope.
- AI systems fail to generate coherent long-range musical structures and often lack cultural sensitivity when exposed to underrepresented music forms.

BACKGROUND:

AI-generated music has become increasingly sophisticated through advances in machine learning, particularly with models trained on large corpora of existing music. These systems function predominantly as statistical pattern matchers, imitating stylistic conventions found in their training data. This raises a key question: does AI in music creation merely imitate human creativity, or does it exhibit signs of autonomous originality? Critics argue that current AI models act more as “stochastic parrots,” producing stylistically accurate but emotionally flat compositions. Others point to occasional emergent behaviors—such as surprising harmonic shifts or novel melodies—that seem to go beyond basic recombination, inviting debate about the nature of creativity, authorship, and aesthetic value in computational systems.

CONCLUSION:

Current AI systems in music composition exhibit constrained creativity. They are capable of generating stylistically consistent music with occasional emergent originality but largely operate within the bounds of recombination rather than invention. Quantitative metrics suggest moderate novelty, while human evaluations often detect derivative and emotionally inert outputs. The research supports the view that AI serves best as a creative tool or collaborator rather than an autonomous artist. Its outputs, though polished, are typically devoid of deeper intentionality or cultural resonance.

In short, AI can create compositions that appear rather complex and may seem apparently unique, the AI demonstrates constrained creativity. Whilst you could prompt the AI to make something more creative with more detailed and elaborate instructions, the AI can’t recreate such a complex composition on it’s own with broad instructions.

FUTURE DIRECTION:

- Improved Evaluation Frameworks: Develop more nuanced metrics that integrate perceptual, emotional, and narrative aspects of music.
- Multimodal and Embodied Models: Explore AI systems that incorporate sensory data or world knowledge for richer musical expression.
- Cultural Diversity in Training Data: Expand datasets to include a broader range of musical traditions and non-Western styles.
- Creative Partnerships: Investigate hybrid workflows where humans and AI co-create, emphasizing transparency and user control over generative processes.
- Ethical Frameworks and Legal Standards: Develop clearer guidelines on authorship, copyright, and fair use in AI-generated art.

ACKNOWLEDGEMENTS:

The following sources were most frequently referenced and utilized in the development of this research:

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