



European Research Council

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CITIZEN SCIENCE AND FRONTIER RESEARCH

Harvesting session

#ERCengage

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and the Center for Hybrid Intelligence
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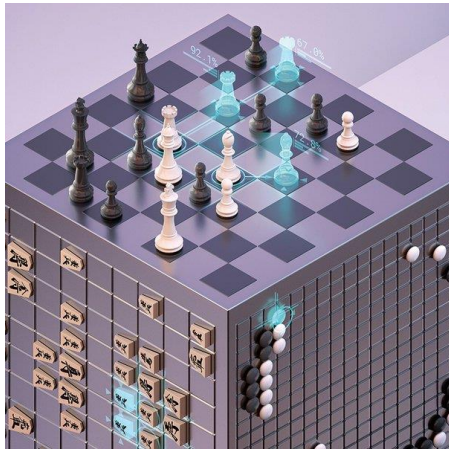
CITIZEN SCIENCE THEMES

1. What is citizen science?
2. What are current challenges in citizen science?
3. Are there disciplinary differences in the approach to citizen science?
4. Can citizen science help connect social and technical science?
5. What is the relation between citizen science and SDGs?
6. What is the relation between citizen science and AI?
7. Can citizen science provide a pathway towards human centered AI?

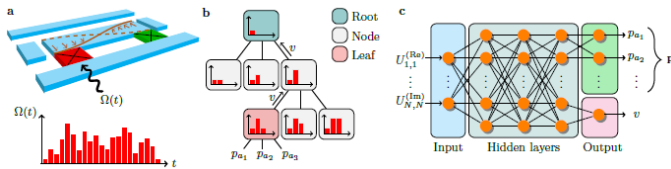
3 AMAZING AI EXAMPLES

AlphaZero:

AI reinforcement learning model conquering games (chess, go, starcraft...) and beyond



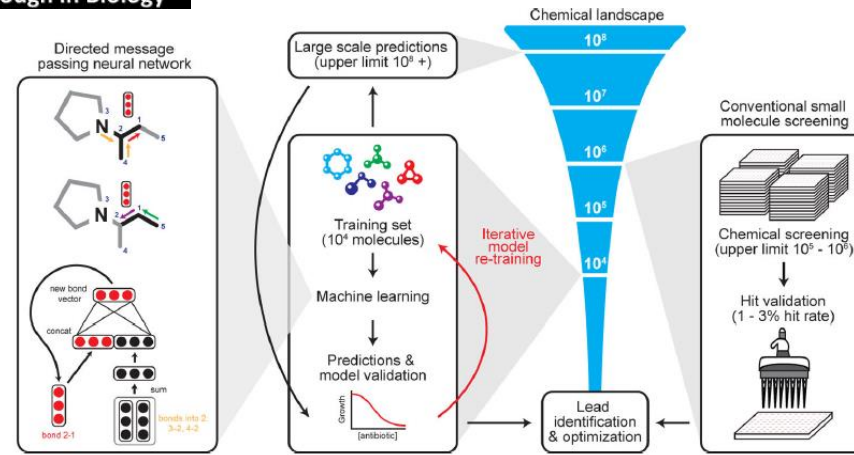
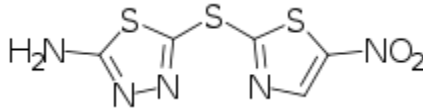
First real-world application of AlphaZero done in our lab!



Halicin: a deep learning discovered E-coli anti-bacterial drug

Problem: current screening is costly and inefficient

Solution: train on 2,500 known drugs + apply predictive model to millions of compounds



Stokes et al, [A deep learning approach to antibiotic discovery](#), 2020

DALL-E 2: + ChatGPT

A text-to-image generative model disrupting creative and functional production



TEXT DESCRIPTION

An astronaut Teddy bears A bowl of soup

mixing sparkling chemicals as mad scientists shopping for groceries working on new AI research

as kids' crayon art on the moon in the 1980s underwater with 1990s technology



DEPARTMENT OF MANAGEMENT
AARHUS UNIVERSITY



<https://openai.com/dall-e-2/>

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what is citizen science?



Citizen science is a way for members of the general public to contribute to scientific research. This can be done in a variety of ways, such as by collecting data or observations in the field, helping to classify and analyze data, or by participating in experiments or other research activities. The goal of citizen science is to involve more people in the scientific process, and to allow researchers to gather a greater amount of data or information than they would be able to on their own. This can be a valuable way to engage the public in the scientific process and to foster a greater understanding of science and its importance in our daily lives.



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what are current challenges in citizen science?



There are a number of challenges facing citizen science today. One of the biggest challenges is finding ways to effectively engage the public and to make citizen science projects accessible to people with a wide range of backgrounds and interests. This can be especially difficult for complex or technical projects that may require a high level of scientific knowledge or specialized skills. Additionally, there are challenges around ensuring the quality and reliability of data collected through citizen science, and around finding ways to effectively incorporate this data into existing scientific research. Another major challenge is providing the necessary resources and support for citizen science projects, including funding, equipment, and training. Finally, there are also challenges around ensuring that the results of citizen science projects are widely disseminated and used to make a meaningful impact on society.



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J are there disciplinary differences in the approach to citizen science?



Yes, there can be disciplinary differences in the approach to citizen science. Different scientific fields may have different priorities, methods, and goals when it comes to citizen science, and this can influence the way that these projects are designed and carried out. For example, some disciplines, such as ecology or astronomy, may be more focused on collecting large amounts of data or observations from the field, while others, such as psychology or social science, may be more interested in involving the public in experiments or surveys. Additionally, different disciplines may have different expectations or standards for the quality and reliability of data collected through citizen science, and may use different methods for incorporating this data into existing research. Overall, while there are many commonalities across different disciplines when it comes to citizen science, there can also be significant differences in approach and methodology that reflect the unique characteristics of each field.



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Can citizen science help connect social and technical sciences?



Yes, citizen science can help to connect social and technical sciences in a number of ways.



First, citizen science can provide a platform for collaboration and cross-disciplinary communication between researchers from different fields, such as sociology, psychology, economics, and engineering. This can help to foster a greater understanding of the social and technical dimensions of scientific research, and can lead to the development of new insights and innovations that may not be possible within a single discipline. Additionally, citizen science can provide a way for members of the public to engage with and contribute to research that spans both social and technical sciences, which can help to bridge the gap between these two fields and to foster a greater sense of connection and shared purpose. Finally, citizen science can also help to highlight the importance of interdisciplinary research and its potential to address some of the most complex and pressing challenges facing society today.

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what is the relation between citizen science and SDGs



The relation between citizen science and the SDGs (Sustainable Development Goals) is a strong and important one. The SDGs are a set of global goals adopted by the United Nations in 2015, which aim to end poverty, protect the planet, and ensure that all people have the opportunity to live healthy and prosperous lives. Citizen science can play a significant role in achieving these goals by providing a way for the public to engage with and contribute to scientific research that can help to address some of the most pressing challenges facing the world today. For example, citizen science projects can focus on gathering data and information on issues such as climate change, environmental degradation, public health, and social justice, which can help to inform policy and decision-making at the local, national, and global levels. Additionally, citizen science can help to raise awareness and educate the public about the importance of the SDGs, and can encourage individuals to take action to support their achievement. Overall, the relationship between citizen science and the SDGs is an important one, and can help to drive progress towards a more sustainable and equitable future for all.



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what is the relation between citizen science and AI



Citizen science and AI (artificial intelligence) can be related in a number of ways. For example, AI algorithms and machine learning techniques can be used to analyze and interpret data collected through citizen science projects, which can help to accelerate the research process and to uncover new insights and discoveries. Additionally, AI can be used to develop tools and platforms that make it easier for members of the public to participate in citizen science projects, such as by providing interactive interfaces, gamified experiences, or other engaging and user-friendly features. Furthermore, citizen science can provide a valuable source of data for training and testing AI algorithms, which can help to improve their accuracy and performance. Overall, the relationship between citizen science and AI is an important and growing area of research and innovation, with the potential to greatly enhance and expand the scope of scientific research and discovery.



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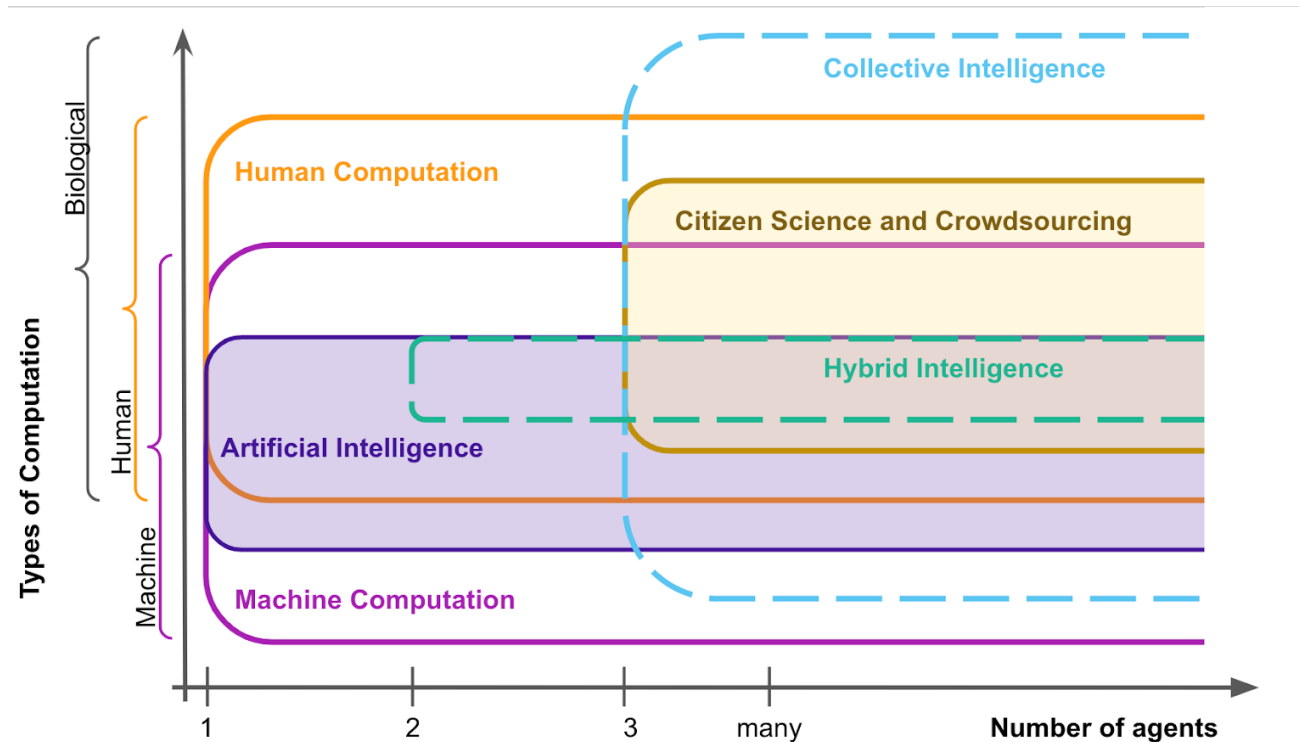
Can citizen science provide a pathway towards human centered AI?



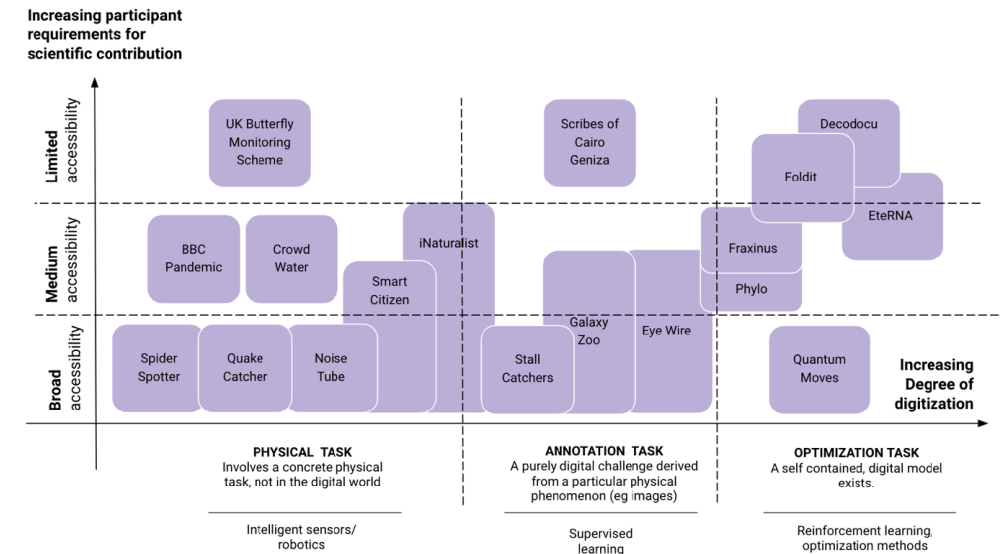
Yes, citizen science can provide a pathway towards human-centered AI (artificial intelligence). One of the key goals of human-centered AI is to develop AI systems that are designed to serve the needs and interests of people, rather than solely focusing on optimizing for efficiency or performance. Citizen science can help to achieve this goal by involving the public in the development and use of AI, and by giving people a say in how these technologies are designed and applied. This can help to ensure that AI systems are designed in a way that takes into account the values and priorities of the people who will be using them, which can lead to more ethical, equitable, and human-centered AI. Additionally, citizen science can provide a valuable source of data and feedback for training and testing AI algorithms, which can help to improve their accuracy and performance, and to ensure that they are aligned with human needs and preferences. Overall, citizen science can play an important role in advancing the development of human-centered AI, and can help to ensure that these technologies are used in a way that benefits people and society.



OPEN SCIENCE AS A TESTBED FOR HYBRID INTELLIGENCE



“Due to the **unique participant-centered set of values** and the abundance of tasks drawing upon both **human common sense and complex 21st century skills**, we believe that the field of CS offers an invaluable testbed for the development of HI and human-centered AI of the 21st century, while benefiting CS as well.”



- [Mapping Citizen Science Through the Lens of Human-Centered AI](#), Janet Rafner, Miroslav Gajdacz, Gitte Kragh, Arthur Hjorth, Anna Gander, Blanka Palfi, Aleks Berditchevskaia, François Grey, Kobi Gal, Avi Segal, Mike Walmsley, Josh Aaron Miller, Dominik Dellerman, Muki Haklay, Pietro Michelucci, Jacob Sherson, Human Computation, 9(1), 66-95.
- [A conceptual mapping of Collective Intelligence, Crowdsourcing, Human Computation and Hybrid Intelligence](#), J. Rafner, M. Gajdacz, D. Veraszto, J. Sherson, ACM Collective Intelligence Conference 2021

LETTING AI ANSWER OUR QUESTIONS



← → ↻ chat.openai.com/chat

J how can citizen science reach more people?



An error occurred. If this issue persists please contact us through our help center at help.openai.com.



Instead, I will give my response to the question

A blue-sky corner of my ERC application

Quantum control is an ambitious framework for steering dynamics from initial states to arbitrary desired final states. It has over the past decade been used extensively with immense success for control of low-dimensional systems in as varied fields as molecular dynamics and quantum computation. Only recently have efforts been initiated to extend this to higher-dimensional many-body systems. Most generic quantum control schemes to date, however, put quite heavy requirements on the controllability of either the system Hamiltonian or a set of measurement operators. This will in many realistic scenarios prohibit an efficient realization.

Within this proposal, I will develop a new quantum control scheme, which is minimalistic on system requirements and therefore ideally suited for the efficient and reliable optimization of many-body control problems. The fundamentally new ingredient is the total quantum evolution dictated by a combination of *fixed* many-body time evolution and the precise knowledge of the quantum back-action due to repeated quantum non-destruction (QND) measurements of a *single* projection operator.

The main focus of this proposal is theoretical and experimental quantum engineering of the dynamics in systems, which are sufficiently small to calculate the measurement back-action exactly and sufficiently large to have interesting many-body properties.

Recent experimental advances in single site manipulation of bosons in optical lattices have enabled the high fidelity preparation exactly such mesoscopic samples of atoms (5-50). This forms an ideal starting point for many-body quantum control, and we will i.a. demonstrate engineering of quantum phase transitions and preparation of highly non-classical Schrödinger cat states.

Finally, using the results from an online graphical interface allowing users of the internet to solve quantum problems we will attempt to build next-generation optimization computer algorithms with a higher level of cognition built in.

Milestone 2: Intelligent optimization strategy based on human response

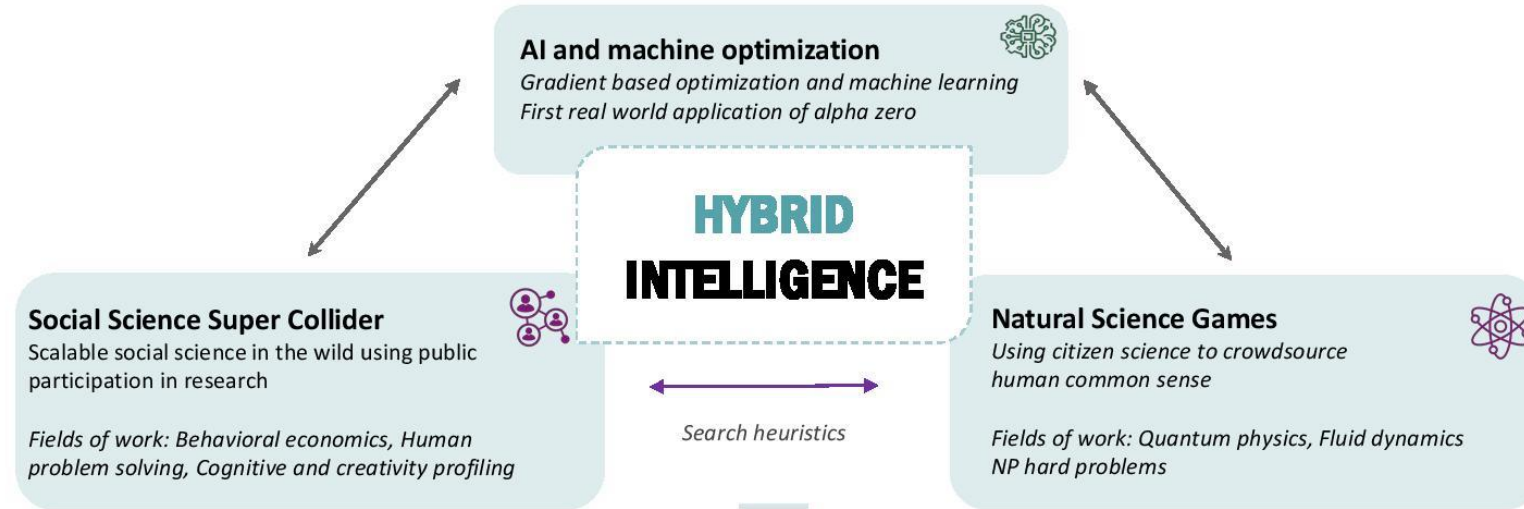
Milestone 3: Interactive simulation interface utilizing crowd-computing

Finally, using the results from an online graphical interface allowing users of the internet to solve quantum problems we will attempt to build next-generation optimization computer algorithms with a higher level of cognition built in.

CENTER FOR HYBRID INTELLIGENCE

VISION: understanding and fostering 21st century skills (in particularly computational thinking, complex problem solving and creativity) through the lense of Hybrid Intelligence

BASIC RESEARCH



CROSS-CUTTING UNITS

- Data Science
- Public engagement
 Citizen science + communication
- Software development

IMPACT AND APPLIED RESEARCH



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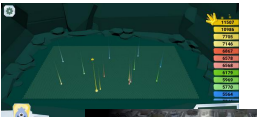


Jacob Sherson

Founder and director,
ScienceAtHome.org
Center for Hybrid Intelligence

BASIC RESEARCH

Vil du være med til at skabe Danmarks nye superhjerne?
 AlphaZero er en af de stærkeste kunstige intelligens med computerkraft. Hvis alle har været med, og du er blevet udvalgt til at spille "Science Detective".



AI and machine optimization
 Gradient based optimization and machine learning
 First real world application of alpha zero



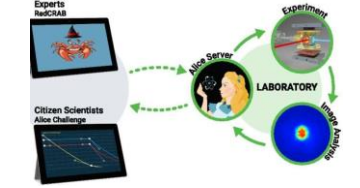
HYBRID INTELLIGENCE

Social Science Super Collider
 Scalable social science in the wild using public participation in research
 Fields of work: Behavioral economics, Human problem solving, Cognitive and creativity profiling

Natural Science Games
 Using citizen science to crowdsource human common sense
 Fields of work: Quantum physics, Fluid dynamics NP hard problems



Citizen scientists excel at creating Bose-Einstein condensates
 03 Dec 2018



Search heuristics



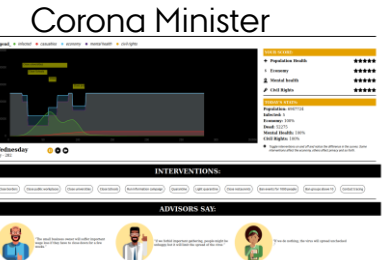
IMPACT AND APPLIED RESEARCH

EDUCATION
 Scaffolding students to think with technology
 • Digital educational tools and inquiry based material as well as in person interventions

ArguNotes



GAMES FOR GOOD
 Applying games to the public sector
 • SAH Examples: crea.blender SDG, Smithsonian, Confoo Bio, Corona Minister



CORPORATE TRAINING
 Playfully adapting research insights to corporate context
 • Workshop concept: Play, reflect, learn, adapt
 • Areas: AI and optimization, data visualization, 21st century skills and creativity, hiring and team formation and collaboration, corporate ethics, strategic foresight in the age of AI...

CORPORATE COLLIDER
 Developing HI solutions in corporate context
 Applying SSSC games in the private sector (bridging the gap between lab and corporate context)

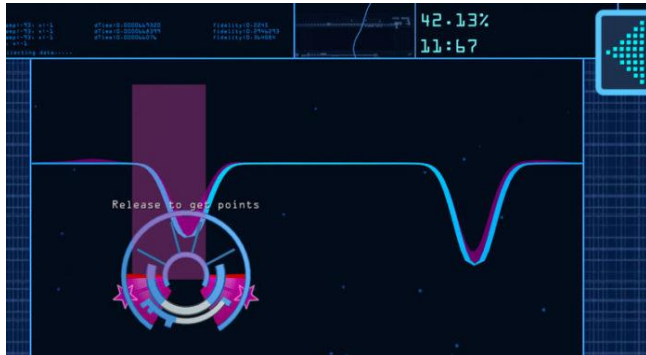


CROSS-CUTTING UNITS

- Data Science
- Public engagement
Citizen science + communication
- Software development



PRESENTING COMPLEX NATURAL SCIENCE PROBLEMS AS GAMES



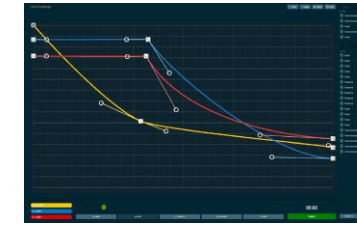
+250k players

64 | WISSEN

WELT AM SONNTAG NR. 15 | 12. APRIL 2015

Taktik eines Taxifahrers

Computer sind dem menschlichen Gehirn an Rechenleistung überlegen. Dennoch löst der Mensch komplexe Probleme schneller als die Maschinen. Wie kann das sein?



Remote optimization of an ultracold atoms experiment by experts and citizen scientists

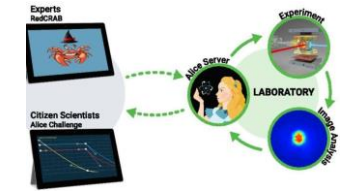


NOVEMBER 15, 2018

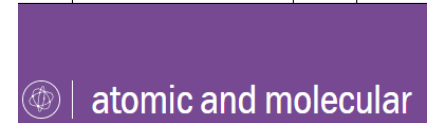
Quantum science turns social

by Robert Heck, Aarhus University

R. Heck et al. PNAS 2018



physicsworld



ATOMIC AND MOLECULAR | RESEARCH UPDATE

Citizen scientists excel at creating Bose-Einstein condensates
03 Dec 2018

Experimental control

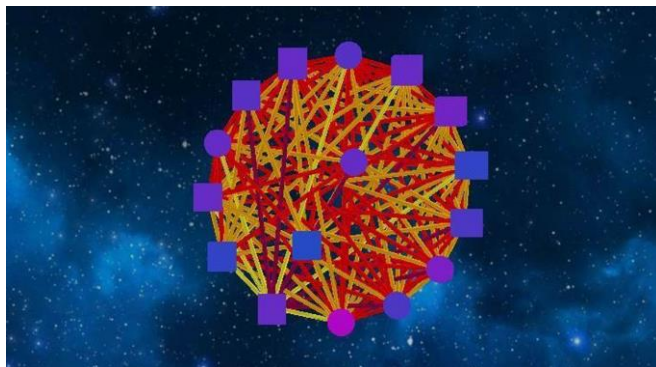
<https://www.scienceathome.org/games/the-alice-framework/>

Crowdsourcing human common sense for quantum control

Quantum Physics

J Jensen et al. PRR 2020

<https://www.scienceathome.org/games/quantum-moves-2/>

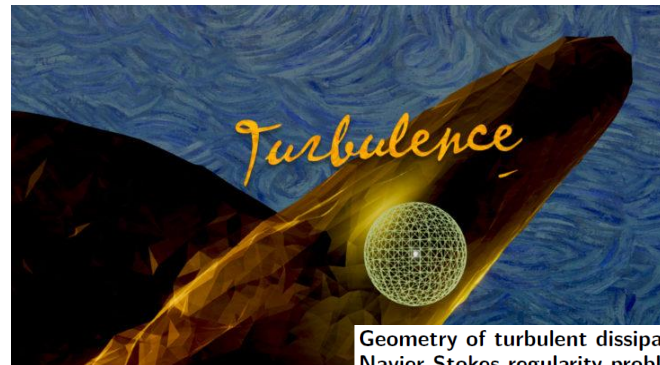


Computer science:
NP Hard Problems



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<https://www.scienceathome.org/games/network-game/>



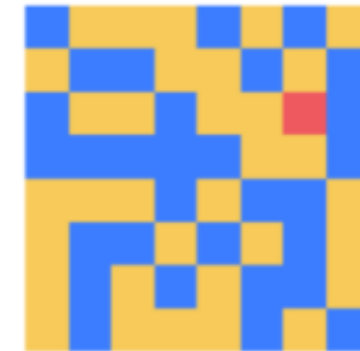
Geometry of turbulent dissipation and the Navier-Stokes regularity problem

Janot Rafner¹, Zoran Grujić^{1,2}, Christian Bach³, Jakob Andreas Barentzen⁴, Bo Gervang⁵, Ruo Jia⁶, Scott Leinweber⁷, Marek Mical⁸, and Jacob Sherson⁹

Millenium Math Challenge:
Turbulence

J. Rafner et al. Scientific Reports 2021

<https://www.scienceathome.org/games/turbulence/>



Quantum Pattern Matching:
co-creating high-Tc superconductivity theories

<https://www.scienceathome.org/games/quantum-pattern-matching/>



Social Science Super Collider

Scalable social science in the wild using public participation in research

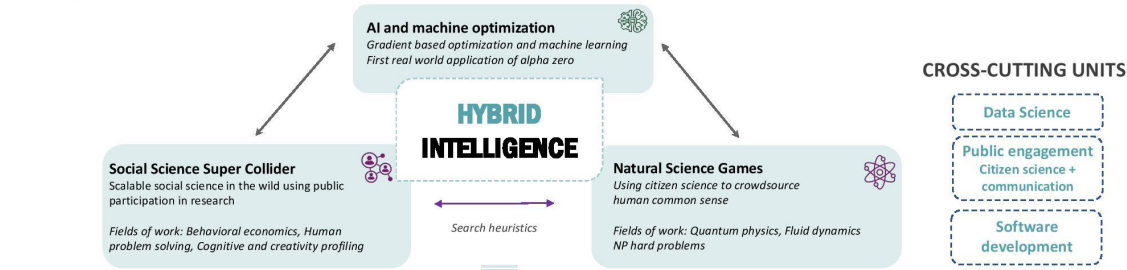
Fields of work: Behavioral economics, Human problem solving, Cognitive and creativity profiling



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BASIC RESEARCH



IMPACT AND APPLIED RESEARCH



THE SCIENCEATHOME SOCIAL SCIENCE SUPERCOLLIDER: ONLINE CITIZEN SCIENCE GAMES

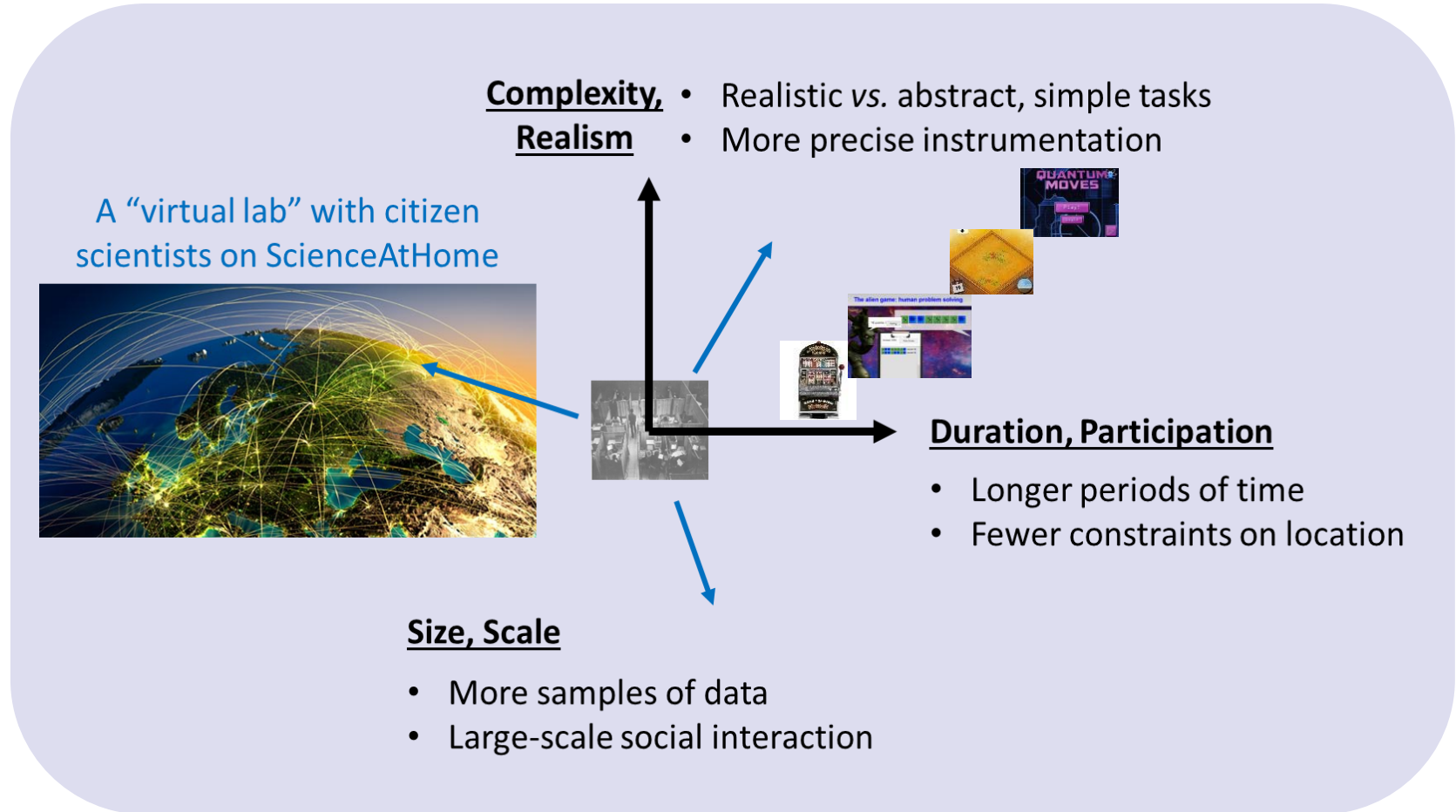
Research:

1. **Realistic** (NOT WEIRD*) settings for **collective** behavior...
2. with **precise instrumentation** and measurement...
3. studied **longitudinally** over periods of time...
4. with a high degree of **experimental control (A/B testing)**.

* Social science so far has mainly been confined to lab studies involving students or graduates who are Western, Educated, Industrialized, Rich and Democratic



GEMENT



Step 1: the social science super collider

- Complexity, Realism**
- Realistic vs. abstract, simple tasks
 - More precise instrumentation

A "virtual lab" with citizen scientists on ScienceAtHome



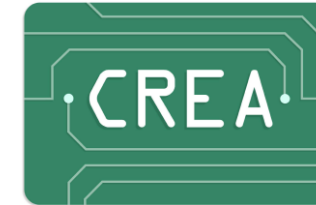
- Duration, Participation**
- Longer periods of time
 - Fewer constraints on location

- Size, Scale**
- More samples of data
 - Large-scale social interaction

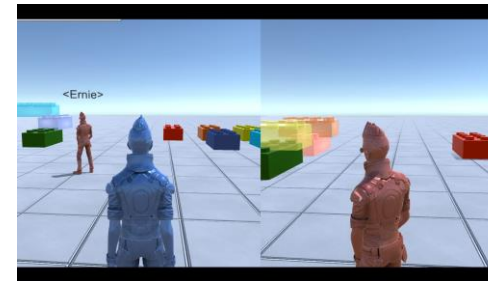
Cognitive profiling



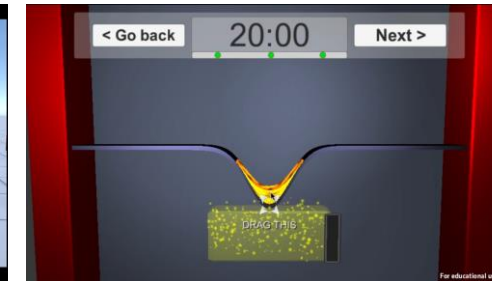
Creativity



Collaborative construction



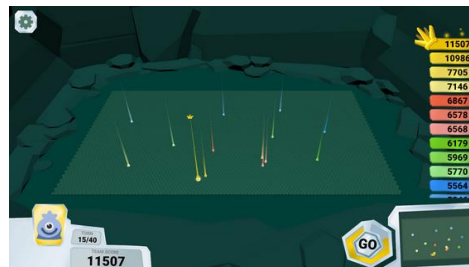
Predicting learning



Jana Jarecki, CogSci, Max Planck, Basel



Game theory, behavioural economics



Collaborative search



Individual strategy selection



The emergence of inequality

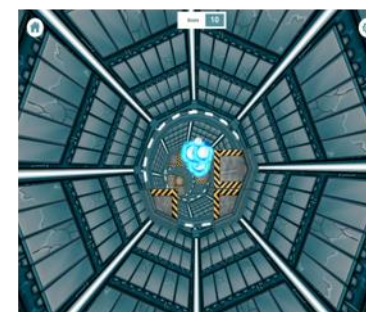
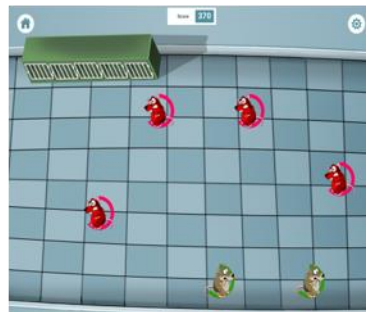


Nudging in complex environments



Skill Lab: cognitive abilities in the wild, population-scale game based cognitive assessment

6 entertaining games

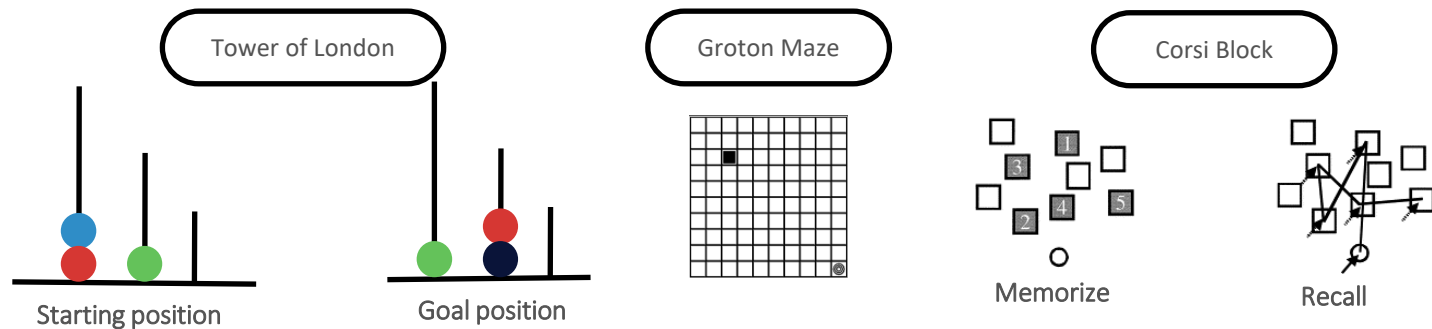


Video of Skill Lab: <https://youtu.be/jExAHLrp-Kk>

Skill Lab explores basic and higher cognitive skills such as

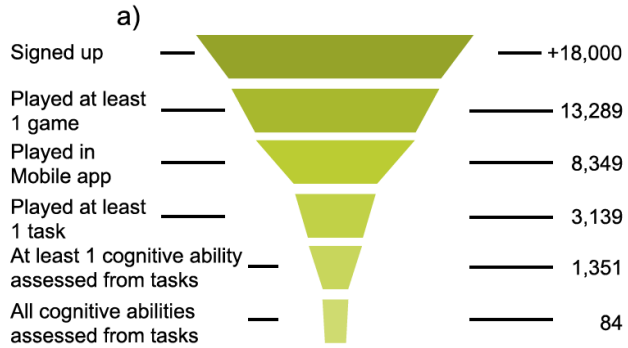
- Executive functioning
- Visuospatial reasoning,
- Response inhibition,
- Visuospatial working memory,
- Reaction times.

16 validated psychological tasks

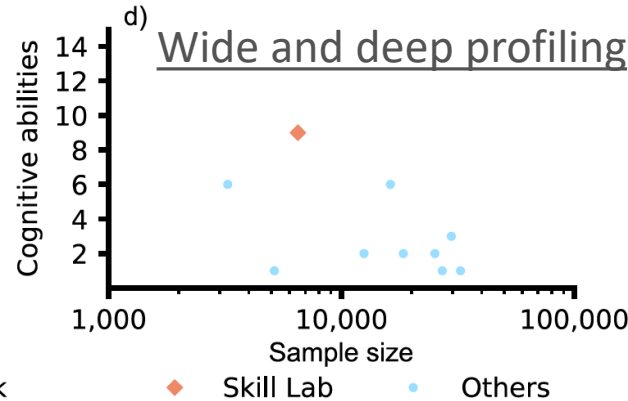
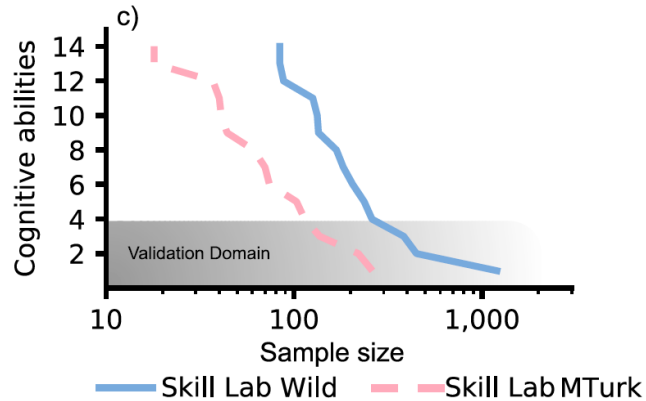
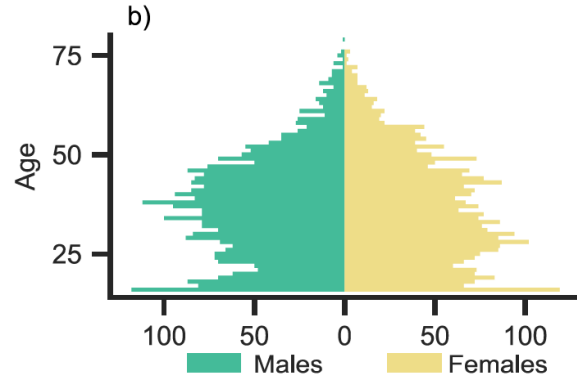


SKILL LAB: COGNITIVE ABILITIES IN THE WILD, POPULATION-SCALE GAME BASED COGNITIVE ASSESSMENT

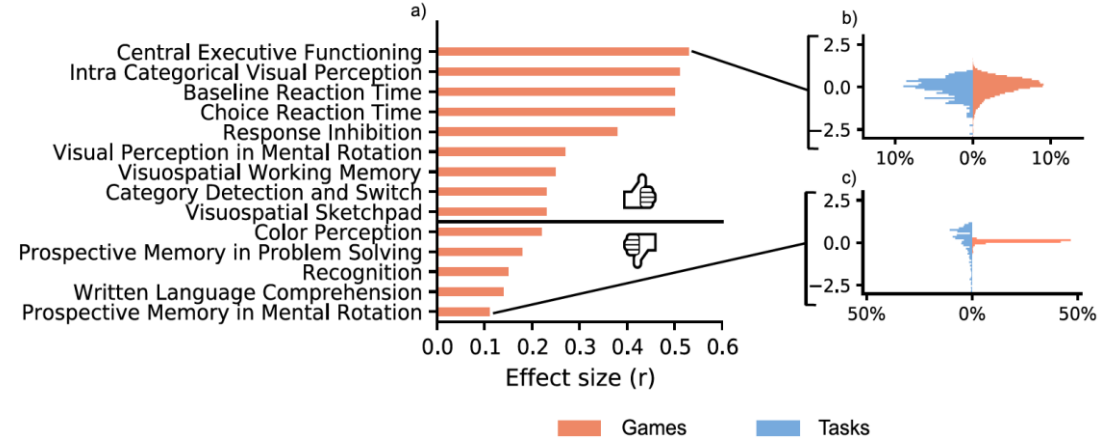
Volunteer scaled up validation



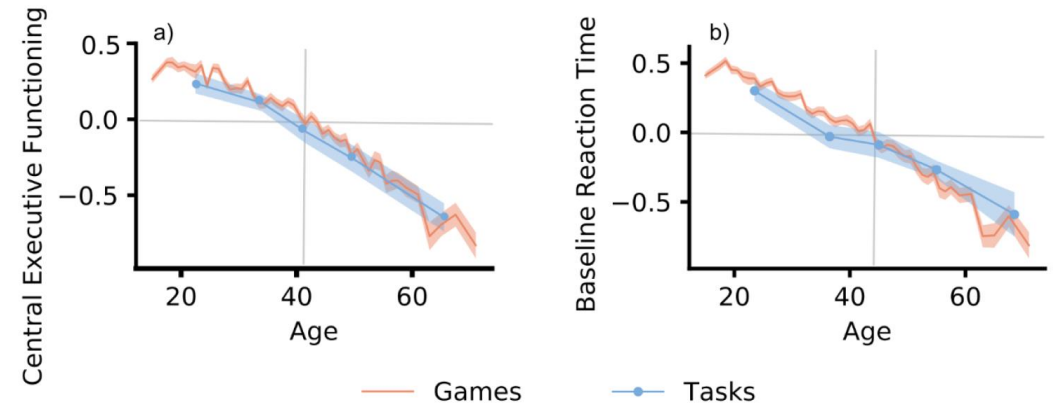
Nearly flat age distribution



9 of 14 cognitive ability models accepted

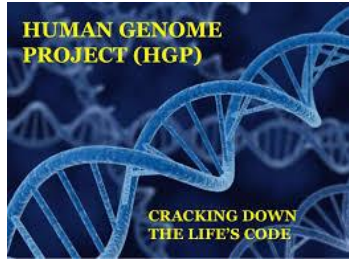


Highly resolved detection of cognitive decline



SKILL LAB: THE MISSING LINK BETWEEN MICROSCOPIC AND MACROSCOPIC DATA

Genotype



Phenotype



Behavior/actions



Summer 2018, open call for researchers: ask 2-4 questions to our users and correlate with cognitive profiles



Michael Bang Petersen, Dep. Pol. Sci, AU

Political affiliations



Carsten Bergenholtz, AU, Kim Klyver SDU

Entrepreneurial intent



Morten Christiansen, comp. neurosci., Cornell/AU
Kristian Tylen, Semiotics, AU

Language and working memory



Anders Villadsen, Dep. Management, AU

Public vs private employment



Mikkel Wallentin, Semiotics, AU

Spatial perception in language



Nicolai Ladegaard + Kim Mathiasen, Cl. Psych., AU
Ali Amidi, Dep. Psychology

Sleep patterns and cognitive rhythm

No cognitive data exists, so any finding will be foundational



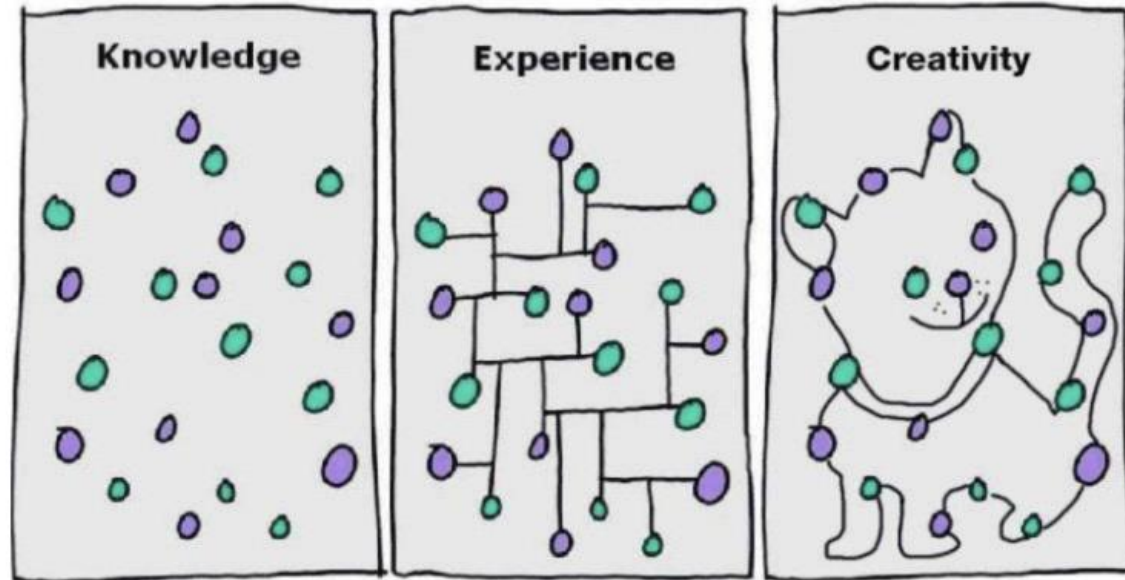
Ralph Hertwig, Dir. Max Planck Inst Human Development, Berlin

Risk willingness

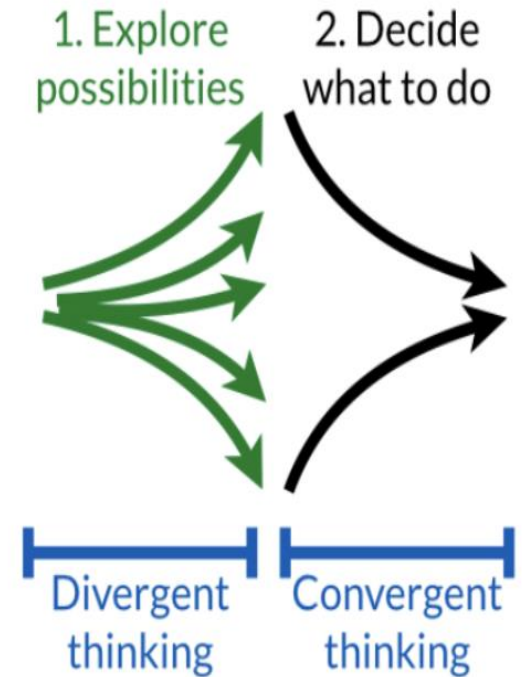
Main findings so far

- Strongest ever bounds on effect of cognitive abilities on risk willingness (long standing scientific dispute)
- Contradicting established wisdom of entrepreneurship as Jack-of-all-trades (observe high variance of abilities)

Creativity is a **complex, contextual and nuanced** skill that is hard to assess.



Viral internet image, circa 2014



THREE TYPES OF DIGITAL-CREATIVITY INTERACTION

Creativity support tools



Build tools to
support user's creativity



HCI researchers build tools that support user's creativity

Computational creativity



Generate creative
artifacts



AI researchers build algorithms that generates creative artifacts

Computational **co**-creativity



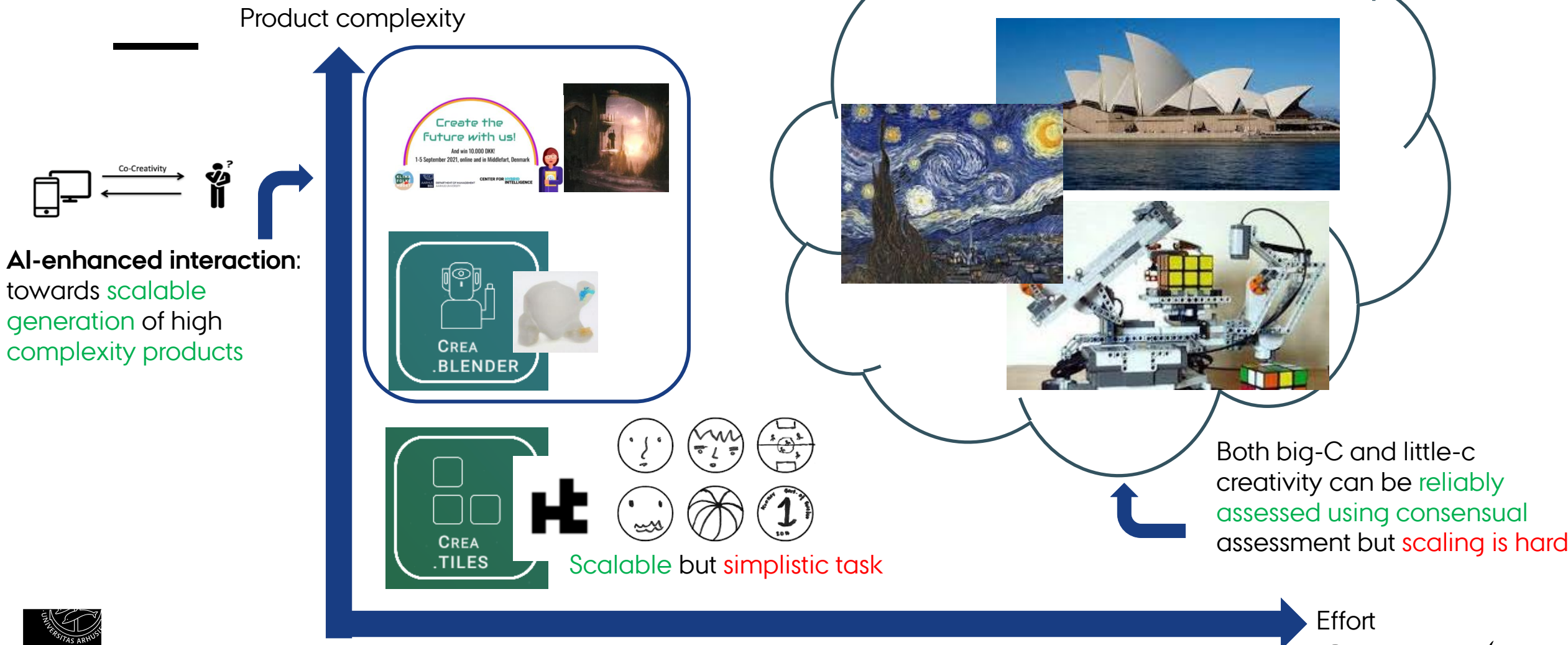
Co-Creativity



HCI and AI researchers build tools to support co-creation

Karimi, P., Grace, K., Maher, M. L., & Davis, N. (2018). Evaluating creativity in computational co-creative systems. *arXiv preprint arXiv:1807.09886*

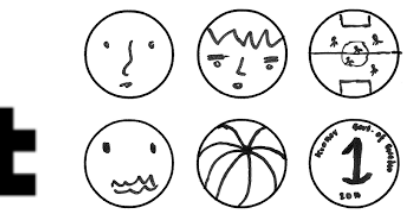
GRAND CHALLENGE OF CREATIVITY ASSESSMENT: ECOLOGICAL VALIDITY AT SCALE



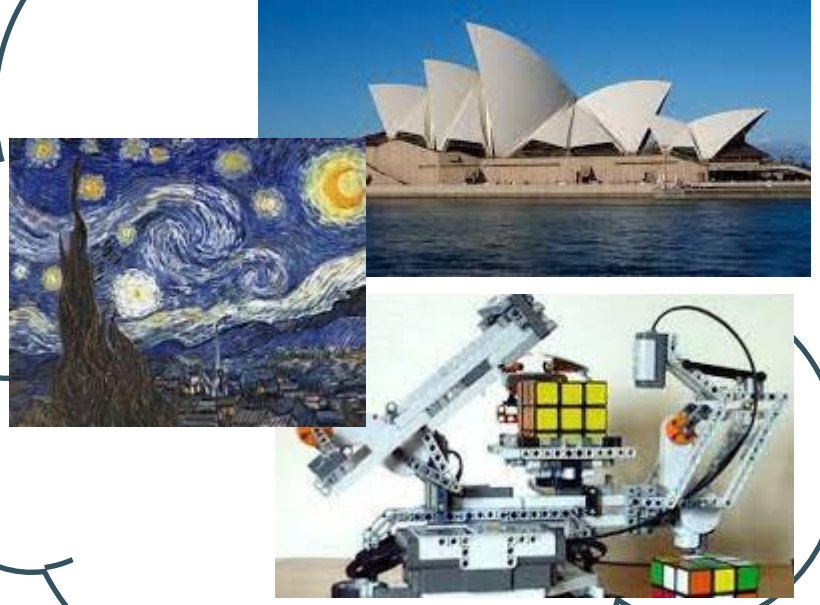
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And win 10.000 DKK!
1-5 September 2021, online and in Middelfart, Denmark

CREA BLENDER

CREA TILES



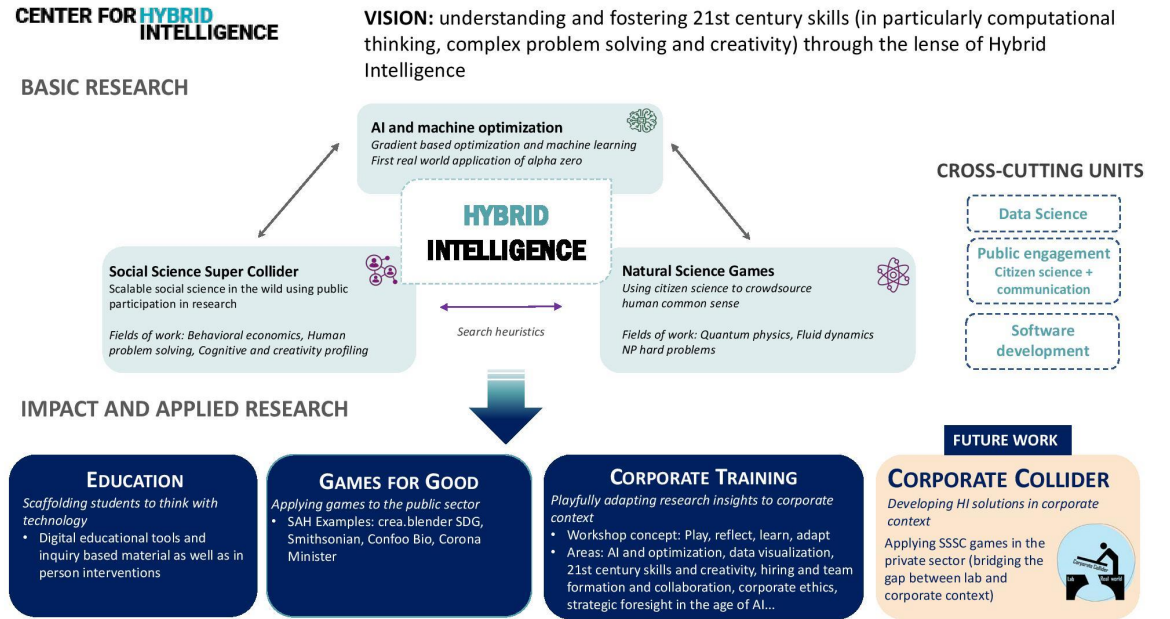
Scalable but **simplistic task**



GAMES FOR GOOD

Applying games to the public sector

- SAH Examples: crea.blender SDG, Smithsonian, Confoo Bio, Corona Minister



- Using digital technologies to:
- Crowdsource public opinions on ethical issues
 - Generate engagement in societal issues

STEPPING INTO THE SHOES OF THE CORONAMINISTER:



Arthur Hjorth Gitte Kragh Carsten Obel

Purpose 1: Let players experience the complexity of finding optimal containment and reopening strategies
 Purpose 2: crowdsource public preferences on prioritization issues as input to politicians

Pick a Challenge

Play the Game

Followup: use the newfound psychologically safe space to let students collectively reflect on the personal issues related to Covid-19

Reflect on how well you did, and maybe try again?



- **Feeling empty**, being at home without others than your family
- Feeling **powerless** and waiting for politicians to decide what you can and can't do.
- Being stuck inside results in **moodiness and headache**.



- **Less stress** due to a more self-scheduled school
- **Healthier lifestyle** due to less alcohol consumption but junkfood as well
- Newfound appreciation for moments spent with people you care for – **cherish every moment**, at any time something could come along to screw it up

<https://www.scienceathome.org/community/blog/corona-minister-in-action/>

CREA.VISIONS: AI-ASSISTED PARTICIPATORY FUTURES



Generic landscapes (2021)

Venice (May 2022)

Paris (January 2023)

Aarhus (summer 2023)

1. crea.visions SDG xx AI4Good



Changing The Story
interview:Hybrid
Intelligence. Artistic
Intelligence with Janet
Rafner, Researcher and
Fulbright Fellow

Goal: make a version of *crea.blender* that can be used to facilitate discourse over socioscientific problems through the SDGs

Output

- Paper published in **Creativity & Cognition '21**

Paper findings:

- Does crea.blender SDG offer **enough flexibility** to produce both utopian and dystopian images? **YES**
- Are images **recognizable by others as utopian or dystopian?** **YES**
- Which particular **components** of the images are recognizable as utopian and dystopian?
- »50% were reported as motivated by **color**, 29% by **motif**, and 21% by **style**

In collaboration with:



AI for Good
Global Summit

An ITU experience



AARHUS UNIVERSITET

ARTBREEDER

Published:

Utopian or Dystopian?: using a ML-assisted image generation game to empower the general public to envision the future

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ABSTRACT

The rise of digital technologies and Machine Learning (ML)-tools for creative expression brings about novel opportunities for studying creativity and cognition at scale. In this paper, we present a pilot study of crea.blender SDG - an online GAN based image generation game. We designed crea.blender SDG with two goals in mind: The first, to let people create images relating to the United Nations Sustainable Development Goals (SDGs) and through them, engage in large-scale conversations on complex socioscientific problems. The second, as a fun and inspiring gateway for public participation in research, generating data for the creativity and cognition research and design community. Specifically in this pilot, we study and affirm that the design of crea.blender SDG is flexible enough to allow users to create images that express both anxiety and hope for the future; affirm that user generated images express these ideas in ways that are meaningful to people other than the original creator; and begin to investigate which specific features of images are more closely related to dystopian or utopian ideas of the future. Finally, we discuss implications for future design and research with ML-based creativity tools.

KEYWORDS

GAN, crowdsourcing, creativity, sustainability, SDGs

ACM Reference Format:

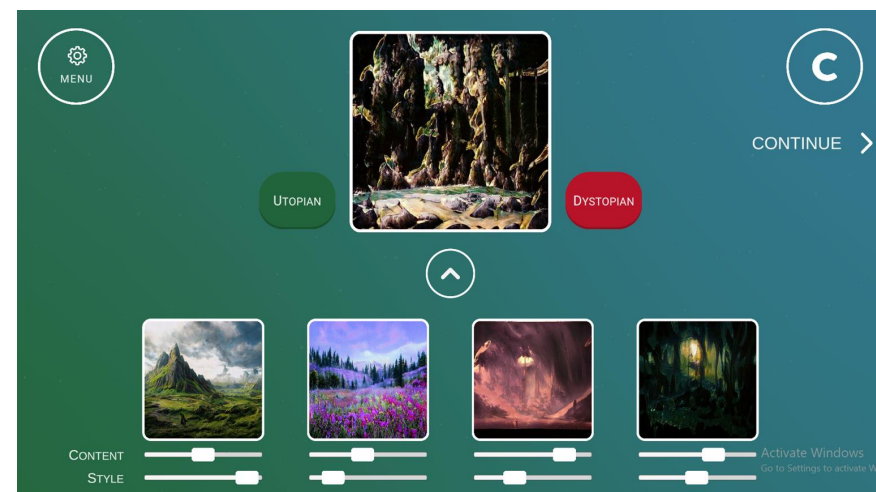
Janet F. Rafner, Steven Langsford, Lotte Philipsen, Sebastian Risi, Arthur Hjorth, Joel Simon, Miroslav Gajdacz, and Jacob Sherson. 2021. Utopian or Dystopian?: using a ML-assisted image generation game to empower the general public to envision the future. In *Creativity and Cognition (C&C '21)*, June 22, 23, 2021, Virtual Event, Italy. ACM, New York, NY, USA, 5 pages. <https://doi.org/10.1145/3450741.3466815>

1 INTRODUCTION

Artistic expression from both professional artists and the general public is a key method for raising awareness of and facilitating discussions around the Sustainable Development Goals (SDGs) [27, 31–33, 35]. These 17 goals were set into place by the United Nations in 2015 as a blueprint to achieve a better and more sustainable future for all [37]. Generative Adversarial Networks (GANs) [7] are Machine Learning (ML) models that can be used as creative tools by both professional and non-professional users in a variety of contexts. Professional artists use GANs as a new medium [8, 11, 13, 14], as

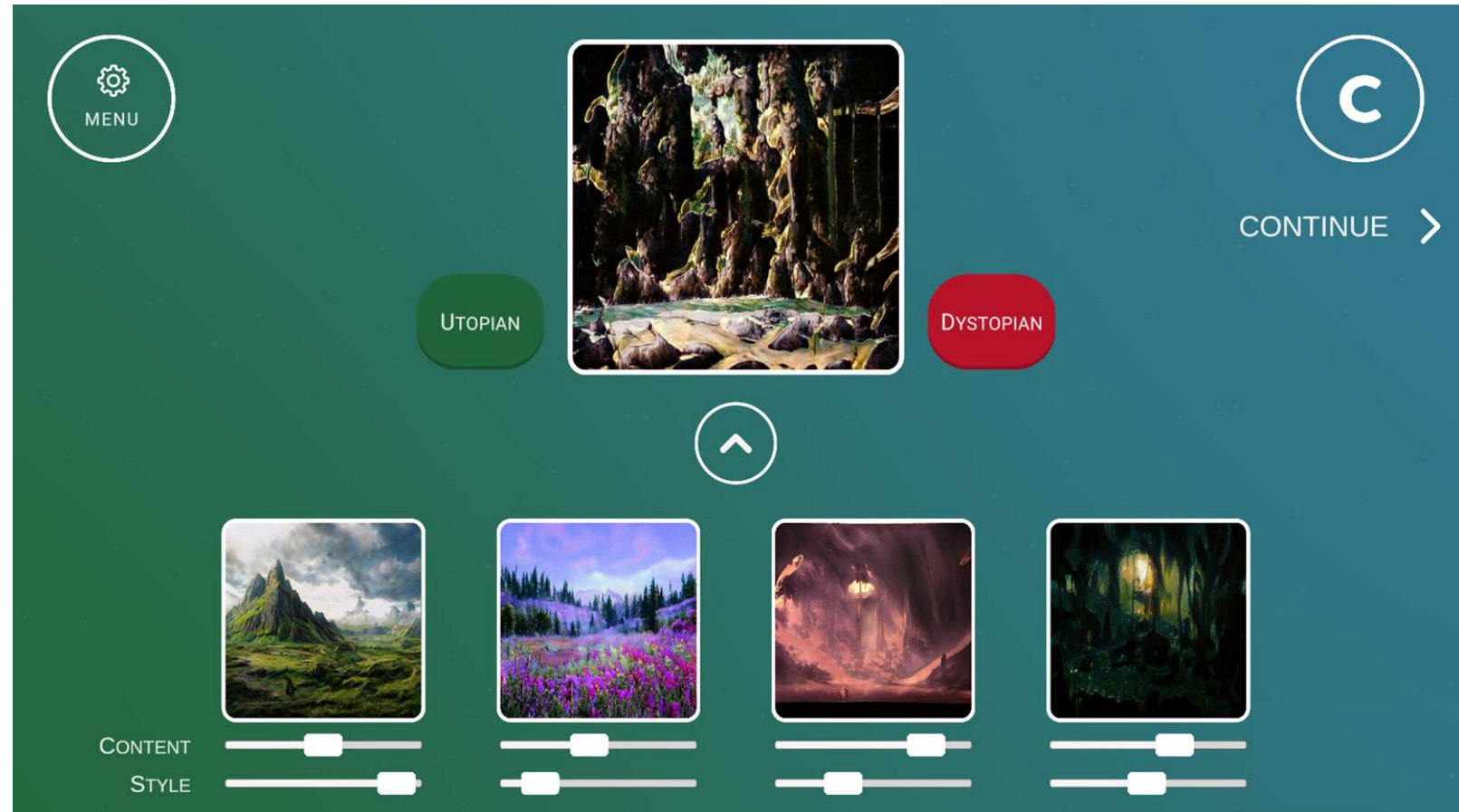
Link: <https://dl.acm.org/doi/pdf/10.1145/3450741.3466815>

The interface:



crea.visions SDG xx AI4Good Interface

- 1.) Choose images
- 2.) Adjust the sliders
- 3.) Decide if Utopian or Dystopian
- 4.) Submit



2. crea.visions Klimafolkemødet

Held with 500+ participants who had the chance to submit their visions of the future to a competition.

»11, 596 images generated

»237 images submitted to the competition



WINNER: What we have left



"If the end of the world was near, would you hide in fear or stand here and spend the last minutes with me? You say that everything ends some day. And you are right. But it went faster than you expected. It is now no longer only our souls, which are on fire. But it is too late now. What is destroyed cannot be restored. We were given a responsibility but we were not strong enough to lift it alone. So, here we spend our last few minutes in each others arms. With our gaze to the horizon, we observe the final ending."

Data collected: User interviews with winners and hosts of the climate summit, log data, titles, captions

In collaboration with:



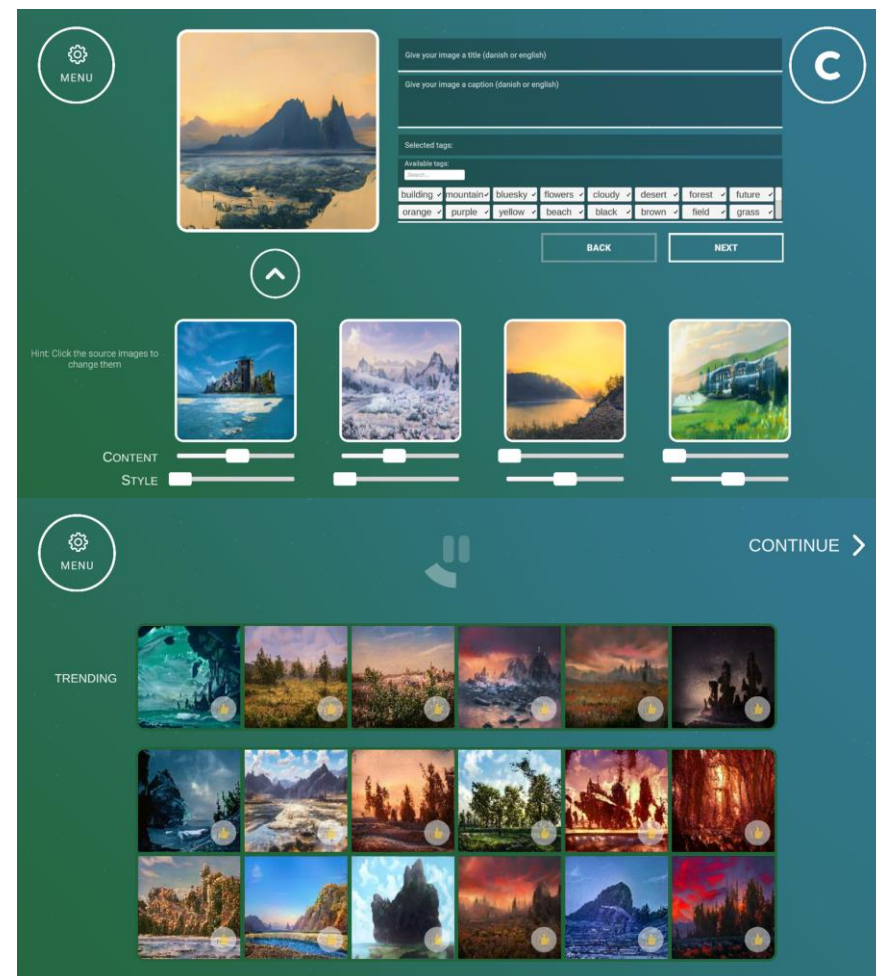
AI for Good
Global Summit
An ITU experience



AARHUS UNIVERSITET

ARTBREEDER

The interface:

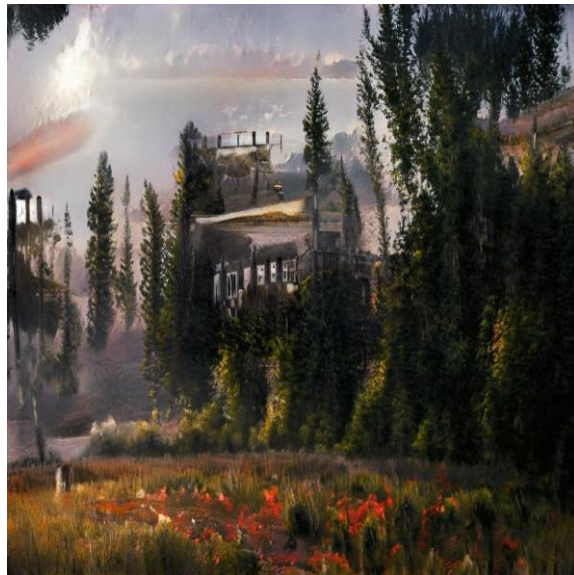


NEW features: captions and descriptions to prompt deeper interaction and reflection

YOUR CREATIONS



A view from new office's window



"cities love nature".
In the future I want my children to live in cities full of nature. Kids spend one day per week in the forests, learning all about nature-based solutions

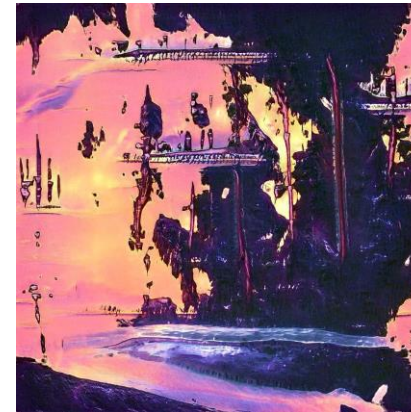
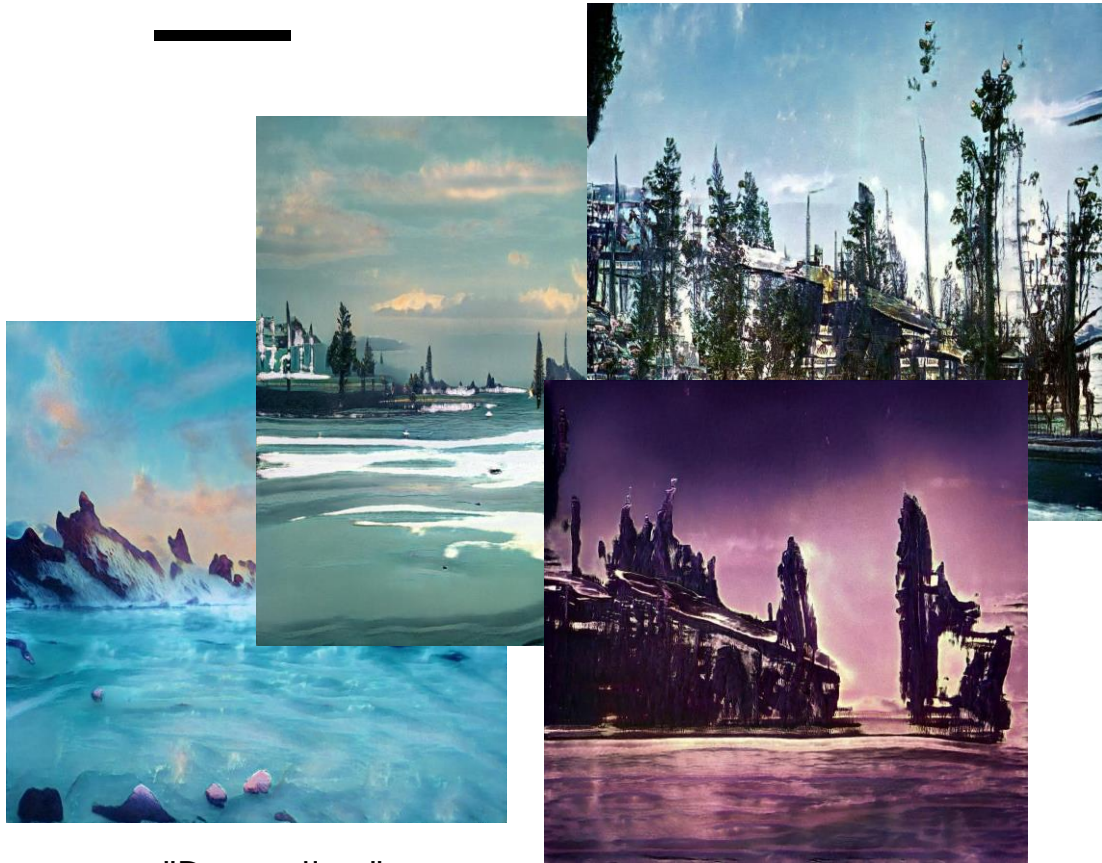


"universea"
life came from sea and will return to sea (sdg14)



Scent of freedom

YOUR CREATIONS



"Deucalion"

Deucalion City on the fictional exoplanet 'Gliese 1061 d'
a lot of years after the catastrophe of our planet.. ;)

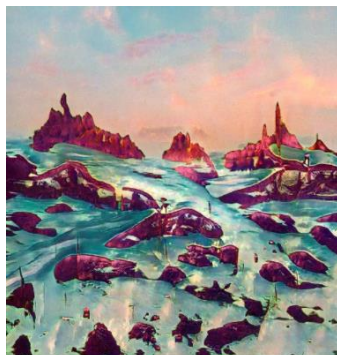
Brændende skove



Burning forest

Politicians promise green ambitions
 And come with various speculations
 A climate debate here and there
 But nothing more
 Forests burning
 But no climate laws in the making
 Around tree trunks
 The flames hug
 The fire rages in the wind
 Where lush landscapes used to be
 Animals cannot live
 They have to find a new place
 We must take care of mother earth
 It's not enough just with words
 The climate crisis must be addressed
 Instead, we talk through our hats

Submitted by a senior citizen

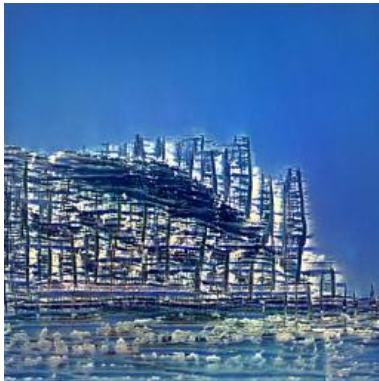


Valigifart

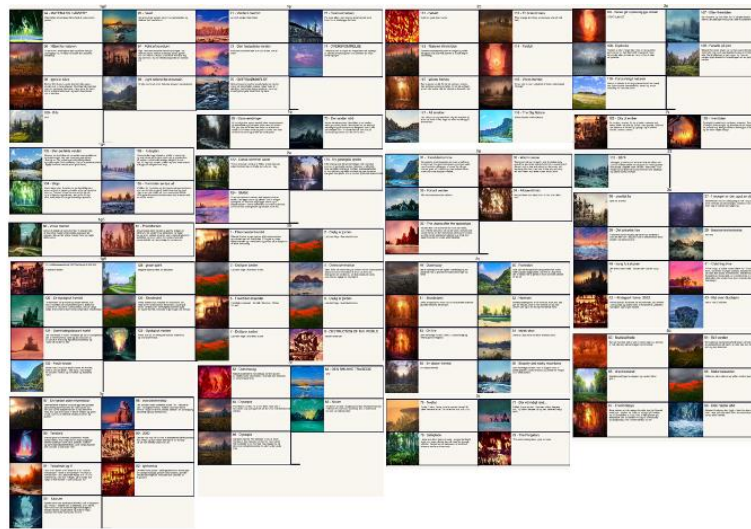
Vejen er kringlet – målet er objektivt!

electricity

In a city where there is a lot of new
 electronic such as robots and several
 large buildings and hotels on Mars.



Submitted by a 7th grader



The beautiful sea

The fishing industry is happy and so is
 the sea, better than it has been in a
 long time. There is officially no more
 plastic in the world's oceans.



What we have left

If the end of the world was near, would you hide in fear or
 stand here and spend the last minutes with me? You say
 that everything ends some day. And you are right. But it
 went faster than you expected. It is now no longer only our
 souls, which are on fire. But it is too late now. What is
 destroyed cannot be restored. We were given a
 responsibility but we were not strong enough to lift it
 alone. So, here we spend our last few minutes in each
 others arms.

With our gaze to the horizon, we observe the final ending.



Vallée de l'espoir – the valley of hope
 Visualization of the ambiguity and
 uncertainty of the future. The two
 paths humanity can take...

crea.visions Klimafolkemødet

Images from the Event



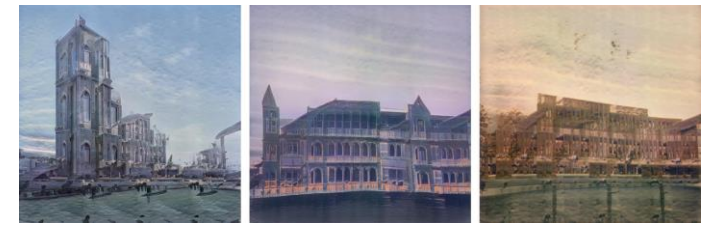
3. crea.visions Venice

ACM Creativity & Cognition '22, Venice

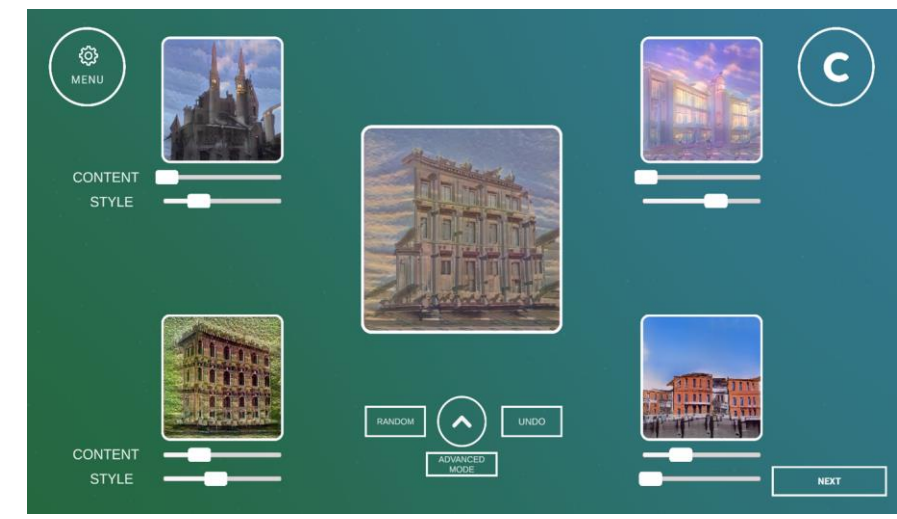
In coordination with *Neil Maiden*, Professor of Digital Creativity

NEW:

- AI was trained on images of Venetian buildings
- New layout for blending interface
- New mode: Kaleidoscope - preview of possible options
- Added 'Random' button which adjusts the sliders



The interface:



In May '22, we held pop-up events at various locations in the city of Venice. Over the course of one week,

4668 Images were generated

235 Submitted, and

70 Ranked

The top 10 images were exhibited on Giudecca, at the Insituzione Fondazione Bevilacqua La Masa in Venice, from 22-25 June, as part of the [ACM Creativity & Cognition 2022 Conference Exhibition](#).

Data collected: 8 user interviews, log data from image blending, titles, captions, final images

Pictures from the events, May 2022



Exhibition in Venice, June 2022



In collaboration with:



ARTBREEDER

This is how the user interacts with the GAN...

The player starts out with four images to blend

Start images



The process of image blending

Each of these images were *generated* by the player, after adjusting the *image sliders* (*style* and *content*)

SUBMITTED IMAGE



crea.visions Venice Winners



GREEN LIVING VENICE
Get the plants out, show the world we live here. We are not just a city of facades
Jutta Palmén



VETRI SULL'ACQUA
Le rifrazioni, il movimento continuo e i giochi d'acqua, si espandono nelle architetture e nei materiali che le compongono, generando luoghi ideali all'incontro.
Debora Lo Russo



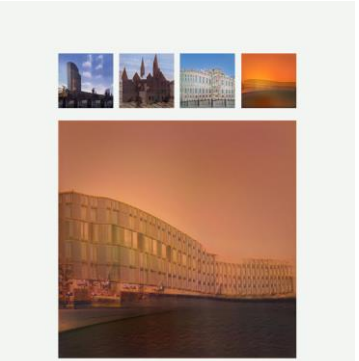
VENEZIA-ANTICO E MODERNO SI INCONTRANO
Sempre nell'acqua, la città prende forme diverse a causa dei cambiamenti sia climatici sia temporali. Venezia mantiene la sua unicità, ma si avvicina a una realtà più contemporanea. I colori sono quelli del deserto.
Lene Torricella and Thea Zamparo



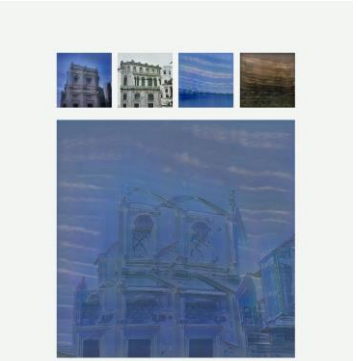
VAN GOGH IN VENICE
Venice in sunset mode
Kelly Jegers



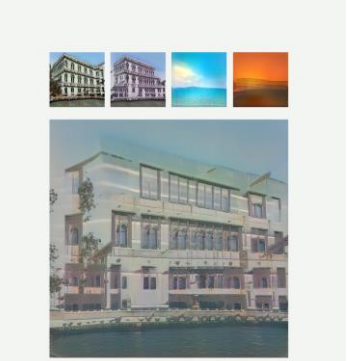
VENEZIA CON UN FUTURO NATURALE
A sustainable vision of Venice in synchronicity with nature
Mark JV. Olson



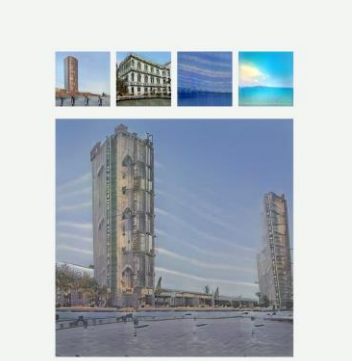
SUNSET VENICE
Sunsets in Venice are my favourite sunsets in the world. In this picture, my building is a modern architecture different from the ancient Palazzi that you can find in the island, but with some connection to the amazing Venetian style. This future Venice is painted with the sunset colours, in order to make everybody realise how beautiful Venice is in that particular moment of the day, and to add a more romantic touch to it.
Giada Tasinato



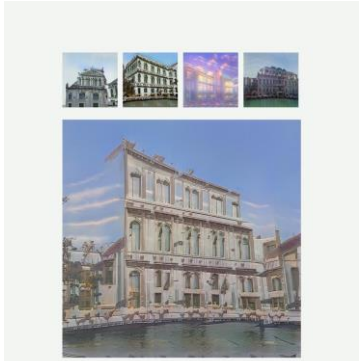
THE NEW ATLANTIS
Venice and its upcoming future: underwater
Anonymous



IMMOBILITY
Through this particular color scheme, that gives a nostalgic feeling, and a building that is inspired by traditional Venetian architecture, this image wants to represent the idea of Venice as a city incapable of change.
Anonymous



MY FORTRESS OF SOLITUDE
If you seek a place of isolation and complete disconnection. Find a fortress of solitude. By my lonesome up in the clouds.
Love Reynes



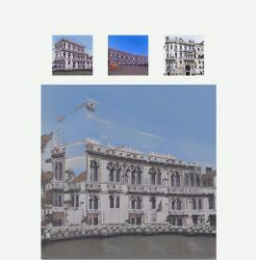
VENICE URBANIZATION
Venice 2.0: espansione in altezza e non in ampiezza per ospitare sempre più turisti e cittadini
Eleonora Favaro



STUCCHI VERDI
Il futuro verde di Venezia
Pietro Vianello



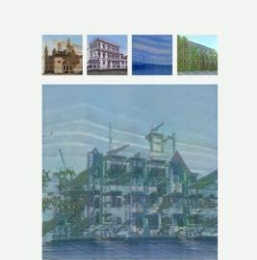
SEMPRE PIU' ACQUA
Sempre piu acque alta
Antonia von Cebastiel



VENETIAN GOTHIC WITH A GLASS ROOFTOP
Fantasy Gothic on the Grand Canal
Chris Weyman



VENEZIA CON UN FUTURO NATURALE
A sustainable vision of Venice in synchronicity with nature
Mark JV. Olson



VENICE THE MOON AND YOU
Waiting for the moon shining
Anonymous



VENEZIA 2080
Immagine di Venezia tra 60 anni
Loulia Vianello



VENEZIA NUOVA
Trauma delle acque che creerà una città più naturale, verde e gli edifici troveranno un modo diverso di dialogare con il territorio, estendendosi in verticale
Anonima

What do the users say?

“Easy to communicate ideas to other people.”

- Venetian marketing student

“It can give the people a great impression of the future. Not just an image in your mind, but something you can see on the laptop. So you can create it and actually see it.”

- Venetian marketing student

“I think it’s very very interesting what you do with these pictures.”

- Venetian architecture student

“Easy and intuitive.”

- Venetian citizen

“I want to create an image where you can see a bit of land and a bit of water. What is Venice for you? Only the buildings or only the water?”

- Venetian marketing student

“I try to use this slider, I really like this color. Or this part of the building here. If I want more of this, I just move this slider and see what’s coming out. The outcome is very interesting.”

- Venetian architecture student

“Maybe it’s not always what you expect to see but the outcome is really nice. I didn’t know what this image was going to be exactly, but I like the outcome very much.”

- Venetian architecture student

Teaching AI(GAN) new things...

1. crea.visions SDG: artbreeder landscape (style) gan
2. crea.visions Klimafolemøde: artbreeder landscape (style) gan
3. crea.visions Venice: first time we trained such a customized GAN for an event

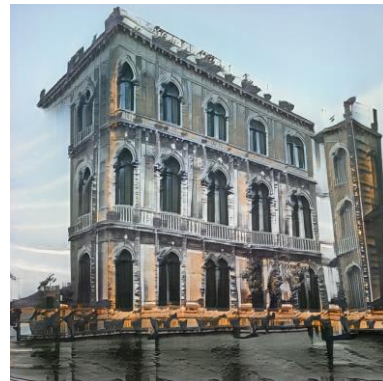


GAN trained on building images from ArtBreeder



Images of buildings taken in Venice

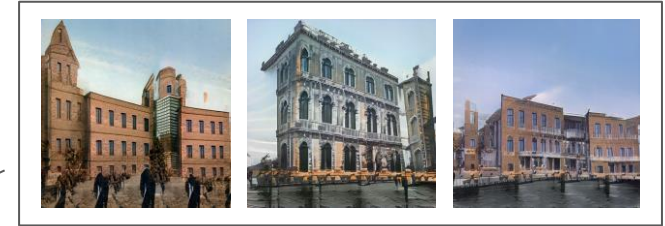
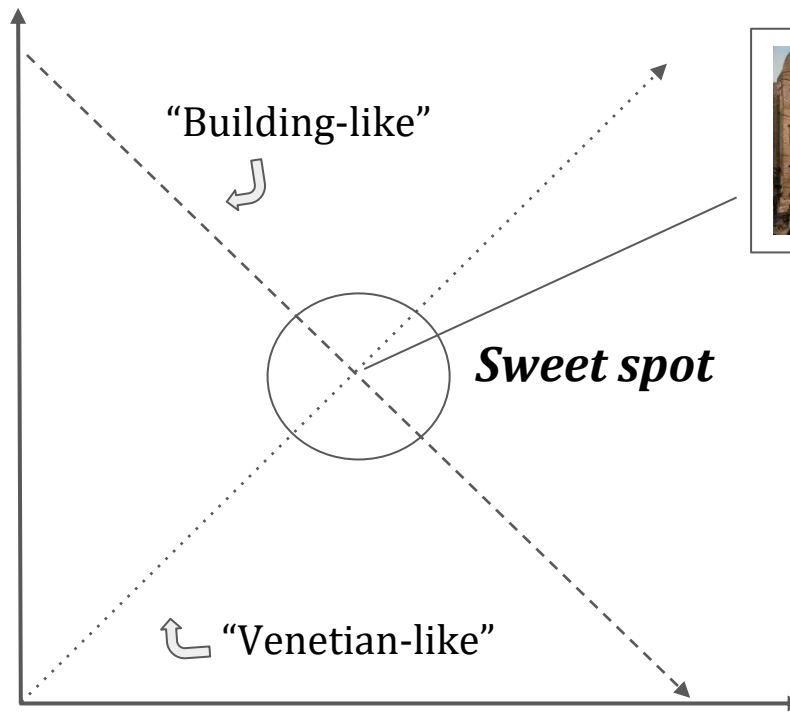
When feeding the Venetian images to the trained algorithm, it translate them into images such as:



Teaching AI new things: generality vs specificity

As we train the GAN with more Venetian images, it will learn to nearly perfectly recreate the training images, however, lose its understanding of what a building is. We need to find the amount of training that teaches the GAN what Venetian buildings look like, while allowing for a diverse representation of buildings.

Image "quality"



Number of Venice re-training stages for the AI/GAN

4. crea.visions Paris

In collaboration with Circle U and Learning Planet Institute

Challenge: For citizens of Paris to identify local problems and solutions and use crea visions either as a **facilitator of their process** OR **illustrator of the externally conceived ideas**

Status:

Preparations have already started

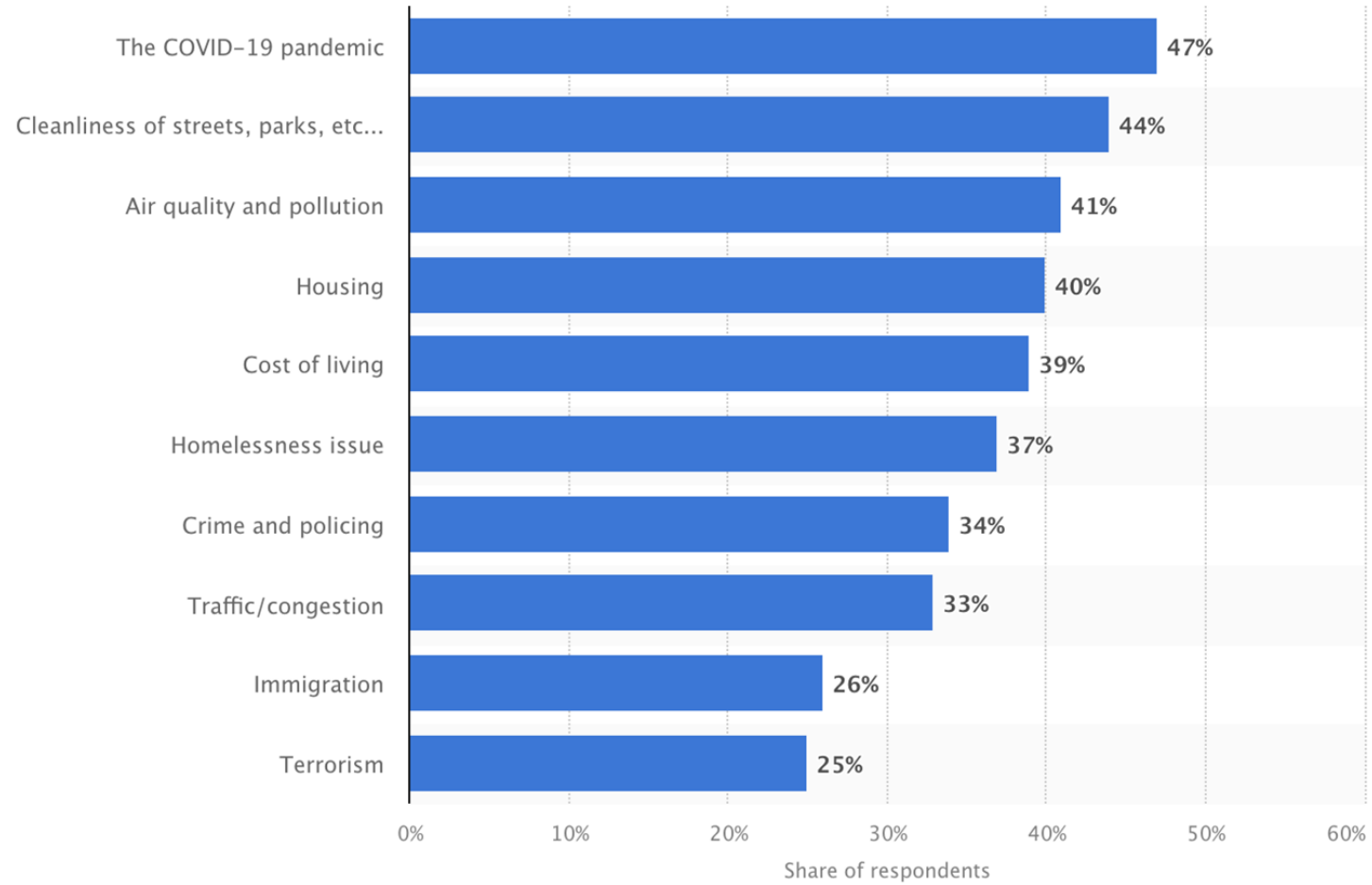
- Photos have been taken in Paris
- GAN training, initial images

Next steps:

- Brainstorm the types of partners that might be interested in collaborating on this project. Collaborations can be big or small - affiliations or co-creation
- With patterns, determine the types of challenges that they are interested in addressing
- Once the challenges are determined then take the necessary photos of the places
- Hold a focus group and test sessions / participatory design
- Develop educational material with the collaborators



Supporting concrete action on concrete (local) issues



Describe

Describe your problem



Choose a problem **Problems of Paris** ▾

Add a new problem (+)

Give your submission a title

test

Write your solution for this problem

Your solution

Comments

Comments

 Pin this problem onto the map



Describe

Describe your problem



Choose a problem **Overcrowding** ▾


Add a new problem ▾
Degraded Environmental Quality

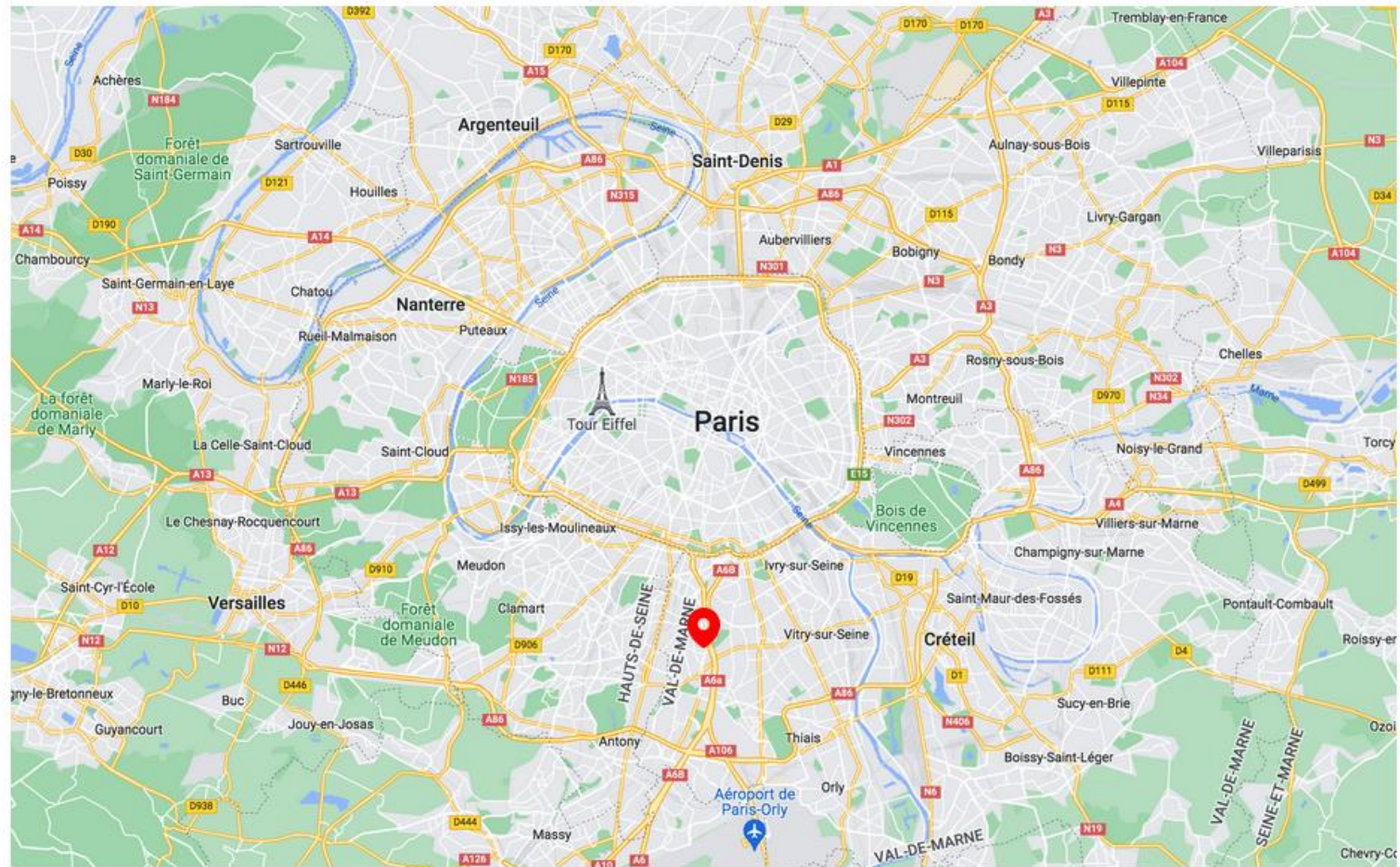
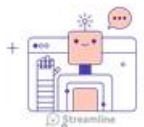
Give your submission a title
test
Overcrowding
Housing Problems

Write your solution for this problem
Your solution
Unemployment
Development of Slums
Water Problems
Sanitation Problems


Comments
Comments
Health Hazards
Transportation Problems
Disposal of Trash
Urban Crime




 Pin this problem onto the map




Core staff




Jacob Sherson




Janet Rainer



Janice Wang



Mads K. Pedersen



Arthur Hjorth

CITIZEN SCIENCE AND COLLECTIVE INTELLIGENCE



Pietro Michelucci, human computation



Muki Haklay, extreme citizen science



Mike Walmsley, deep learning



Francois Grey, SDG



Aleks Berdichevskaia, collective intelligence




Anna Gander, Applied Information Tech.


Aarhus University

Arts


COMMUNICATION AND CULTURE



Morten Christiansen, computational neuroscience



Michael Biskjær, Center for Digital Creativity




Martin Brynskov, Aarhus Smart Cities


COGNITIVE SCIENCE



Mikkel Wallentin, linguistics




Kristian Tylen, language comprehension



Andreas Liberth, game psychology



Niels Bonderup, student motivation



Lotte Philipsen, Art History

DANISH SCHOOL OF EDUCATION

ART HISTORY

PSYCHOLOGY & BEHAVIOURAL SCIENCES



Ali Amidi, cognitive ageing

Business and Social Sciences

MANAGEMENT



Carsten Bergenholtz, individual and collective problem solving



Oana Vuculescu, individual and collective problem solving



Anders Villadsen, sector of employment and cognitive abilities



Andrea Carugati, future of work

POLITICAL SCIENCE



Michael Bang Petersen, psychology of democracy

ECONOMICS AND BUSINESS



Alexander Koch, behavioural economics




Dan Mønster, behavioural economics



Julia Nafziger, behavioural economics


Science

PHYSICS




Klaus Mølmer, quantum physics

MATHEMATICS




Kristian Hvidtfelt Nielsen, science studies

ENGINEERING




Bo Gervang, fluid mechanics

DEAN'S OFFICE



Rajiv Vaid, entrepreneurship, team formation

SCIENCE MUSEUMS



Linda Greve, Science Museums

CENTER FOR HYBRID INTELLIGENCE

Health

CLINICAL MEDICINE



Nikolai Ladegaard, clinical psychology

PUBLIC HEALTH



Kim Mathiasen, clinical psychology



Carsten Obel, public engagement

NEUROSCIENCE



Micah Allen, computational neuroscience

PSYCHOLOGY, SOCIAL SCIENCES



Jana Jarecki, Max Planck, Basel



Milena Tsvetkova, Economics



Claudia Wagner, London School of Comp. SocSci Dep. Koblenz

External















AI AND HUMAN-COMPUTER INTERACTION




Joel Simon, morphogen




Sebastian Risi, ITU




Rose Luckin, UCL




Lior Noi, Weitzmann Institute




Wendy Mackay, ExSitu




Kobi Gal, Ben Gurion University




Gary Marcus, Robust.AI




Dr. Kori Inkpen, Microsoft




Josh Bongard, University of Vermont




Dr. Carmel Kent, EDUCATE Venture



Andrea Martin, IBM




Philipp Ebel, IWI HSG




Matthias Söllner, ITeG


EDUCATION, LEARNING SCIENCES, SCIENCE ENGAGEMENT




Carol O'Donnell, Smithsonian Sc. Edu. Center



Martin Krabbe Sillasen, VIA UC




Karen Schrier, Play Innovation Lab




Julien Bobroff, Physics Reimagined


MEDICINE PHYSICS, MATH, ENGINEERING NEUROSCIENCE




Jacob Thyssen, Copenhagen University Hospital



Zoran Grujic, University of Virginia




Jakob Andreas Baerentzen, DTU




Ralph Hertwig, Max Plank, Berlin


CORPORATE INNOVATION




Kim Klyver, SDU




Karim Lakhani, HBS




Maroc Iansti, HBS



Henry Sauermann, ESMT Berlin



Dominik Dellermann, Vencortex



Marion Poetz, CBS

