Computational Futures & Artificial Intelligence

(a introduction lesson)

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Alex Fefegha
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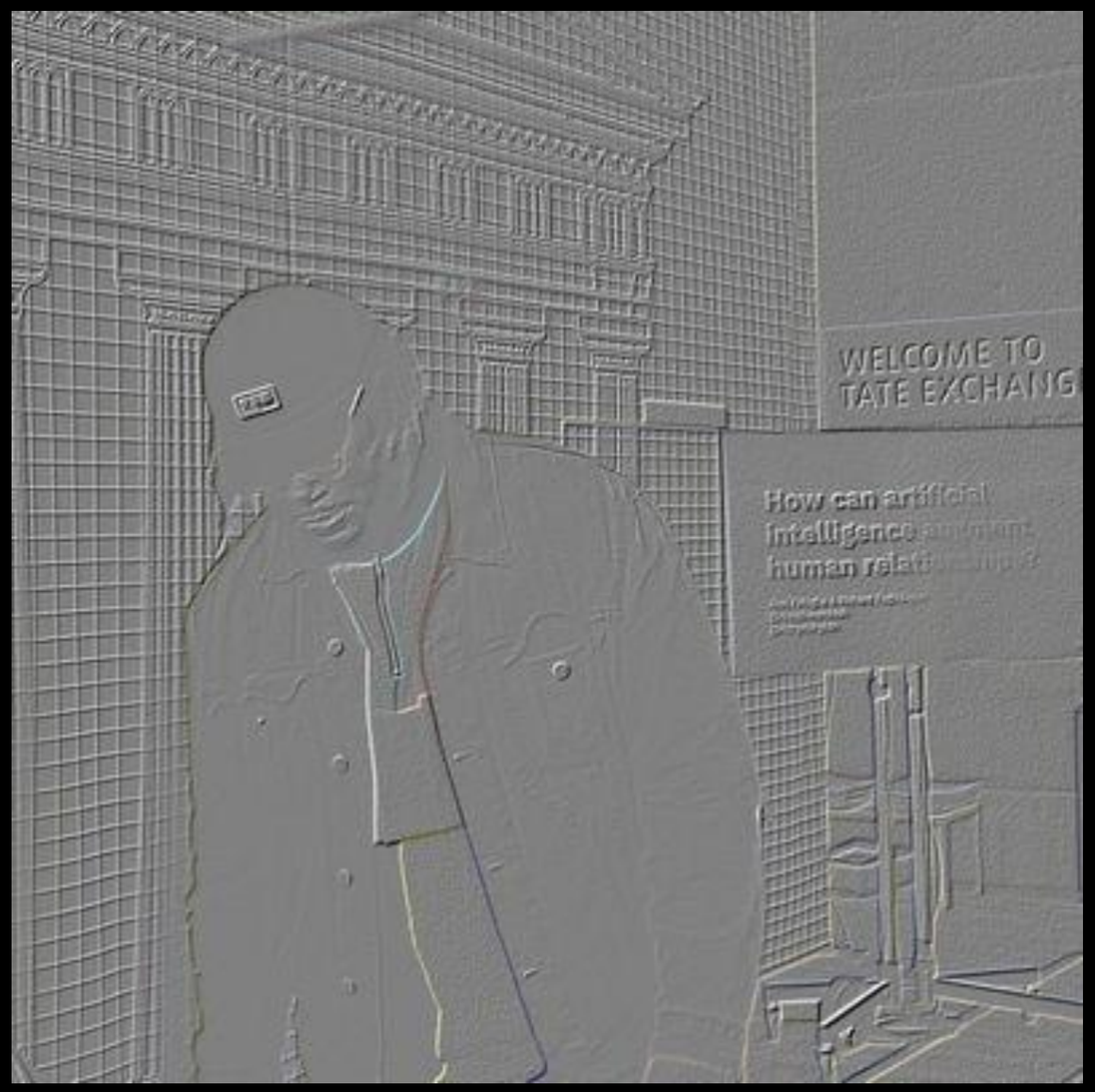
Design+Code Person
Digital Interaction *'Artist'*

AI and Creativity
AI and its future impact on society.



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Creative Technologist *noun*

Definition:

On a day to day, my role alternatives between being a design researcher, interaction designer & a maker/hacker creating emerging technology prototypes which demonstrate novel and effective ideas.

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Positive Human Interaction

Reward
Accessibility
Control
Safety
Usability
Benefiance
Autonomy
Eudaimonia

Emerging Technology

AI & ML
Robotics
AR
VR
Blockchain
IoT
New Interfaces
Mobile & Web

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What is Artificial Intelligence?

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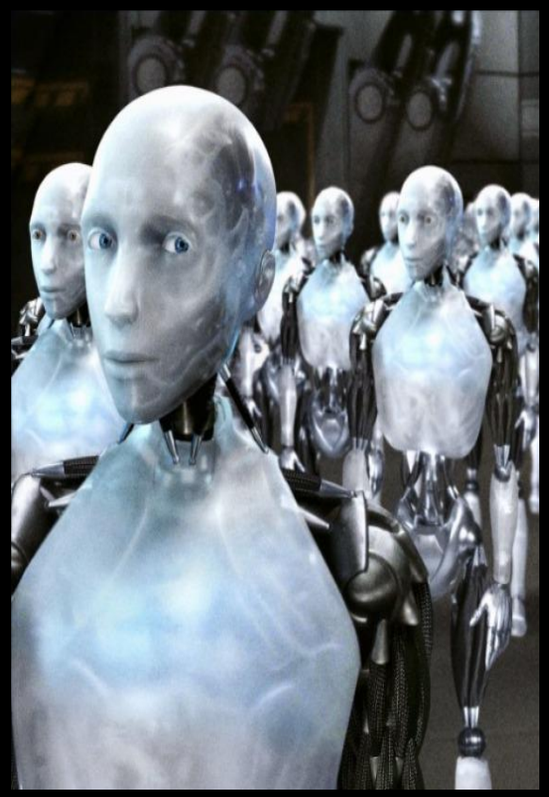
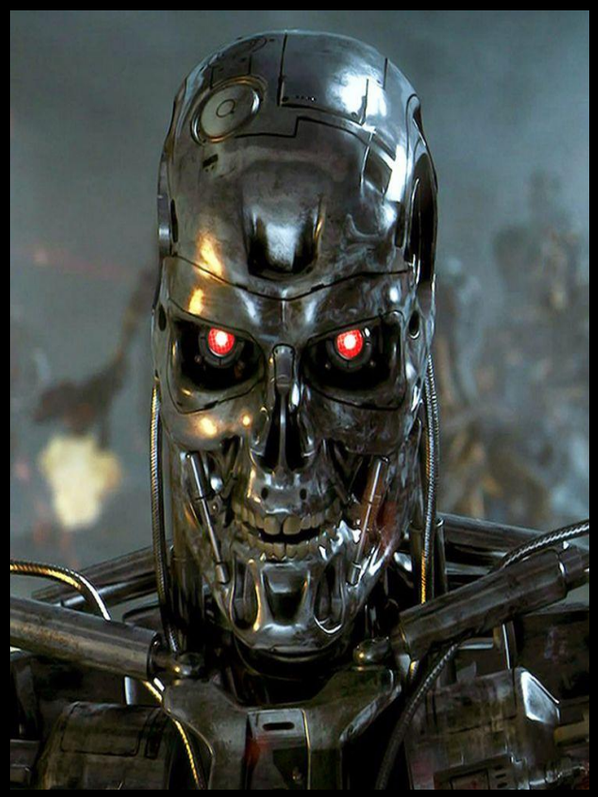
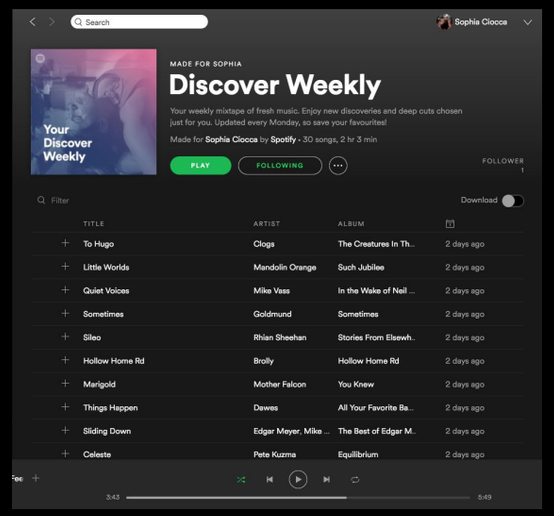


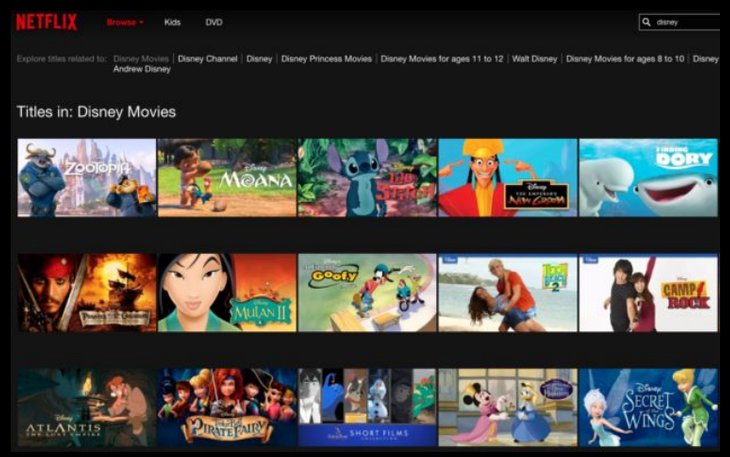


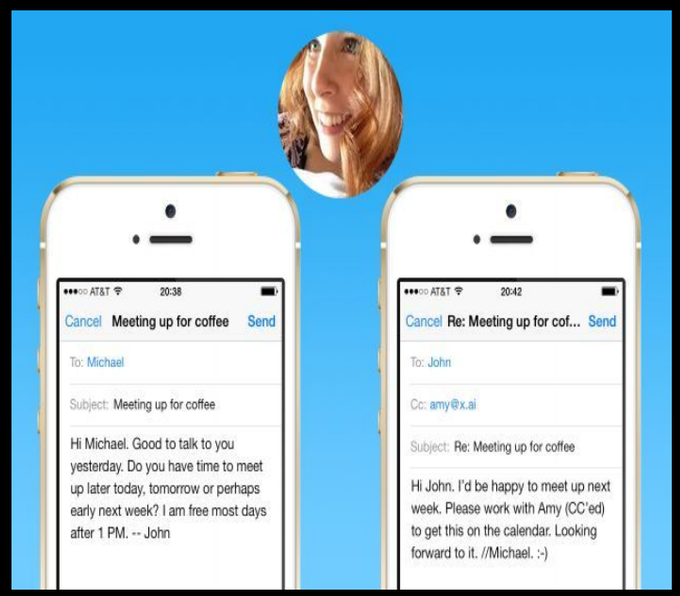
COMUZ
I

Yes it is Terminator!

AI is a part of everyday life.







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Artificial Intelligence *noun*

Definitions:

The art of how to make computers do things at which humans are currently better.

The process of machines learning to think like humans.

- **Chatbots**
(Natural Language Processing)

- **Personal Assistants (Siri, Alexa)**
(Natural Language Processing, Speech Processing + Machine Learning)

- **Autopilot by Tesla**
(Machine Learning, unstructured Data and situational awareness)

- **Deepdream**
(Machine Learning)

- **AlphaGo**
(Machine Learning)

- **IBM Watson**
(Machine Learning, speech, Structured and unstructured data)

Narrow AI
Basic Tasks

‘AI’

Deep AI
Continuously learning

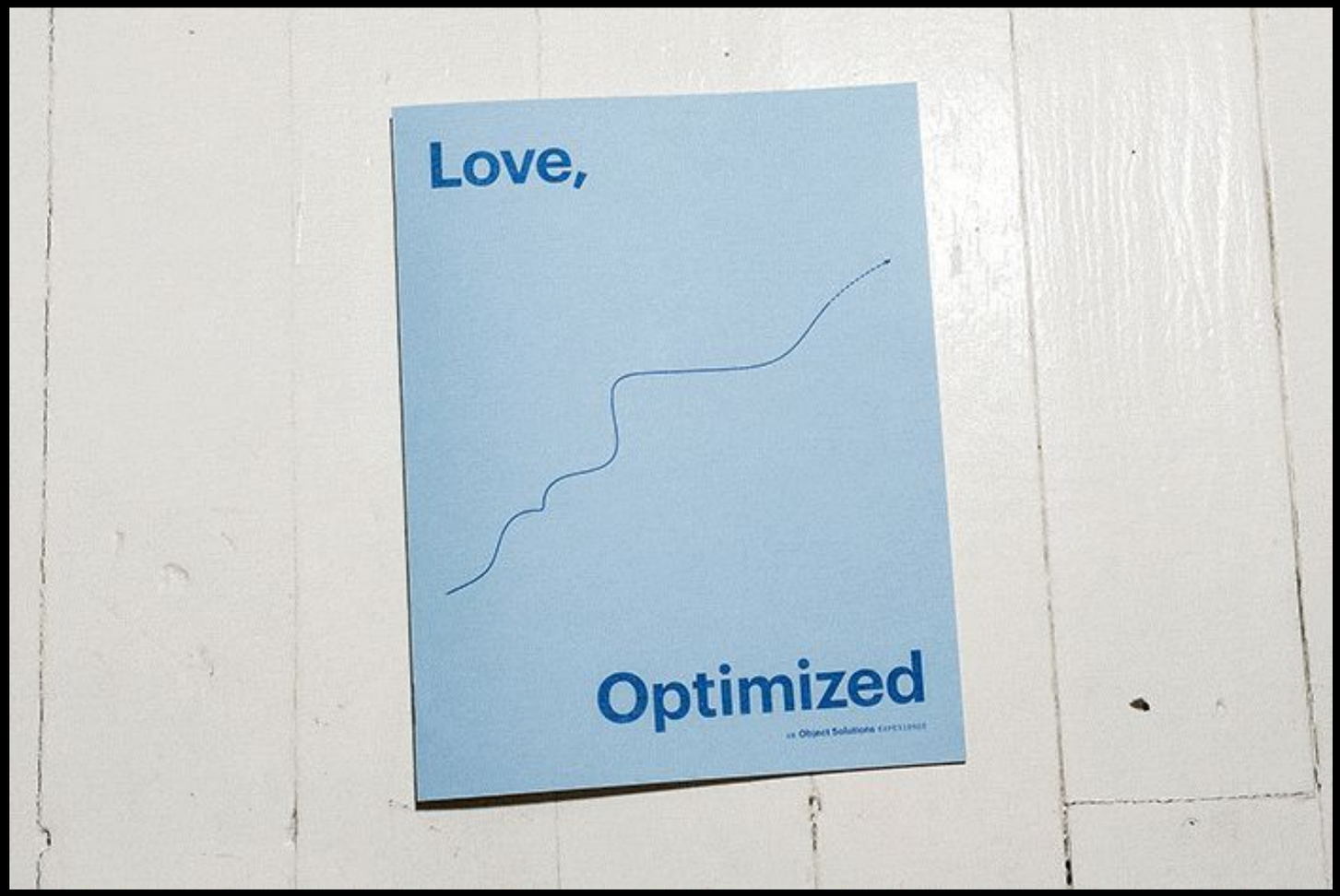
Alex’s obsession - active collaborative interaction between humans and machines.

to be fair, I spend
most of my time
building bots.

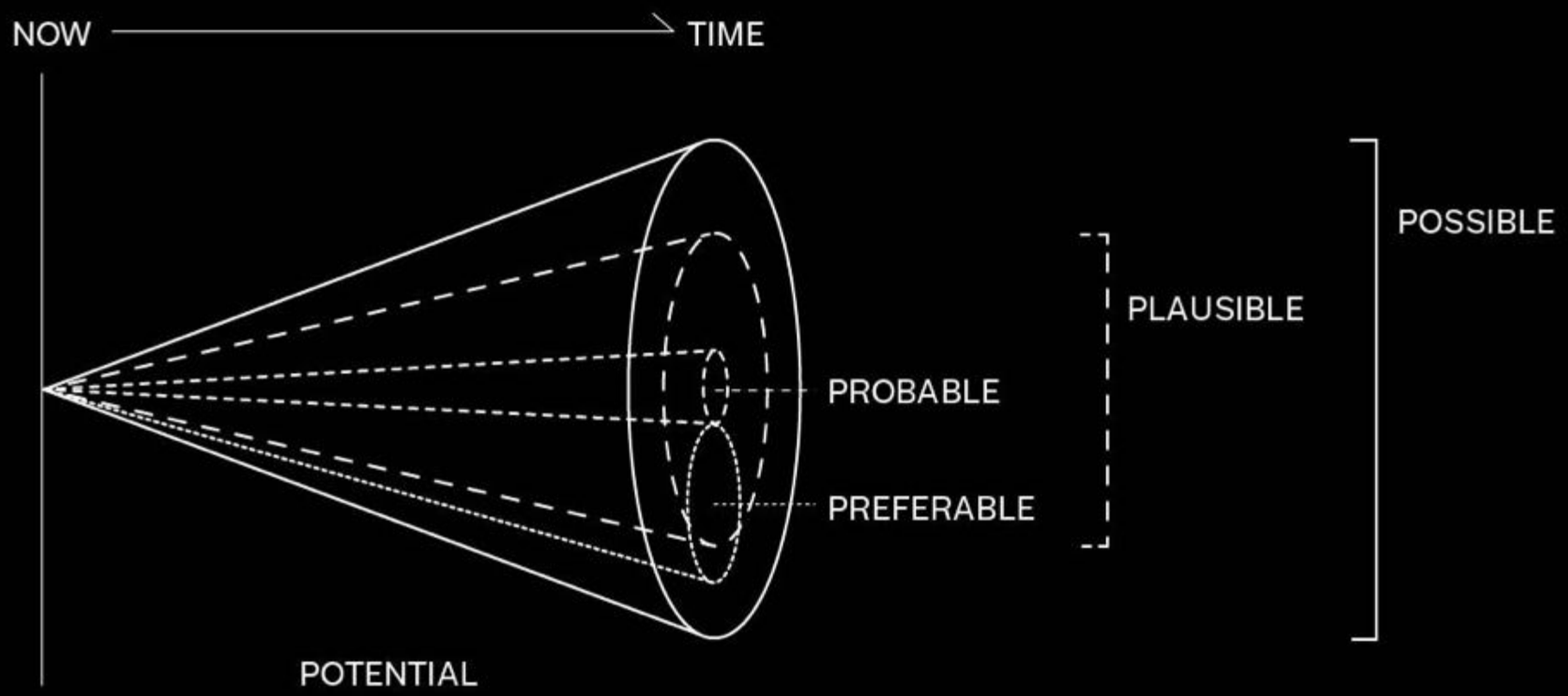
I spend most of our time ‘attempting’ to build provotypes.

(design+code artefacts — digital or physical — whose main goal is to provoke discussion among different types of users and stakeholders.)

Design Fiction



Design being used as a medium to critique social, cultural and ethical implications of emerging technologies and trends.


NOW
TIME
POSSIBLE
PLAUSIBLE
PROBABLE
PREFERABLE
POTENTIAL

Mapping Ethical Futures with Artificial Intelligence

Alexander Fefegha
Masters Dissertation
Central Saint Martins, University of the Arts London
MA Innovation Management 2018

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Many of the narratives and criticism displayed by design fiction practitioners seem to only apply to the aesthetic concerns of the intellectual northern European middle classes.

so I am gonna need you all create some different futures.

by the way who are you?
where are you from?
what is your human super power?
what do you do?
what made you sign up to the course?
what are your expectations?

WTF is a feminist conversation?

Could there ever be a feminist response to ‘Hey Alexa, what’s the weather like today?’

Building feminist voice bots

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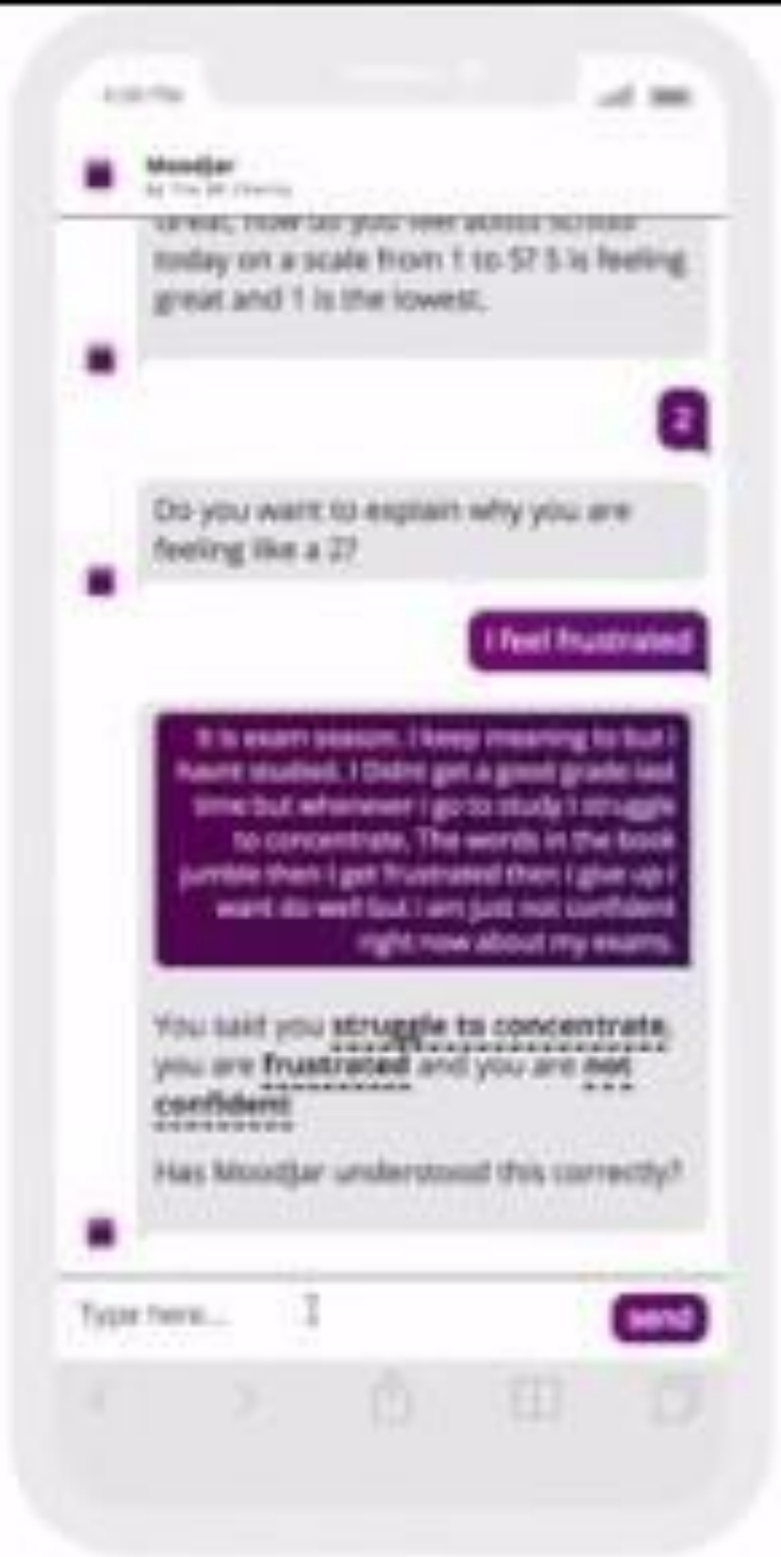
how do you design an explainable algorithm?

a bot that told you how it made an automated decision.



what happens to your digital self when you die?

a bot that shares and collect thoughts about your death + digital rights

what is AI bias and what can I do about it?

a bot that teaches you how bias in AI systems occur.

CVs, resumes and qualifications really cut off a lot of people of getting opportunity.

Can we guide someone to think about their strengths?

a bot that guides young people on finding jobs.

Cool bot stuff, Alex.

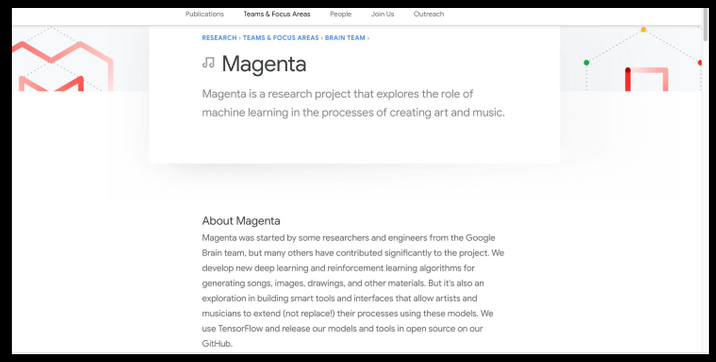
What you trying to do next?

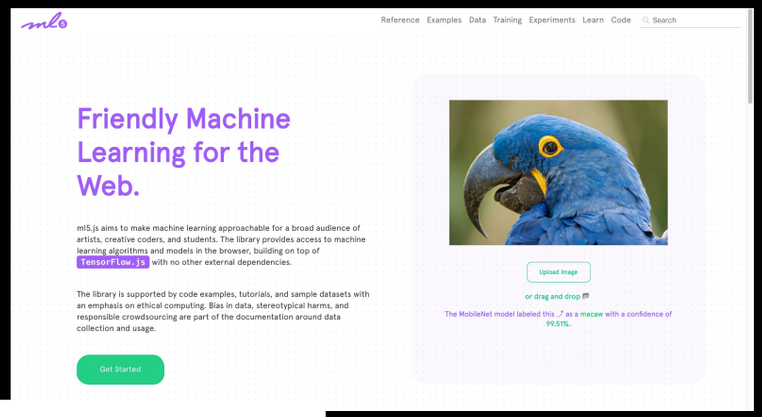
7) Randomness and Creativity

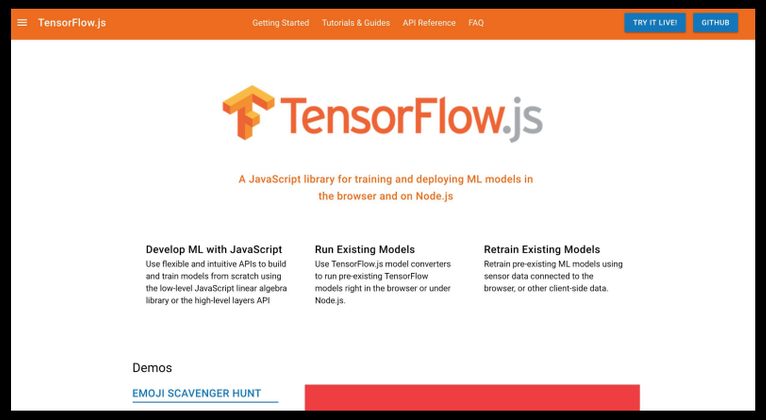
A fairly attractive and yet clearly incomplete conjecture is that the difference between creative thinking and unimaginative competent thinking lies in the injection of a some randomness. The randomness must be guided by intuition to be efficient. In other words, the educated guess on the hunch include controlled randomness in otherwise orderly thinking.

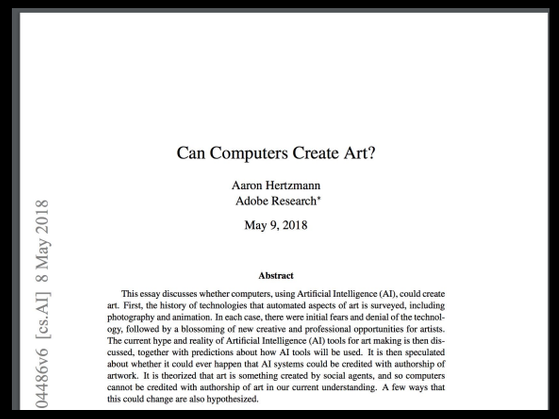
Artists and Machine Intelligence

AMI is a program at Google that brings artists and engineers together to realize projects using Machine Intelligence. By supporting this emerging form of artistic collaboration we open our research to new ways of thinking about and working with intelligent systems. Follow along on our Medium blog.









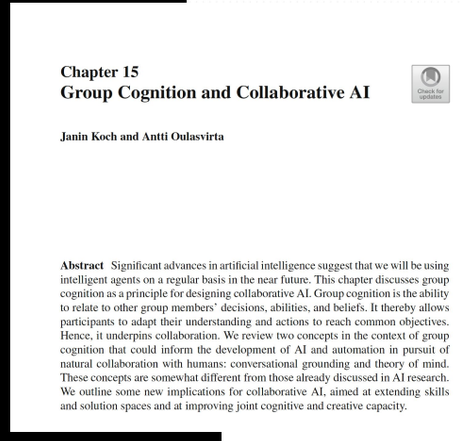
Can Computers Create Art?

Aaron Hertzmann
Adobe Research*

May 9, 2018

Abstract

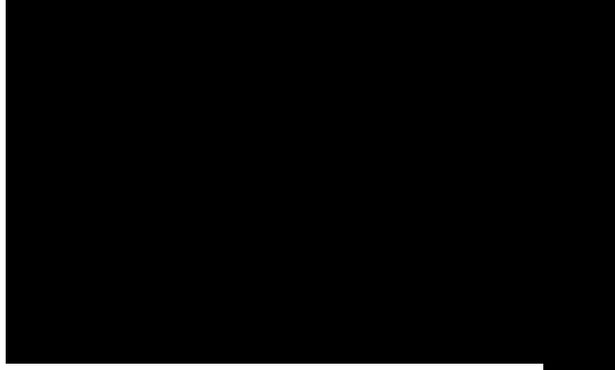
This essay discusses whether computers, using Artificial Intelligence (AI), could create art. First, the history of technologies that automated aspects of art is surveyed, including photography and animation. In each case, there were initial fears and denial of the technology, followed by a blossoming of new creative and professional opportunities for artists. The current hype and reality of Artificial Intelligence (AI) tools for art making is then discussed, together with predictions about how AI tools will be used. It is then speculated about whether it could ever happen that AI systems could be credited with authorship of artwork. It is theorized that art is something created by social agents, and so computers cannot be credited with authorship of art in our current understanding. A few ways that this could change are also hypothesized.

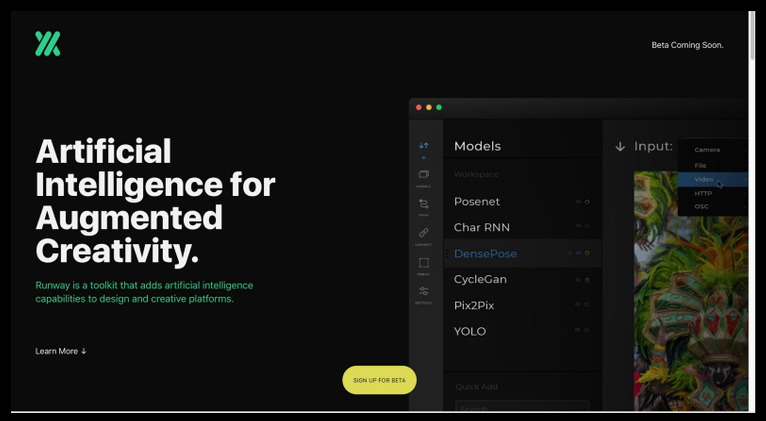


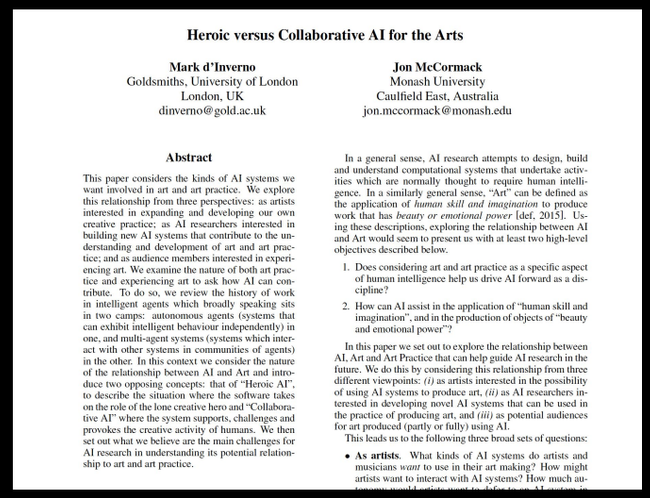
Chapter 15
Group Cognition and Collaborative AI

Janin Koch and Antti Oulasvirta

Abstract Significant advances in artificial intelligence suggest that we will be using intelligent agents on a regular basis in the near future. This chapter discusses group cognition as a principle for designing collaborative AI. Group cognition is the ability to relate to other group members' decisions, abilities, and beliefs. It thereby allows participants to adapt their understanding and actions to reach common objectives. Hence, it underpins collaboration. We review two concepts in the context of group cognition that could inform the development of AI and automation in pursuit of natural collaboration with humans: conversational grounding and theory of mind. These concepts are somewhat different from those already discussed in AI research. We outline some new implications for collaborative AI, aimed at extending skills and solution spaces and at improving joint cognitive and creative capacity.







Heroic versus Collaborative AI for the Arts

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Abstract

This paper considers the kinds of AI systems we want involved in art and art practice. We explore this relationship from three perspectives: as artists interested in expanding and developing our own creative practice; as AI researchers interested in building new AI systems that contribute to the understanding and development of art and art practice; and as audience members interested in experiencing art. We examine the nature of both art practice and experiencing art to ask how AI can contribute. To do so, we review the history of work in intelligent agents which broadly speaking sits in two camps: autonomous agents (systems that can exhibit intelligent behaviour independently) in one, and multi-agent systems (systems which interact with other systems in communities of agents) in the other. In this context we consider the nature of the relationship between AI and Art and introduce two opposing concepts: that of "Heroic AI", to describe the situation where the software takes on the role of the lone creative hero and "Collaborative AI" where the system supports, challenges and provokes the creative activity of humans. We then set out what we believe are the main challenges for AI research in understanding its potential relationship to art and art practice.

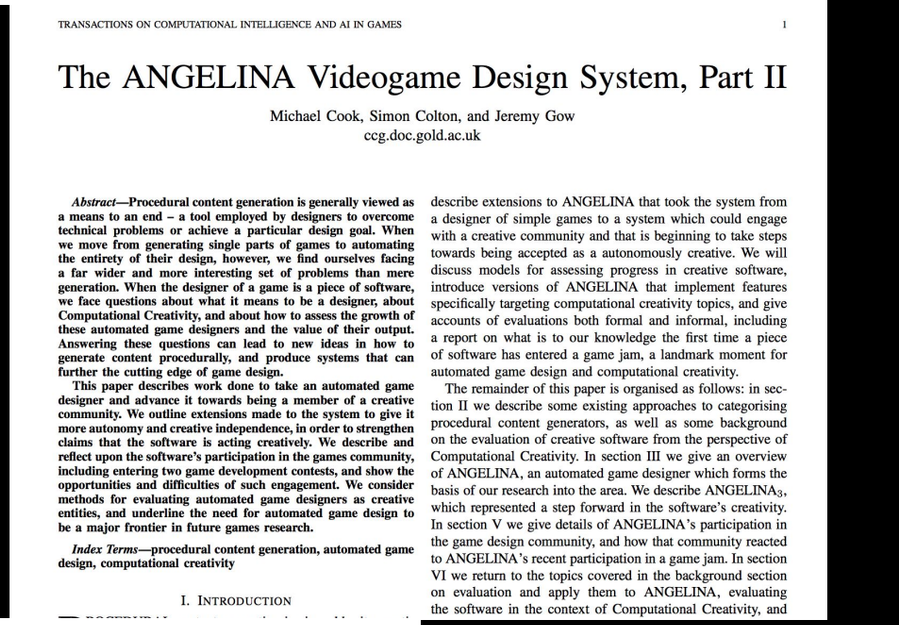
In a general sense, AI research attempts to design, build and understand computational systems that undertake activities which are normally thought to require human intelligence. In a similarly general sense, "Art" can be defined as the application of *human skill and imagination* to produce work that has *beauty or emotional power* [def, 2015]. Using these descriptions, exploring the relationship between AI and Art would seem to present us with at least two high-level objectives described below.

1. Does considering art and art practice as a specific aspect of human intelligence help us drive AI forward as a discipline?
2. How can AI assist in the application of "human skill and imagination", and in the production of objects of "beauty and emotional power"?

In this paper we set out to explore the relationship between AI, Art and Art Practice that can help guide AI research in the future. We do this by considering this relationship from three different viewpoints: *(i)* as artists interested in the possibility of using AI systems to produce art, *(ii)* as AI researchers interested in developing novel AI systems that can be used in the practice of producing art, and *(iii)* as potential audiences for art produced (partly or fully) using AI.

This leads us to the following three broad sets of questions:

- **As artists**. What kinds of AI systems do artists and musicians *want* to use in their art making? How might artists want to interact with AI systems? How much au-



TRANSACTIONS ON COMPUTATIONAL INTELLIGENCE AND AI IN GAMES 1

The ANGELINA Videogame Design System, Part II

Michael Cook, Simon Colton, and Jeremy Gow
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***Abstract*—Procedural content generation is generally viewed as a means to an end – a tool employed by designers to overcome technical problems or achieve a particular design goal. When we move from generating single parts of games to automating the entirety of their design, however, we find ourselves facing a far wider and more interesting set of problems than mere generation. When the designer of a game is a piece of software, we face questions about what it means to be a designer, about Computational Creativity, and about how to assess the growth of these automated game designers and the value of their output. Answering these questions can lead to new ideas in how to generate content procedurally, and produce systems that can further the cutting edge of game design.**

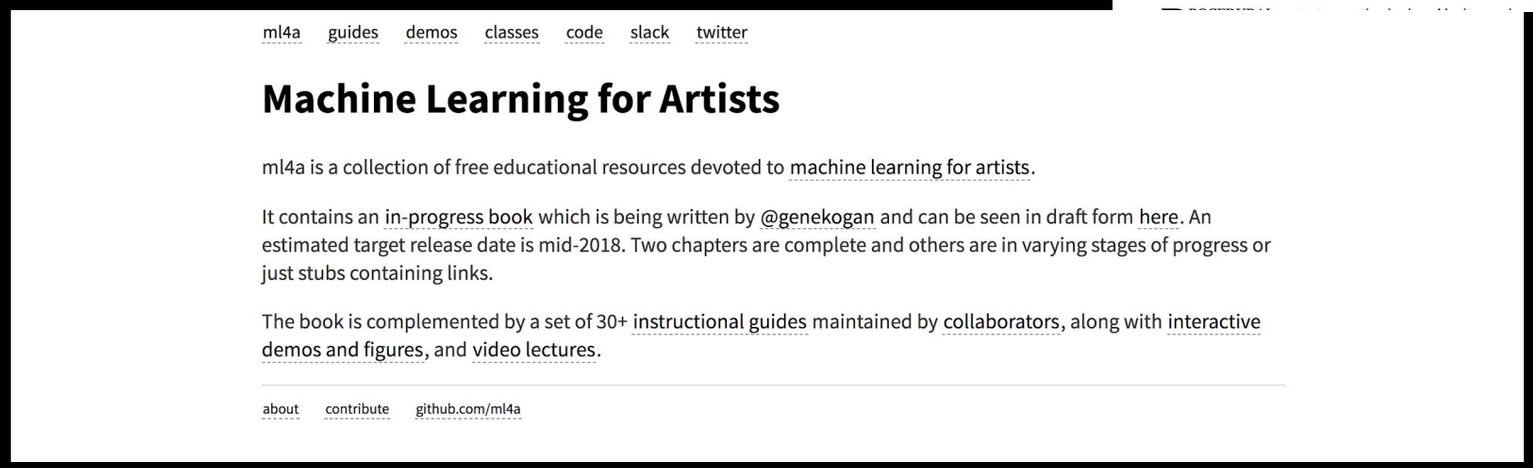
This paper describes work done to take an automated game designer and advance it towards being a member of a creative community. We outline extensions made to the system to give it more autonomy and creative independence, in order to strengthen claims that the software is acting creatively. We describe and reflect upon the software's participation in the games community, including entering two game development contests, and show the opportunities and difficulties of such engagement. We consider methods for evaluating automated game designers as creative entities, and underline the need for automated game design to be a major frontier in future games research.

***Index Terms*—procedural content generation, automated game design, computational creativity**

I. Introduction

describe extensions to ANGELINA that took the system from a designer of simple games to a system which could engage with a creative community and that is beginning to take steps towards being accepted as a autonomously creative. We will discuss models for assessing progress in creative software, introduce versions of ANGELINA that implement features specifically targeting computational creativity topics, and give accounts of evaluations both formal and informal, including a report on what is to our knowledge the first time a piece of software has entered a game jam, a landmark moment for automated game design and computational creativity.

The remainder of this paper is organised as follows: in section II we describe some existing approaches to categorising procedural content generators, as well as some background on the evaluation of creative software from the perspective of Computational Creativity. In section III we give an overview of ANGELINA, an automated game designer which forms the basis of our research into the area. We describe ANGELINA$_3$, which represented a step forward in the software's creativity. In section V we give details of ANGELINA's participation in the game design community, and how that community reacted to ANGELINA's recent participation in a game jam. In section VI we return to the topics covered in the background section on evaluation and apply them to ANGELINA, evaluating the software in the context of Computational Creativity, and



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Human-Computer Collaboration

Lubart (2005)

“Man-Computer symbiosis” (Licklider, 1960)

d’Inverno & McCormack (2015)

Previous work in HCI has focused on exploiting human or machine capabilities

Frich et al (2018)

Halpern et al (2011)

Still & d’Inverno (2016)

collaboration and understanding between participants in a creative process helps to extend the available solution space and facilitates the emergence of creative solution and ideas, which is especially relevant for approaching new problem spaces.

Sawyer & DeZutter (2009)

Brief things to think about

creativity and its measurements?

Boden (2004)

Still & d’Inverno (2016)

Frich et al (2018)

Colton (2008)

Gero (2007)

Jordanous (2012)

Where does AI assist in the creative process?

Lubart, 2005; Gabriel et al, 2016; Lisi, 2015; Koch, 2017; Fiebrink et al; 2018; Bernado et al; 2017; Gillies et al; 2016; Yang et al; 2018, Yang et al; 2018b; Fiebrink et al; 2018

Tool – toy scale

- Is the system designed to solve a problem effectively or is it just for entertainment?

<u>Remote control</u> – autonomous scale

- Does the robot require remote control or is it capable of action without direct human influence?

Reactive – dialogue scale

- Does the robot rely on a fixed interaction pattern or is it able to have dialogue — exchange of information — with a human?

Anthropomorphism scale

- Does it have the shape or properties of a human?

INTERFACES

Bartneck & Okada (2001)

What the best interface for AI to express creativity?

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- **Be able to make context-dependent decisions.**
- **Change its creative strategies autonomously.**
- **Adapt to current user behaviour**

The Vision for AI as a supportive creative collaborator

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Thank you.

Questions?

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Share these bots yo

f-xa.co
deathbotbeta.art
creativetechish.wtf

Break

Activity time

Rules

Our focus

our focus is to engage
in critical creative
practice with
technology.

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our focus is for us to
be philosophers who
don’t write down ideas,
but instead make
objects that embodied
them

our focus is to be
human.

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our focus is on rapid exploration and experimentation.

our focus is to explore futures and shape alternative futures that is different from the norm.

there is no right or wrong.

we are here to learn
and have fun.

collaboration is everything. people are cool.

challenge each other in nice ways :)

Activity time

‘what does man-computer symbiosis mean to you?’

The work describes something of Lickliders' vision for a complementary (symbiotic) relationship between humans and computers at a potential time of the future.

Licklider envisioned a future time when machine cognition (cerebration) would surpass and become independent of human direction, as a basic stage of development within human evolution.

Read

Reflect

Ideate

Present

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