

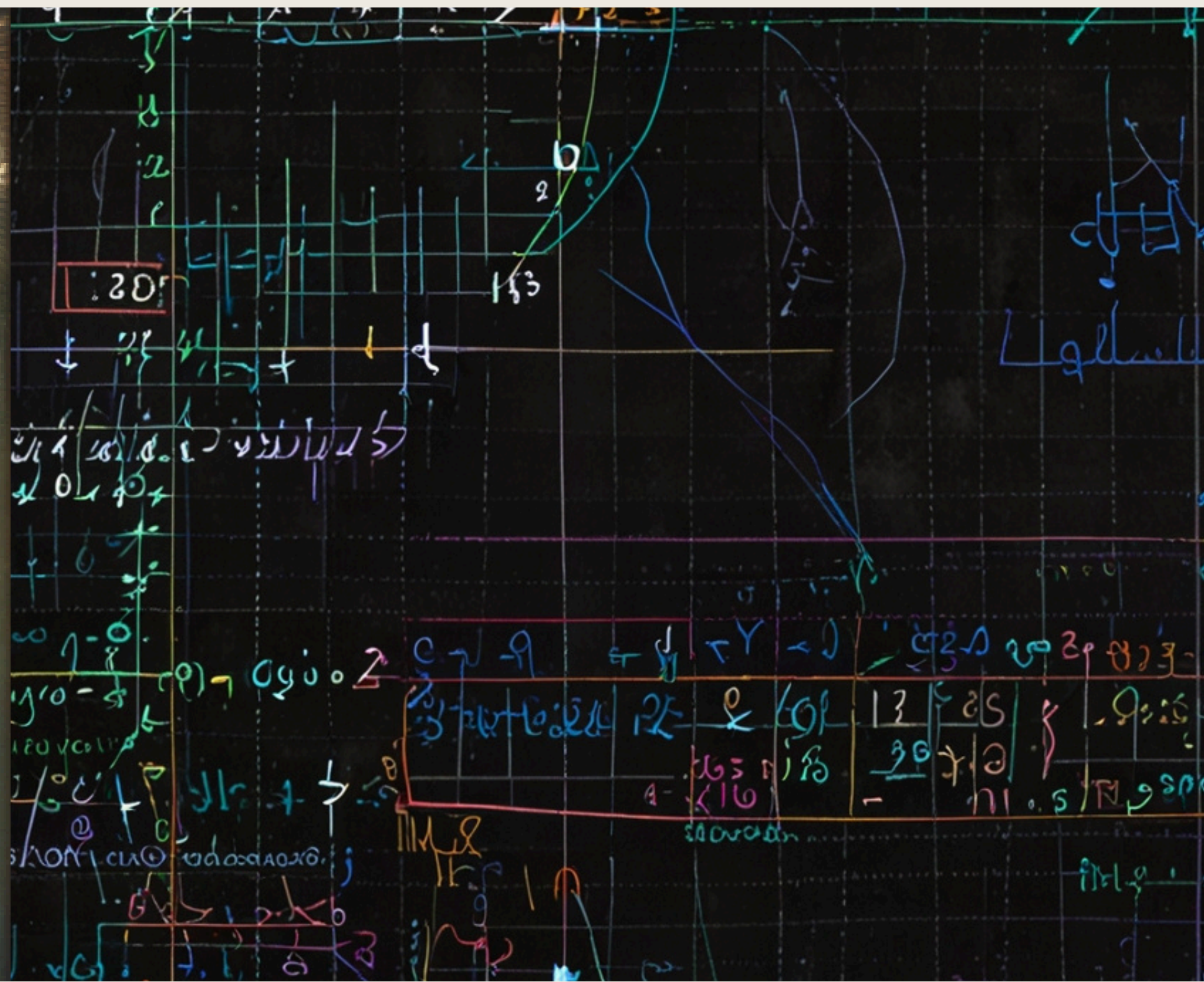
Machine Learning & Creativity

THE GENERATIVE AI REVOLUTION

IDSN 544-Transformative AI
Tara Manuel



INTERSECTION OF CREATIVITY & TECHNOLOGY



What Is Creativity?

IMAGINATION



PROCESS OF
EXPLORATION



ORIGINAL
IDEAS





Art as Human Expression

Desire to understand, explore and represent the world with passion & emotion

THE IMPACT OF AI ON CREATIVE INDUSTRIES

Visual Arts
Music
Writing & Literature
Film & Animation
Dance & Performance

.....

Text To Image Generation
Generative Music & Video
Text Composition
Voice Synthesis





The Analytical Engine has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform. It can follow analysis; but it has no power of anticipating any analytical relations or truths. Its province is to assist us to making available what we are already acquainted with.

Ada Lovelace

LOVELACE OBJECTION

Can Artificial Intelligence Be Creative?

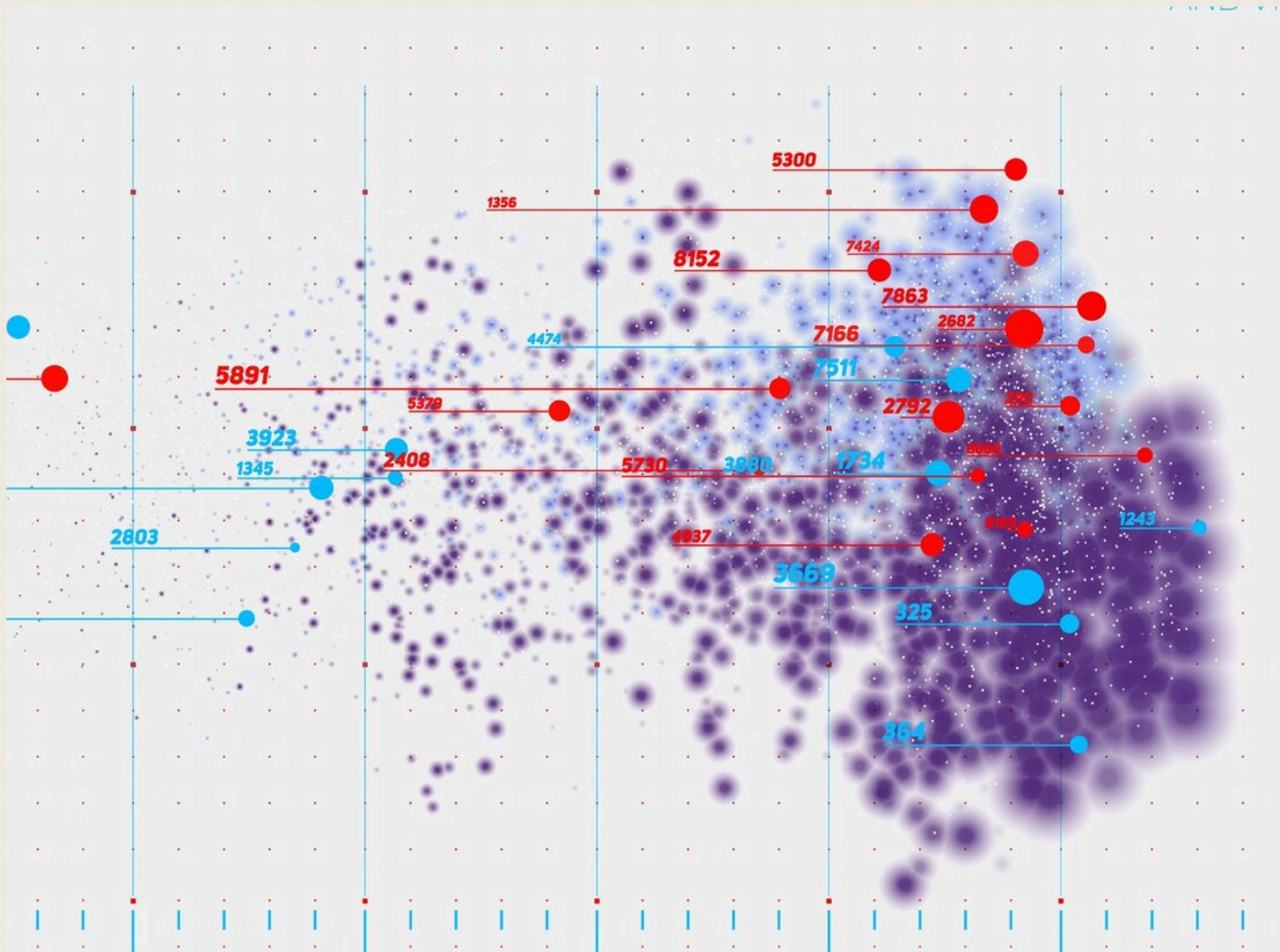
ALTERNATIVE TO
TURING TEST

FOCUSES ON
CREATIVITY RATHER
THAN GENERAL
INTELLIGENCE

MEASURES CREATIVE
POTENTIAL

WHAT CONSTITUTES ORIGINALITY IN AI-GENERATED CONTENT?

CREATIVITY: DATA DRIVEN VS EMOTION & EXPERIENCE



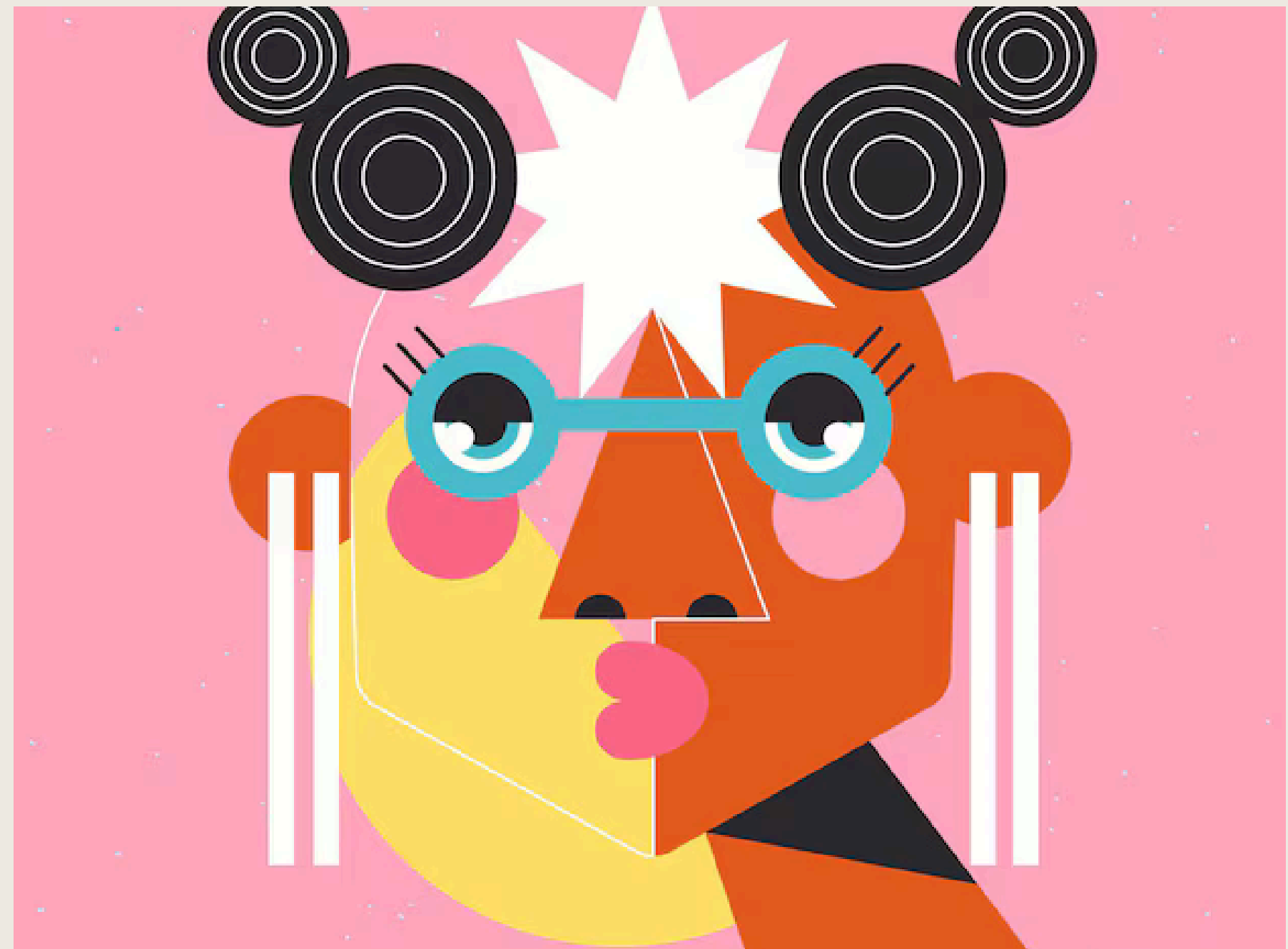
CRITICAL VIEW:

- AI relies on existing patterns
- Sophisticated mimicry
- Lacks understanding
- Follows statistical patterns
- Converges toward mean
- Bound by training data

CREATIVITY: DATA DRIVEN VS EMOTION & EXPERIENCE

SUPPORTIVE VIEW:

- AI's capacity to learn creative skills
- Potential for unexpected results
- Creators can't predict exact outputs
- Makes connections humans might not make



COMPUTATIONAL CREATIVITY

Since the founding of AI in the 1950s, artists and researchers have used artificial intelligence to create artistic works



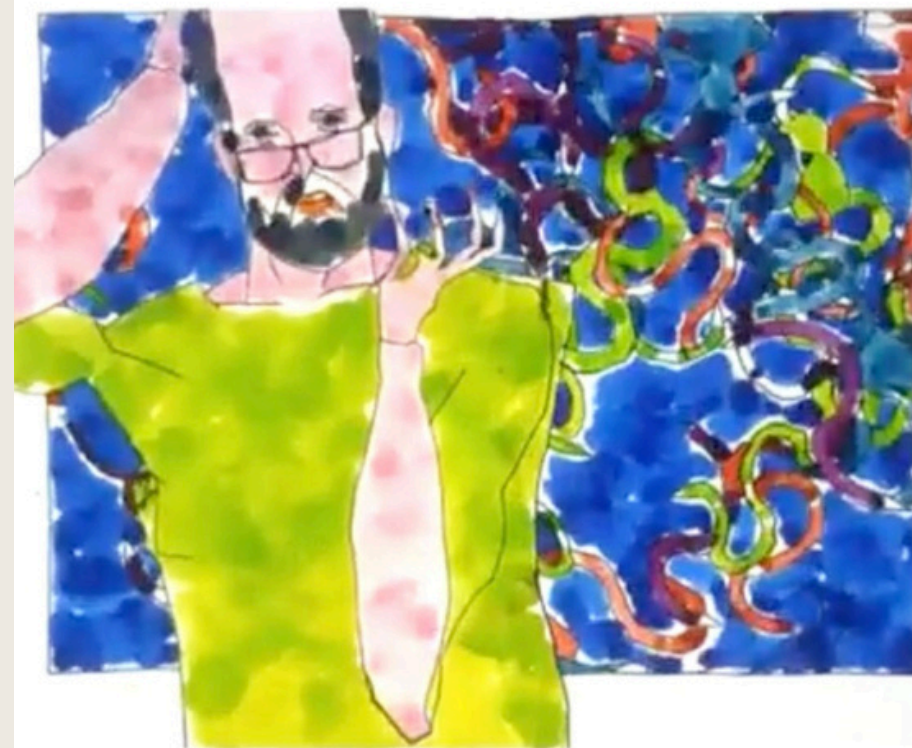


AARON, PAINTING MACHINE
BY, HAROLD COHEN

LATE 1960'S OVER 40 YEARS

AARON
1990's

GOFAI



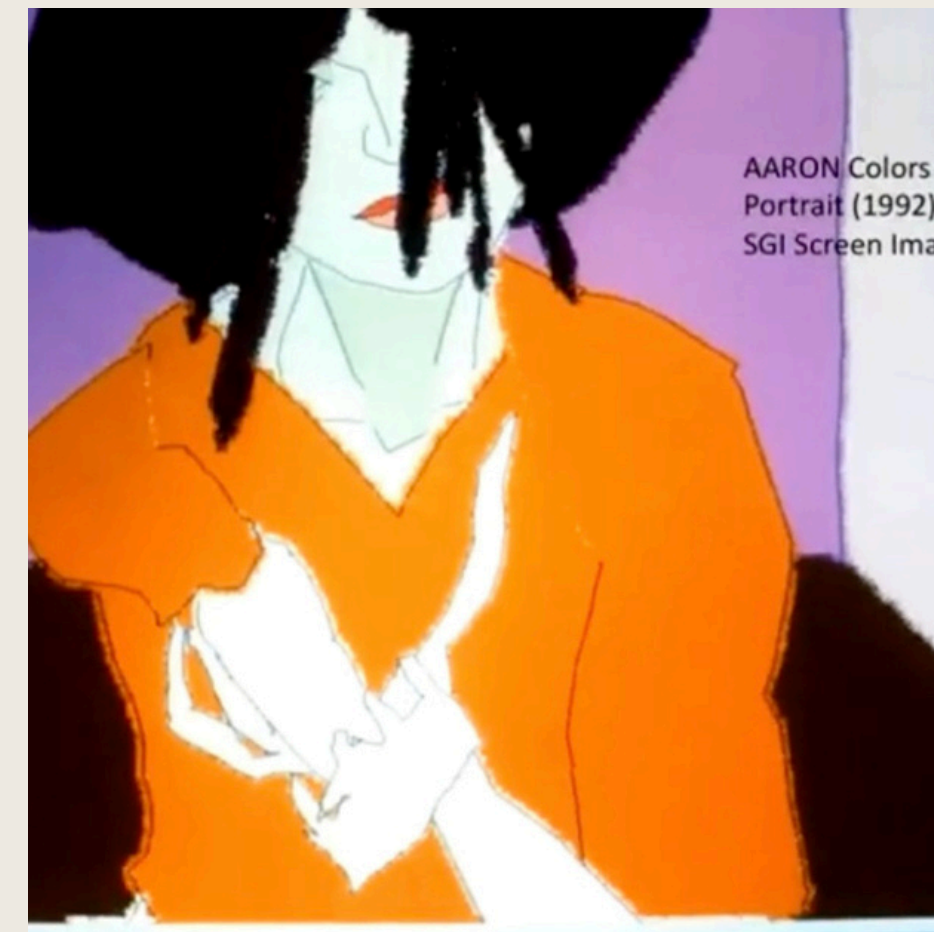
Harold Cohen Paint Machine Painting (1995)

RULE BASED



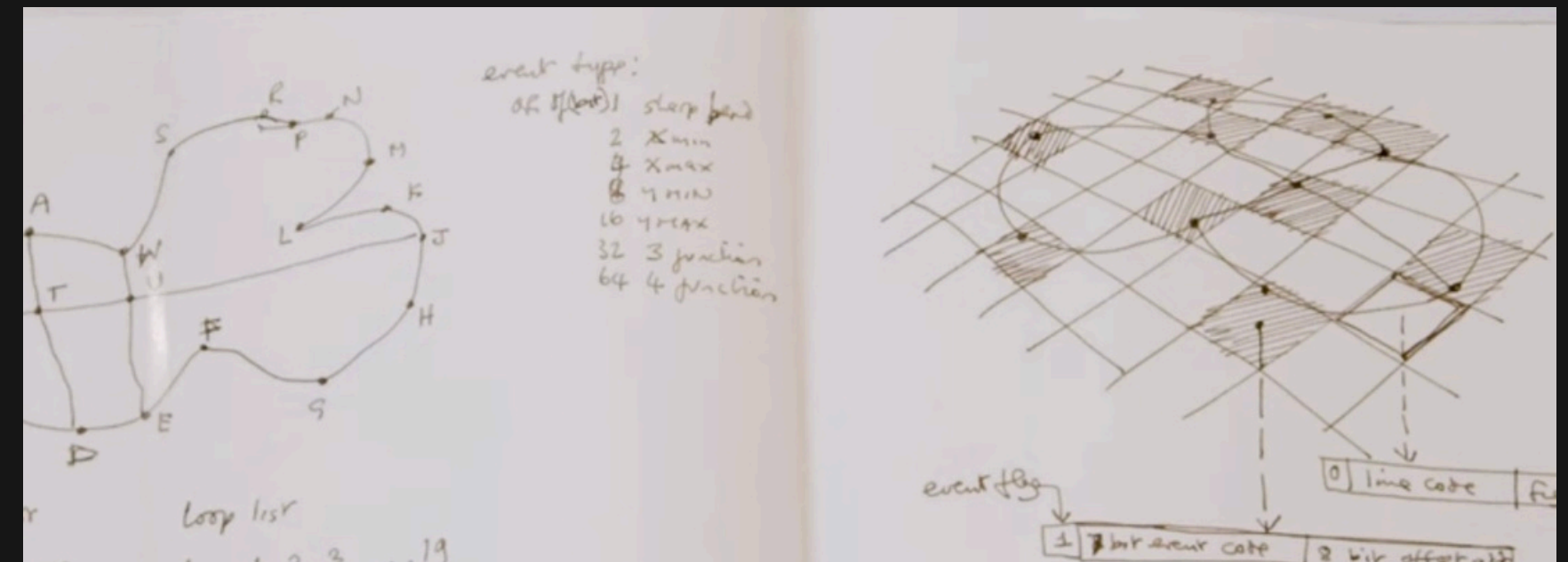
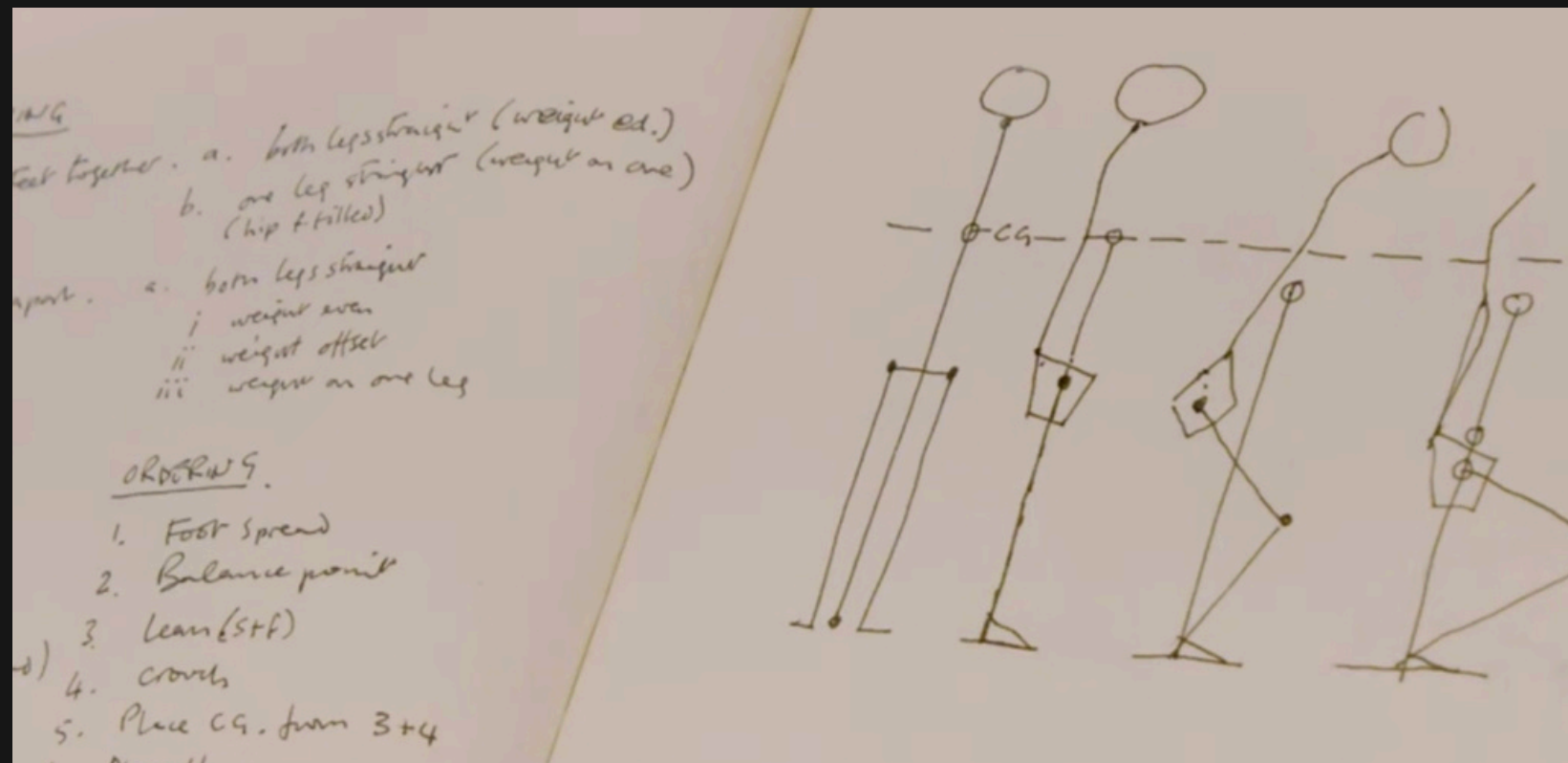
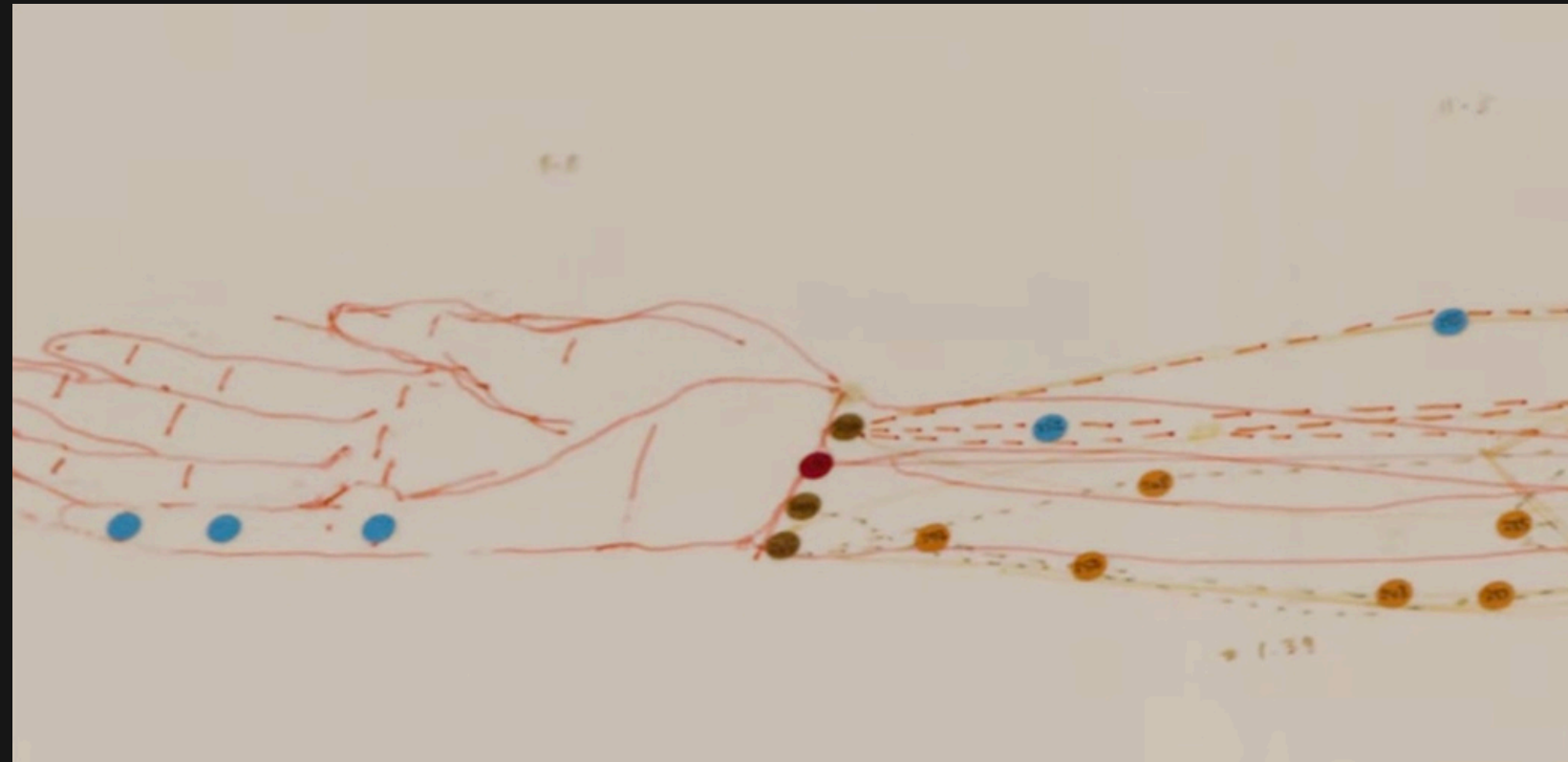
AARON Colors (1993) SGI Screen Image

ART SYSTEM



AARON Colors
Portrait (1992)
SGI Screen Imag

Codifying Artistic Rules



Harold Cohen

Challenged traditional notion of artistic creativity being purely human



The notion that humans have some kind of mystical connection with their soul or God, and so on, allowing them to produce wholly original ideas (not the result of recombination or formalisms) seems ridiculous to me.

David Cope

EXPERIMENTS IN MUSIC INTELLIGENCE

EMI'S MUSICAL TURING TEST

PIANIST WINIFRED
KERNER PERFORMED
THREE PIECES IN THE
STYLE OF BACH

ONE WRITTEN BY EMI,
ONE BY DR. STEVE
LARSON,(COMPOSER/
MUSIC PROFESSOR) AND
THE LAST AN ACTUAL
PIECE BY BACH

AUDIENCE SELECTED
EMI'S PIECE AS THE
ACTUAL BACH, WHILE
BELIEVING LARSON'S
WAS THE ONE
COMPOSED BY
COMPUTER

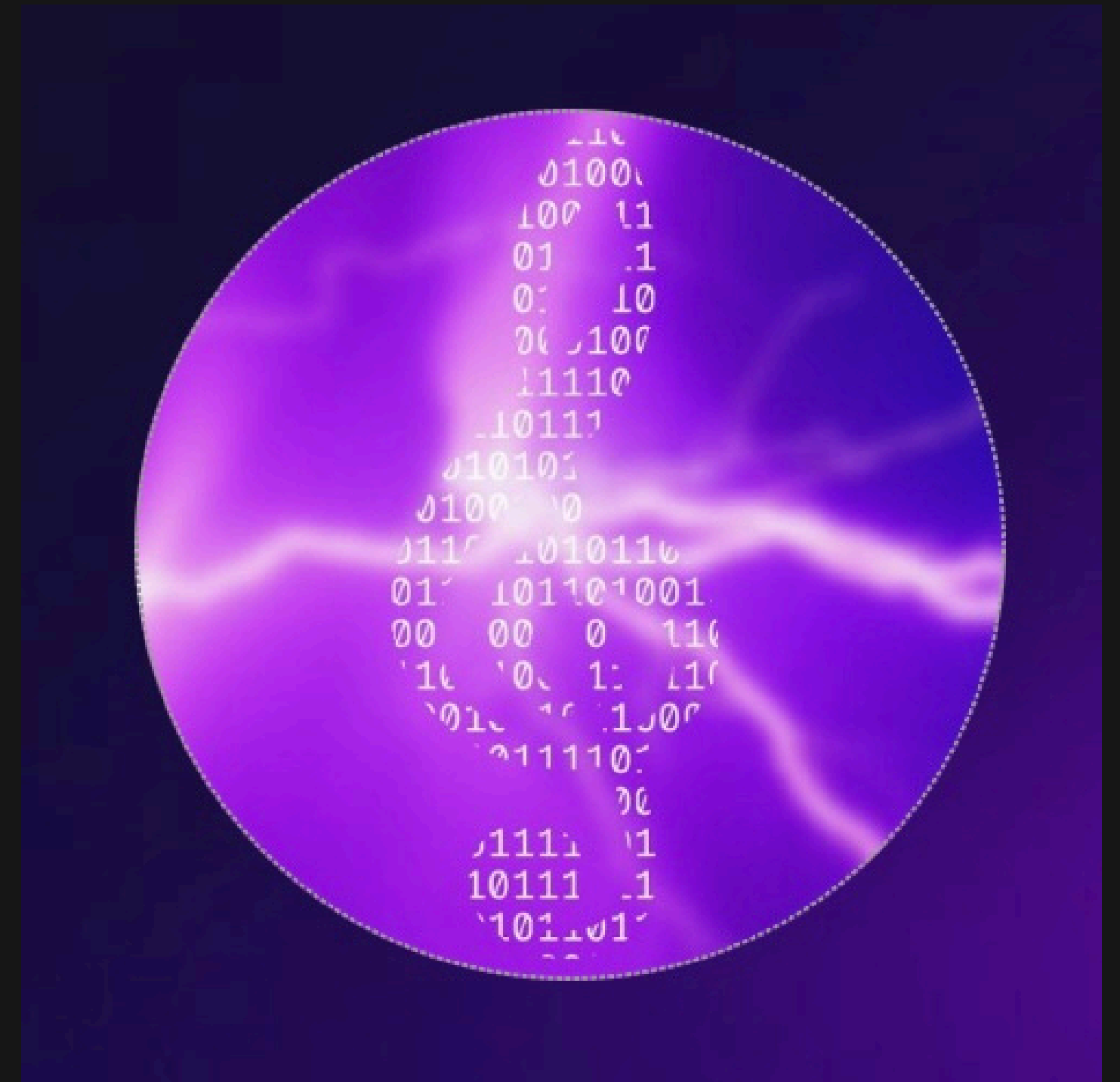
EMILY HOWELL- 2005



Cope attempts to “teach” Emily by providing feedback so she can cultivate her own personal style

Traditional Notions of Authorship, Creative Process, and Intellectual Property Rights are Challenged by EMI & Emily Howell

Emily Howell and David Cope
publish their work as coauthors



ARE COMPUTERS CREATIVE?

Oh, there's no question about it. Yes, yes, a million times yes. Creativity is simple; consciousness, intelligence, those are hard.

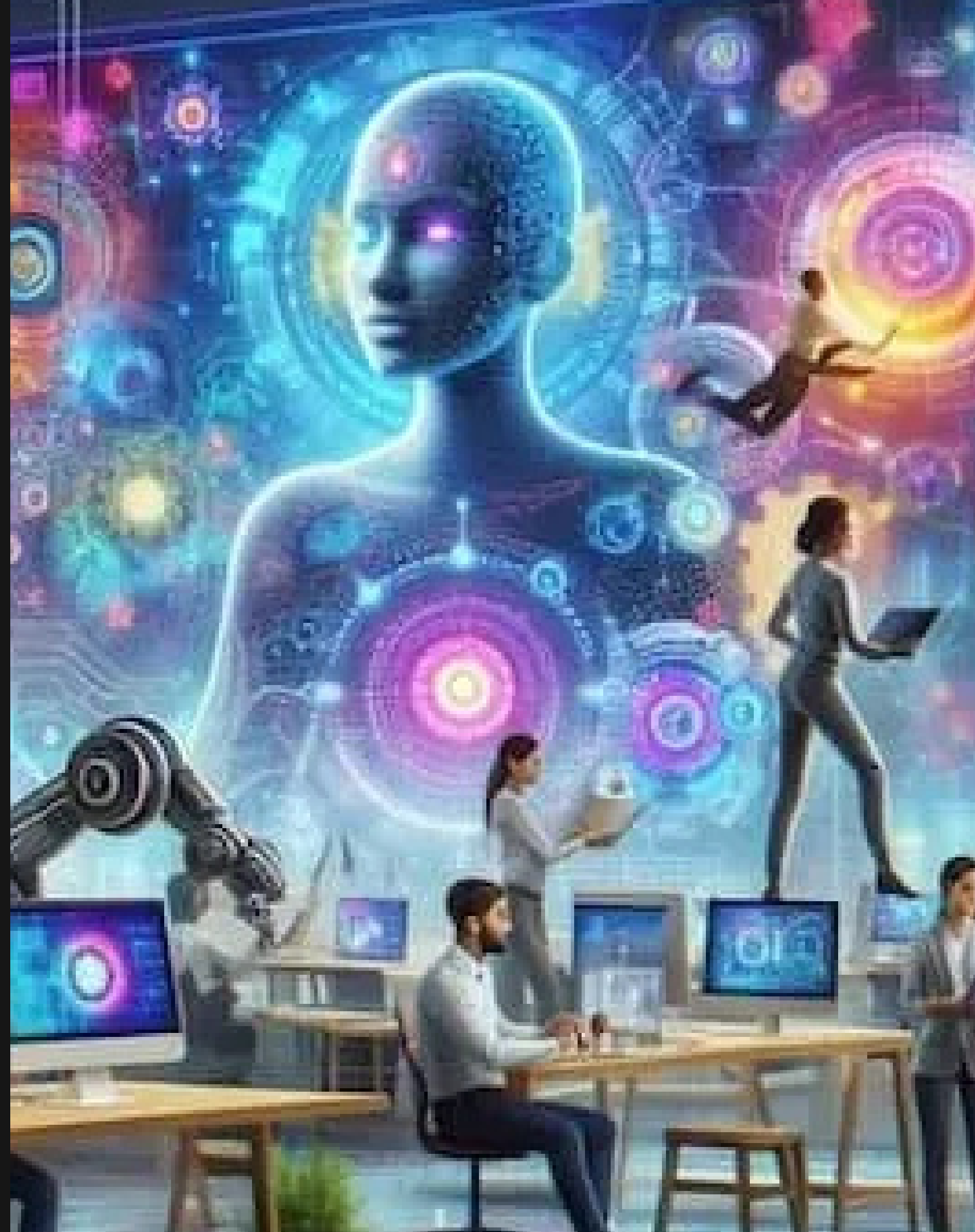
-David Cope

AI AS COLLABORATOR

Anthropomorphism

Both artists gave personal names to their computer programs.

They saw their software as a partner in the creative process, not just a tool, but a collaborator.



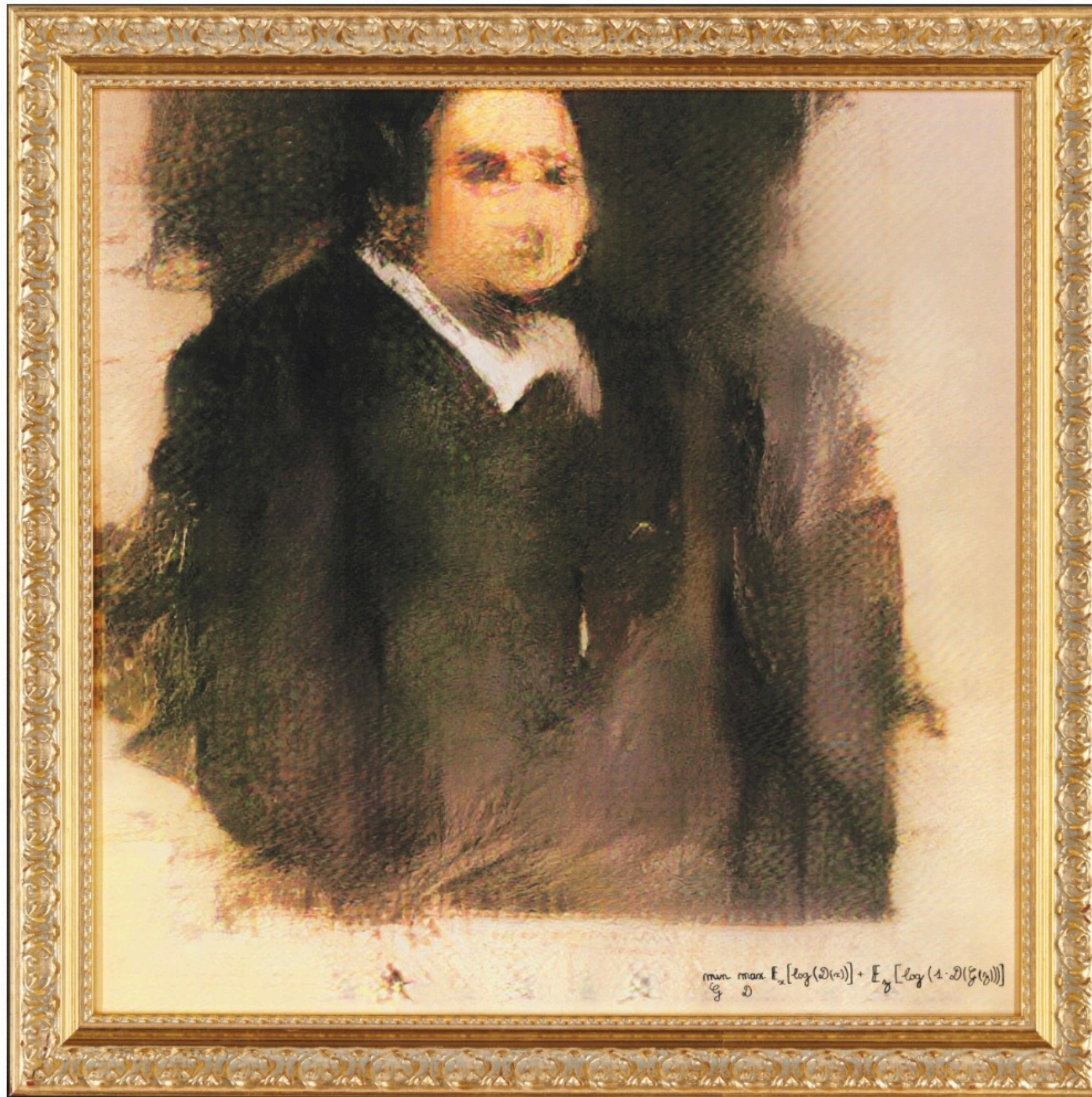


MUSIKALISCHES WÜRFELSPIEL

Wolfgang Amadeus Mozart's Musical
Dice Game

Using dice to randomly generate
music from precomposed options

Anleitung zum Componieren von Walzern so viele man will vermittelst zweier Würfel, ohne etwas von der Musik oder Composition zu verstehen (German for "Instructions for the composition of as many waltzes as one desires with two dice, without understanding anything about music or composition")



AI Art On The World Auction Stage

Exploring the interface between art and artificial intelligence

Portrait of Edmond Belamy, 2018, created by GAN (Generative Adversarial Network). Sold for \$432,500 on 25 October 2018 at Christie's in New York. Image: © Obvious

QUESTION OF AUTHORSHIP



If the artist is the one that creates the image, then that would be the machine. If the artist is the one that holds the vision and wants to share the message, then that would be us.

Caselles-Dupré
Obvious

REPRESENTATION VS REALITY

THE TREACHERY OF IMAGES



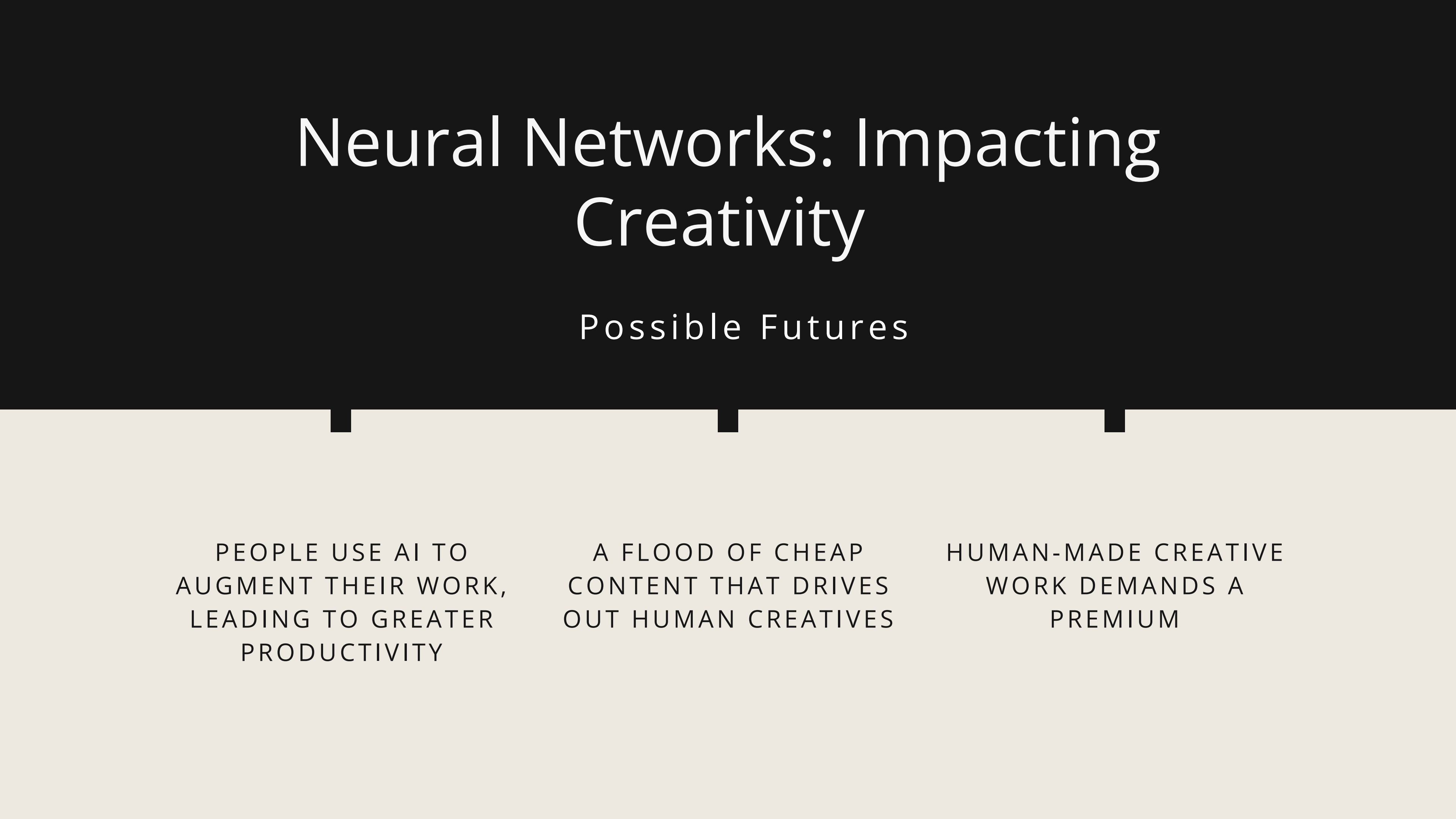
This Is Not A Pipe

Rene Magritte

1929

Neural Networks: Impacting Creativity

Possible Futures



PEOPLE USE AI TO
AUGMENT THEIR WORK,
LEADING TO GREATER
PRODUCTIVITY

A FLOOD OF CHEAP
CONTENT THAT DRIVES
OUT HUMAN CREATIVES

HUMAN-MADE CREATIVE
WORK DEMANDS A
PREMIUM

SCENARIO: EXPLOSION OF AI-ASSISTED INNOVATION



- Promote Efficiency & Performance
- Customer Service, Health Care Professionals
- Writers, Coders, Illustrators
- Faster Iterations
- Larger Number of Ideas
- Reduced Barriers to Entry

SCENARIO: MACHINES MONOPOLIZE CREATIVITY



- Disappearance of Authentic Human Creativity
- Human Writers & Creators Drowned Out by AI Generated Content
- Copyright Infringement
- Inability to Come Up With New Ideas
- Reduced Costs for Production
- Personalized Content Leads to Loss of Shared Experiences
- Curation Is Key

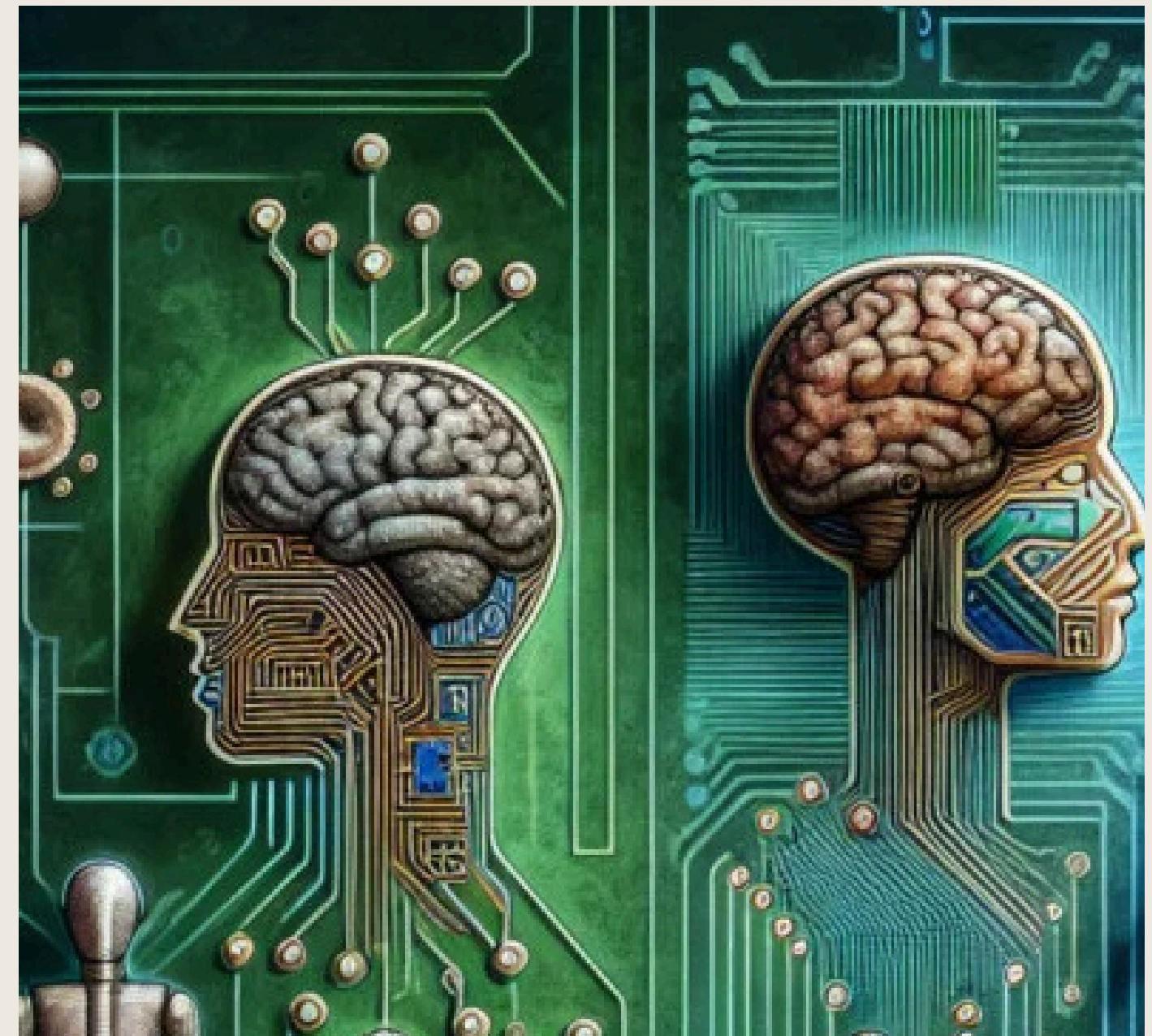
SCENARIO: HUMAN-MADE AS A PREMIUM



- Higher Value on Authentic Creativity
- Premium on Trusted Human Sources
- Demand for Accuracy from Content Providers
- Humans Having Competitive Cultural Advantage
- Human Dynamism that Algorithms Can't Compete With
- Governance & Content Moderation Needed to Prevent Misinformation

EMERGING TREND: AI AS COLLABORATOR

- AI As a Tool, Not a Solution
- Human As Curator, Art Director, Content Moderator
- Evaluating AI-Generated Content, Identifying Biases, and Ensuring Accuracy



LIMITATIONS OF AI

LACK OF:

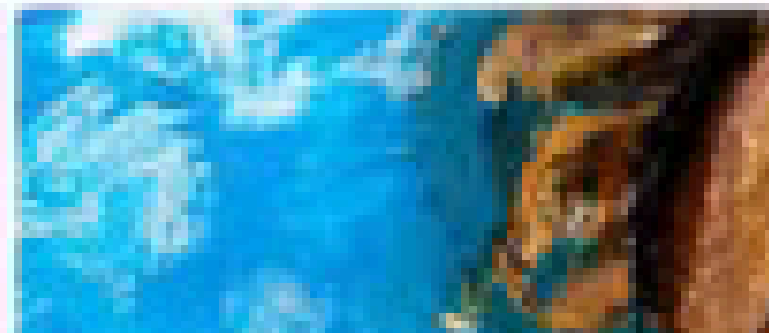
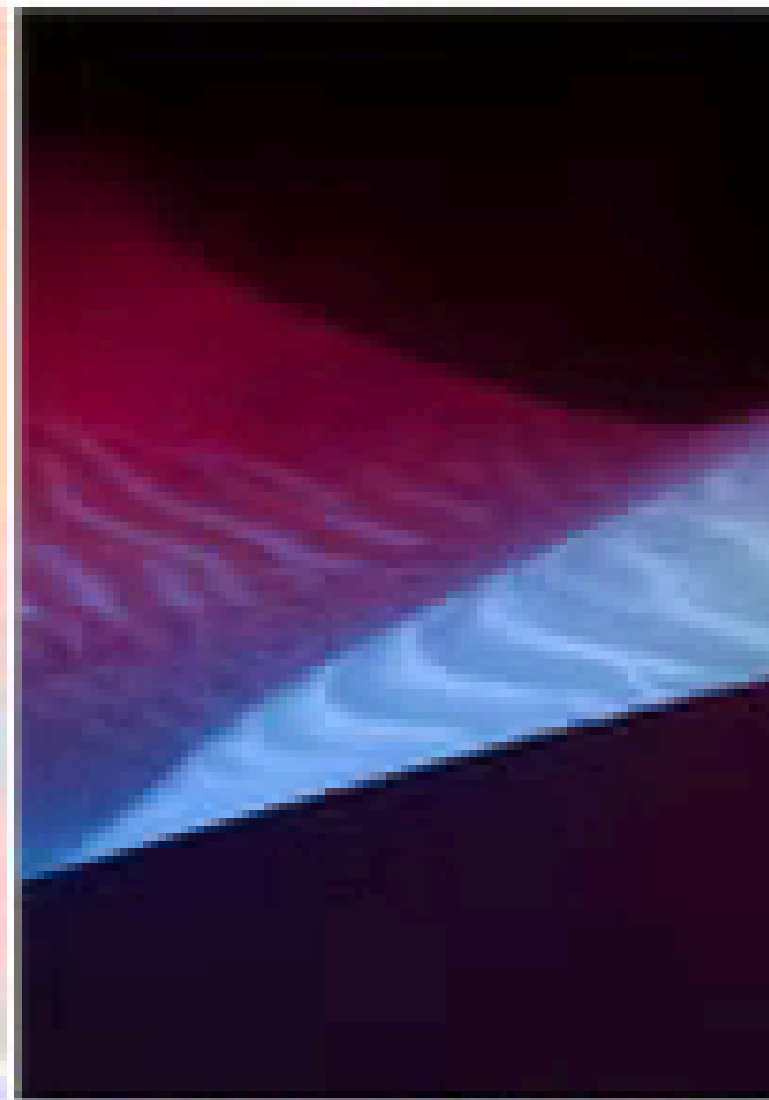
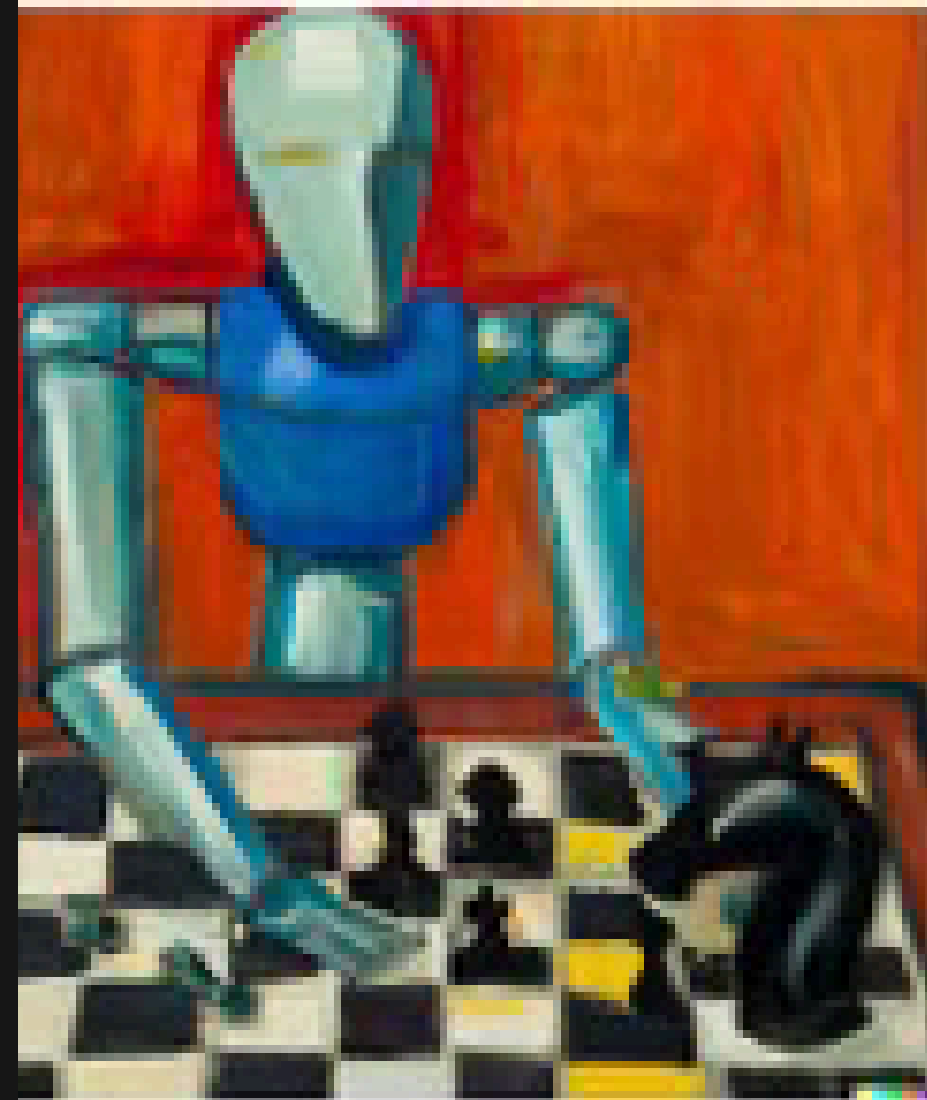
- ORIGINALITY
- EMOTIONAL DEPTH
- CONTEXTUAL UNDERSTANDING
- ARTISTIC INTENTION
- LIFE EXPERIENCES



DALLE

- ABILITY TO GENERALIZE & COMPOSE AT HIGH LEVELS OF ABSTRACTION
- POTENTIAL TO BE LESS BIASED
- MORE CREATIVE & IMAGINATIVE IMAGE GENERATION

ZERO SHOT IMAGE TEXT TO IMAGE GENERATION





Ethical Considerations

- Artistic Ownership & Copyright
- Deepfakes & Misleading Propaganda
- Perpetuating & Amplifying Biases Present in Training Data
- AI-Generated Content that Lacks Diversity & Underrepresentation of Certain Groups
- Datasets Used to Train Models May Overrepresent Certain Artistic Styles or Demographics

AI Nutrition Facts

Your Product Name

Description

Describe your product

Privacy Ladder Level 1

Feature is Optional Yes

Model Type Generative

Base Model OpenAI - GPT-4

Trust Ingredients

Base Model Trained with Customer Data No

Customer Data is Shared with Model Vendor No

Training Data Anonymized N/A

Data Deletion Yes

Human in the Loop Yes

Data Retention 30 days

Compliance

Logging & Auditing N/A

Guardrails N/A

Input/Output Consistency Yes

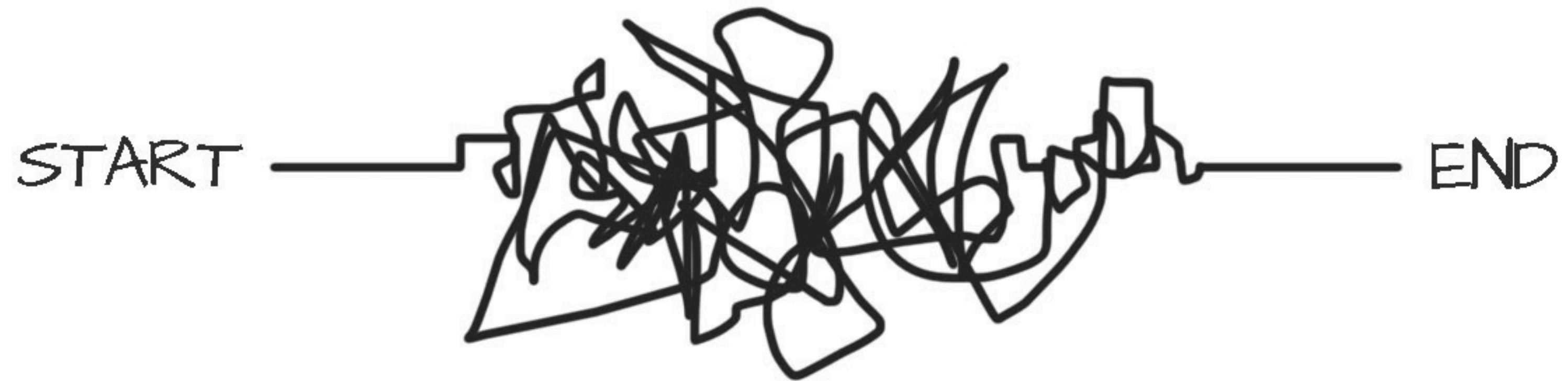
Other Resources

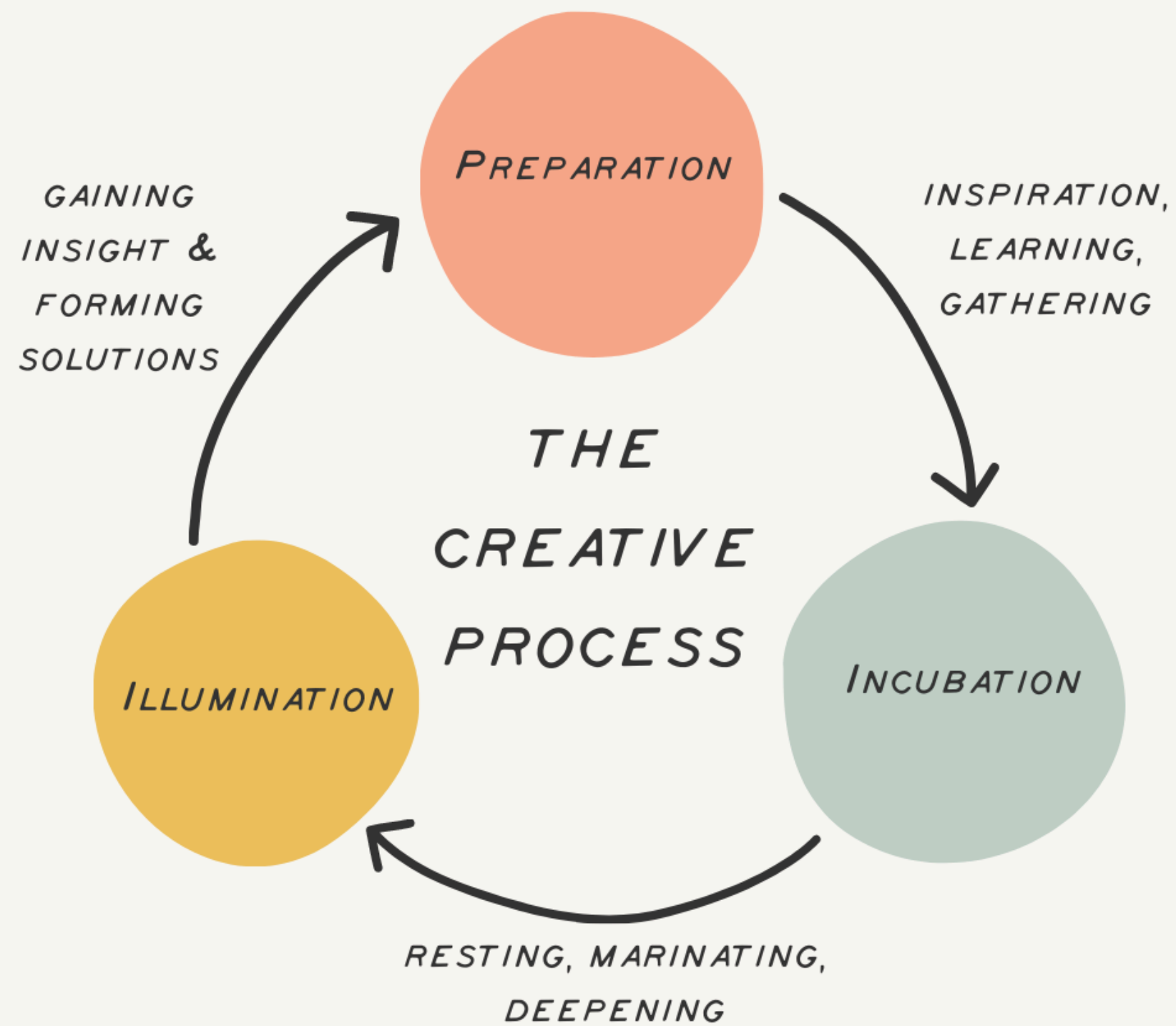
Add any additional resources...

AI Nutrition Facts

- Transparent About Usage of AI
- Give Customers Control
- Select Responsible AI Vendors
- Privacy, Data Security and Bias
- Monitor AI in Action to Address Harms

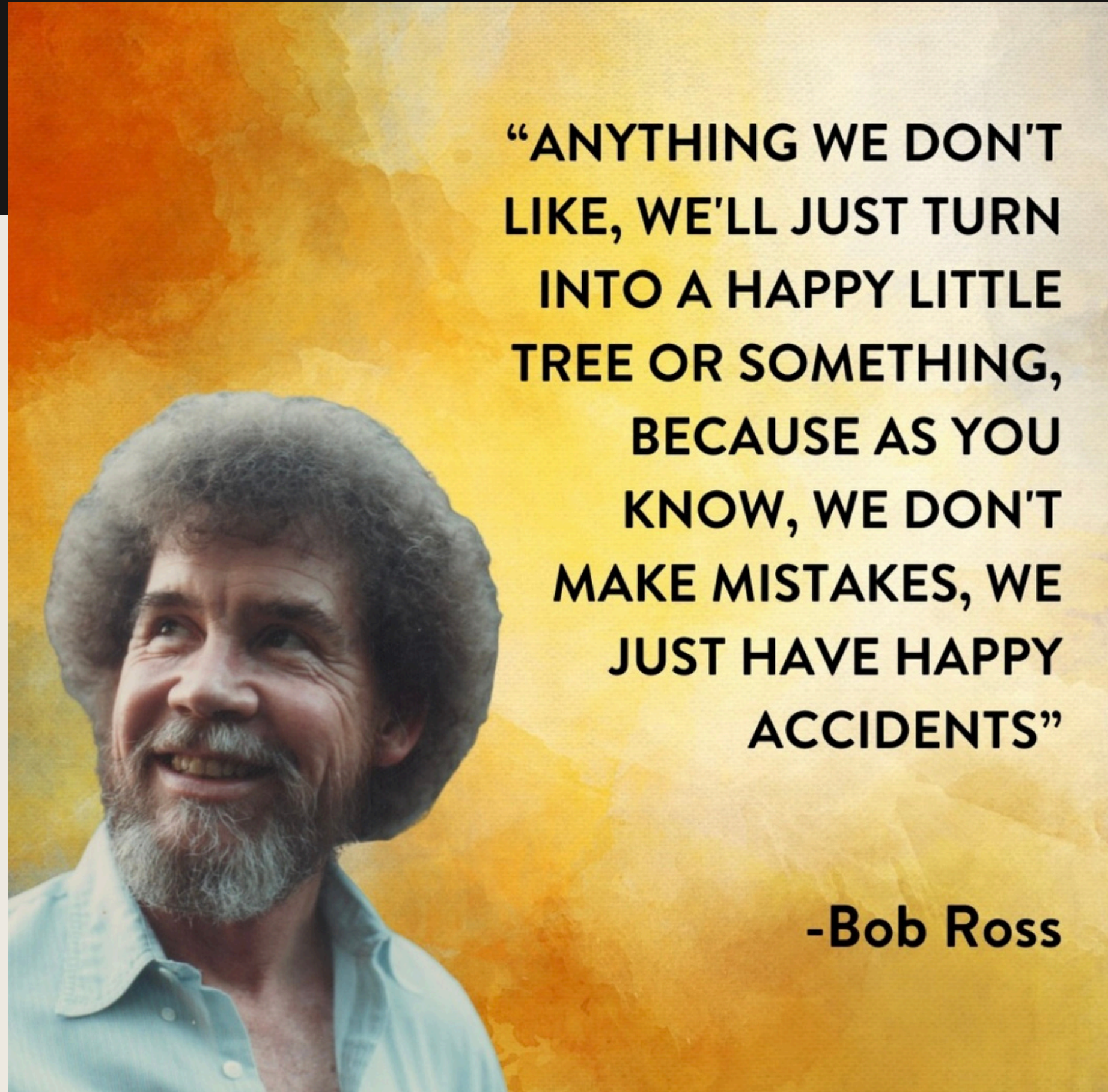
The Creative Process





Inspiration
Ideas
Research
Production
Sharing
Evaluating
Iterating

Authentic Engagement



**“ANYTHING WE DON'T
LIKE, WE'LL JUST TURN
INTO A HAPPY LITTLE
TREE OR SOMETHING,
BECAUSE AS YOU
KNOW, WE DON'T
MAKE MISTAKES, WE
JUST HAVE HAPPY
ACCIDENTS”**

-Bob Ross

MISTAKES AS:

- GROWTH OPPORTUNITIES
- SPARKS OF INNOVATION
- CREATIVE SOLUTIONS

ARTISTIC FLOW

DR. MIHALY CSIKSZENTMIHALY



- Task Must Be Just Outside Person's Grasp Yet Believed To Be Obtainable
- State of Concentration & Engagement
- Challenges One's Skills
- Needs to Receive Clear & Appropriate Feedback for Improvement
- Need to Feel Sense of Autonomy
- Intrinsic Motivation

Immersive Engagement in the Process Itself, Irrespective of the Eventual Outcome

DESIGNING AI TOOLS

- Align with Creative Process
- Enhance Flow State
- Allow for Discovery
- Exploration
- Experimentation
- Promote Iteration
- Steerable



EXPLAINABLE
AI

**HUMANS TO
UNDERSTAND
HOW AI
MAKES
CREATIVE
DECISIONS**



**CLARITY ON
WHAT CAME
FROM AI &
WHAT CAME
FROM
HUMAN**



**TRANSPARENCY
TO ALLOW
USERS TO MAKE
INFORMED
CHOICES**





CONCLUSIONS & TAKE AWAYS

- AI Tools Have Touched Previously Protected Creative Fields
- While Powerful, They Lack Intent and Experience to be Considered Authentically Creative
- True Power Lies in Their Ability to Collaborate
- As Developers, We Must Design AI Tools to Promote Flow and The Iterative Creative process



Thank you!

APPENDIX I: RESEARCH

- <https://www.forbes.com/sites/bernardmarr/2023/03/27/the-intersection-of-ai-and-human-creativity-can-machines-really-be-creative/>
- <https://www.forbes.com/sites/joemckendrick/2023/02/22/yes-artificial-intelligence-has-a-creative-side-sort-of/>
- <https://hbr.org/2023/04/how-generative-ai-could-disrupt-creative-work>
- <https://connectivewebdesign.com/blog/ai-vs-human-creativity> <https://www.akkio.com/post/can-artificial-intelligence-be-creative> <https://time.com/6289278/ai-affect-human-creativity/>
- <https://neurosciencenews.com/ai-creativity-23585/>
- <https://ibmix.de/en/blog/artificial-intelligence-designers>
- <https://medium.com/@kieferrvestal/glitchartificial-intelligence-and-the-role-of-designers-in-the-future-66f6eac7e164>
- <https://www.superside.com/blog/ai-in-creative-industries>

APPENDIX II: RESEARCH

- <https://www.wix.com/studio/blog/ai-for-creativity>
- <https://www.economist.com/films/2021/04/07/how-ai-is-transforming-the-creative-industries>
- <https://www.itsnicethat.com/features/shades-of-intelligence-insights-research-creative-industry-ai-151123>
- <https://www.sps.nyu.edu/homepage/emerging-technologies-collaborative/blog/2023/embracing-creativity-how-ai-can-enhance-the-creative-process.html>
- <https://tillerdigital.com/blog/ai-in-design-an-art-directors-perspective/>
- <https://medium.com/@treycwong/the-future-role-of-an-ai-art-design-director-bbbbeda4eca94>
- <https://www.sciencenews.org/article/artificial-intelligence-ai-creativity-art-computer-program>
- <https://aokistudio.com/50-arguments-against-the-use-of-ai-in-creative-fields.html>
- <https://www.sciencedirect.com/science/article/pii/S2713374524000062>
- <https://journals.sagepub.com/doi/full/10.1177/13548565231187730>

APPENDIX III: RESEARCH

- <https://www.creativebloq.com/art/digital-art/blender-artist-has-to-prove-their-work-isnt-ai>
- <https://positivepsychology.com/mihaly-csikszentmihalyi-father-of-flow>
- <https://positivepsychology.com/theory-psychology-flow/>
- <https://www.newyorker.com/tech/annals-of-technology/ada-lovelace-the-first-tech-visionary>
- <https://aesthetics-online.org/page/2002FreelandIsIt>
- <https://abccrit.org/2019/06/05/114-tim-scott-quotes-from-and-comments-on-but-is-it-art-oup-2001-by-cynthia-freeland/>
- <https://www.tandfonline.com/doi/full/10.1080/10400419.2022.2107850#abstract>
- <https://whitney.org/exhibitions/harold-cohen-aaron>
- <https://www.youtube.com/watch?v=xkrJwURBEfg&t=2s>
- <https://www.nytimes.com/1997/11/11/science/undiscovered-bach-no-a-computer-wrote-it.html>
- <http://www.thesoundstew.com/2010/07/interview-with-composer-david-cope-part.html>

APPENDIX IV: RESEARCH

- <https://www.nytimes.com/2024/10/23/technology/openai-copyright-law.html>
- <https://digiday.com/media-buying/adobe-debuts-new-icon-as-a-nutrition-label-for-generative-ai-content/>
- <https://news.adobe.com/news/2024/10/aca-announcement>
- <https://www.tangentfit.com/blogs/news/creative-process-the-light-and-dark>
- <https://computerhistory.org/blog/algorithmic-music-david-cope-and-emi/>
- <https://www.ams.jhu.edu/dan-mathofmusic/stochastic-processes/>