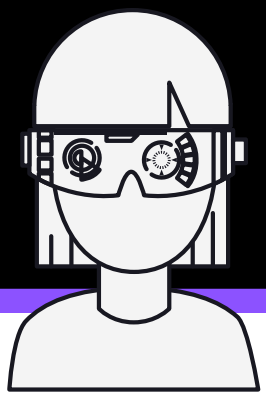
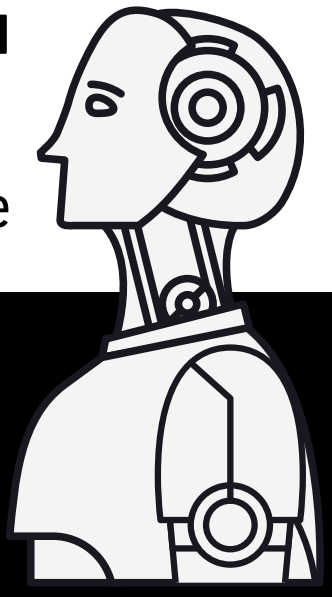
AI LABS

Designed by Enrica Amplo
for SCIENCE GALLERY DUBLIN



INTERACTIVE LEARNING PROGRAMME AT THE INTERSECTION OF AI + ARTS + DESIGN

To develop creative and critical thinking on Artificial Intelligence



FOR SECONDARY SCHOOL STUDENTS

AI LABS

GENERAL GUIDE LINES

BE FLEXIBLE

Keep in mind the whole project and the final objective.
But try to understand your group and adapt consequently. Follow participants' inputs and stimulate who ask for more insights.
Do not expect the same level from every participants.
Try to let them feel empowered rather than not good enough.

OUTCOME VS PROCESS

The process is the most important part.
Outcomes will be different from participants to participants and will always change.

SHARING IS KEY

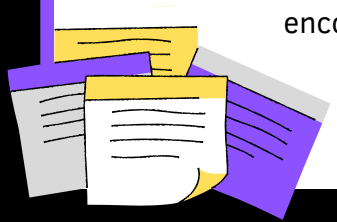
Discussions and contaminations are key.
Give participants time and space to express their ideas. Encourage constructive criticism to ignite improvement.

ONLINE RULES

WHILE USING TOOLS AND DEVICES DURING THE LAB THAT ARE CONNECTED ONLINE

DO **NOT** SHARE
- faces (unless *with permission* to do so)
- full names
- personal data
- sensitive data

Use of SMARTPHONES:
encourage to use them as tools to actively participate in the activity (answer quiz, find information..)



TONS OF QUESTIONS

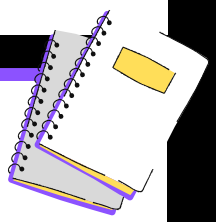
Ignite meaningful conversations and encourage participants to ask questions, rather than giving them answers.
Ask them lots of questions to encourage critical thinking and from your side to better understand their ideas and preconceptions.

NO PREJUDICES

Everyone diserve a chance! Lot's of concepts are new for the most, try to engage everyone. Let them know it is "stuff" for all of them!

COLLABORATION

Try to create a peaceful and respectful environment. Try to encourage collaboration rather then competition..Together we achieve more!



IT IS NOT "SCHOOL"

Try to avoid "classroom" settings.
Prefer *peer-to-peer* atmosphere also between facilitators and participants.
Avoid desks in rows, prefer circles and/or small groups.

WORDS ARE IMPORTANT

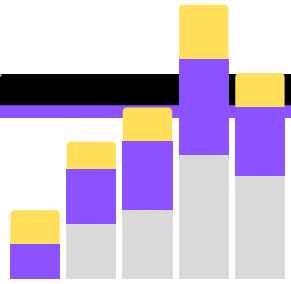
Kindness, respect and responsibility can't be forgot in the name of technology.
Give example of smiles, "please", "thank you", "could". Prefer motivational expressions like "good idea", "well done" "great intuition" "intresting question"

AI LABS

KEY IDEAS ON AI AND DATA

FACTS ON AI AND DATA

- AI is not new, research about AI started around 1950's
- General AI is the kind of super intelligence as depicted in movies and books
- Narrow AI is the "nowadays AI", task oriented: recognise cars, detect people..
- Machine learning and Neural networks are the most commonly used techniques of Artificial Intelligence in computer science
- AI is interdisciplinary with influences from statistics, logic, mathematics but also operations research, image processing, linguistics, philosophy, neurobiology
- AI is not magic, is based on computer programs coded by humans
- Usually a model can give as output a "reply" with a certain "confidence" (accuracy)
- Machine learning models are based on Data. Data are the "experience" in the process of "learning" for the algorithm.
- Data has real and concrete value. Remember: There is no such a thing as a free lunch!
- Dataset come from devices connected to internet (website, social media), wearables, IoT and data we voluntary give.
- Dataset are key to train machine learning models. Dataset can have inherent biases.
- In our society many decisions are based on data. Developers and policymakers must be aware of the both impact and implication of their work and make sure to inform people about that.



USEFUL RESOURCES

VIDEOS

"Can a robot be creative?"- Gil Weinberg, video TedEd
"The danger of AI is weirder than you think" - Janelle Shane, video Ted
"The ethical dilemma of self-driving cars" - Patrick Lin, video TedEd
"The Turing test: Can a computer pass for a human?" - Alex Gendler, video TedEd

DOCUMENTARIES

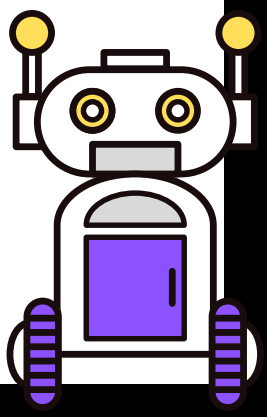
"Coding" from Explained series, Netflix
"Prediction by the number", Nova, Netflix

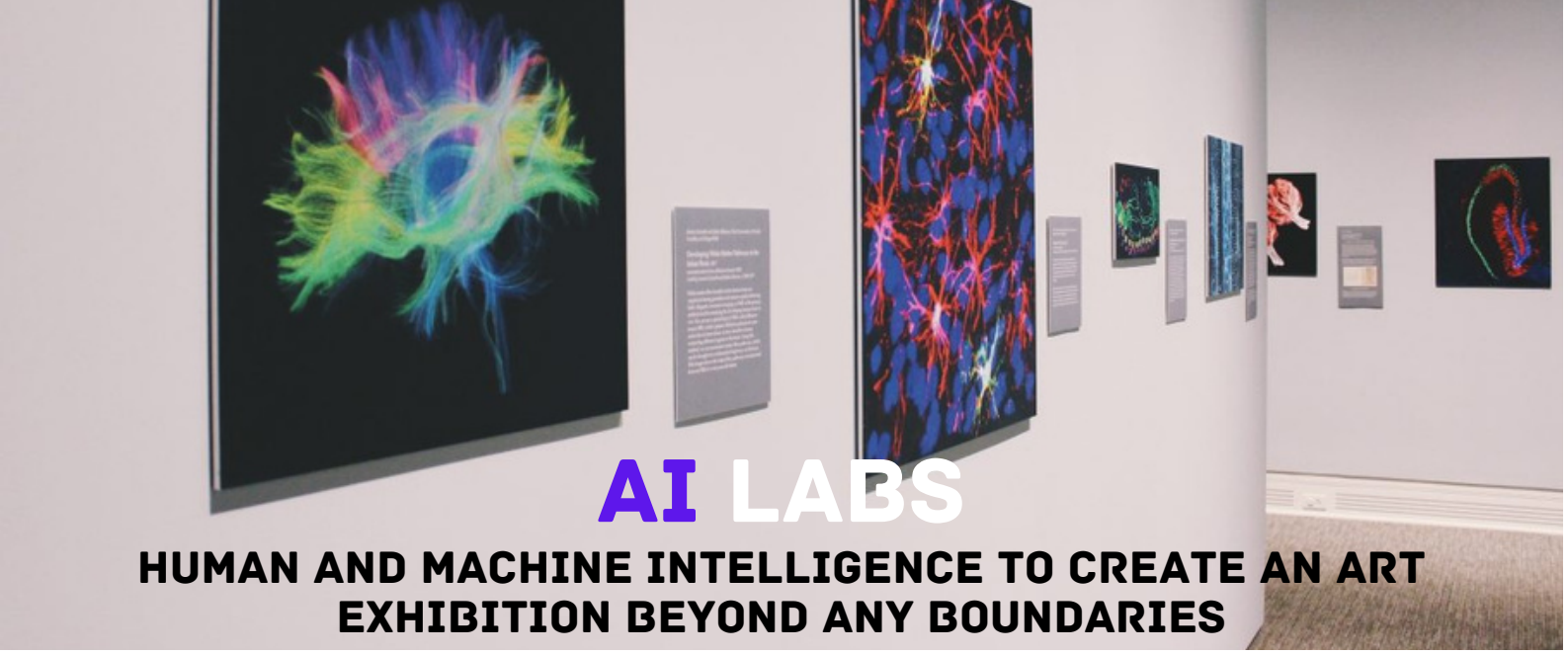
GAME

Code.org lesson AI for oceans
Minecraft edu AI for GOOD (hour of code)

BOOKS

"Artificial Intelligence A Modern Approach" - Norvig and Russell, 2010
"Machine who think" - Pamela McCorduck, 2004
"The hundred pages Machine learning" - Burkov Andriy, 2018





AI LABS

HUMAN AND MACHINE INTELLIGENCE TO CREATE AN ART EXHIBITION BEYOND ANY BOUNDARIES

OVERVIEW

This program is a walk through demystifying AI while discovering applications of machine intelligence between Art and Science. Participants will learn, in an engaging way, how to train a neural network and use it to imagine and create a futuristic exhibition, combination of imagination and technology. The whole program is designed with hands-on activities to involve participants to critically discover AI. Ask questions and think about how AI can be used for good.

OBJECTIVES

The program is thought for adults / young people (TY's students) and aims to engage them in understanding key ideas about AI and data. Ignite discussions about philosophical and ethical issues such as "what is art?" "what is creativity?" "can a machine be intelligent?"

SKILLS

Participants will learn key principles of computational thinking, machine learning, and AI in arts. Participants will be encouraged to think critically and solve problems with a positive and creative attitude. They will practice communication skills, sharing ideas, and collaboration with others.

PROGRAM

5 labs and a final exhibition (online or in person if feasible). Each 2 hours lab include a warm up, main activity, wrap up. Each lab is focused on a particular field / application of AI in art.

1_ AI or not AI

Introducing AI (impact, implication), what's behind AI
some games and fun hands-on activities to explore machine learning principles.

2_ AI for good

Design thinking and ideation cycle to find creative solutions to real world problems (2020 goals) using and training a neural network.

3_ AI and the Arts

Explore innovative application of machine learning and neural networks in the field of the arts. Poetry, painting, and music. Reflect on concepts such as "idea" and "creativity" meaning.

4_ AI+human exhibit 1/2

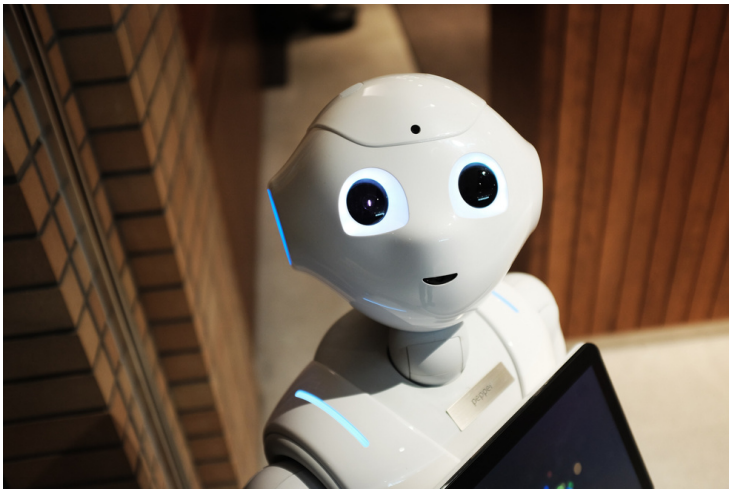
Start working in small groups to create a corner of a futuristic exhibition combining human intelligence with AI to create art works. First: find an idea! Then bring your ideas to life using different online tools, craft materials, printing, sewing, painting, writing.

5_ AI+human exhibit 2/2

FINAL EXHIBITION (can be in person or online)

1 AI OR NOT AI?

INTRODUCING AI
[IMPACT, IMPLICATION, MACHINE LEARNING]



OVERVIEW
This 2 hours long session can be divided into two main parts. The first one allow participants to explore AI key ideas using interactive slides, quiz and games that allow them to ask questions and think critically. Participants will learn both technical and ethical characteristics of AI.
The second part is about training a neural network to recognize objects...and fool it!

PURPOSE / KEY IDEAS
Understand impact and implication of AI in society. Explore machine learning and understand its vital relation with big data.

OBJECTIVES / SKILLS
Participants will learn to critically discuss ethical and moral issues related to AI and Data.
Participants will learn basic principles of machine learning and how to train a neural network.

SETTINGS
ONLINE ZOOM meetings and brake out rooms.

MATERIALS CHECKLIST

- [ ] ZOOM
- [ ] Stationary
- [ ] Google deck for e-Portfolio
- [ ] Google account
- [ ] _____
- [ ] _____

1 AI OR NOT AI?

INTRODUCING AI
[IMPACT, IMPLICATION, MACHINE LEARNING]

WARM UP [15 MIN]

MAIN ACTIVITY 1

INTRODUCTION [20 MIN]

The expert will briefly introduce to the class.

Use Mentimeter deck* to introduce basic concepts about AI
Mentimeter can engage participants in open questions, needed to understand preconceptions,
in order to drive the discussion to demystifying AI, understand its impact and implications.

Show video "What is Artificial intelligence or machine learning?" (6 min)*

Explain the e-Portfolio using Google deck shared with everyone using a link through Zoom chat.

HANDS-ON [20 MIN]

Show the hands on activity: http://moralmachine.mit.edu/
Ask participants to divide in small groups (up to 6), using Zoom breakout rooms.

Each group has to go to http://moralmachine.mit.edu/ and take the test by clicking "Start judging". The test ask for 13 choices. Each choice as to be made together. This approach will simulate a debate of the future among society, policymakers and companies.
(At the end of the scenarios "..contribute to the research..?" NO)

Copy and paste the link of the results on your e-portfolio.

WRAP-UP [5 MIN]

Briefly wrap up to ignite critical thinking: What did you consider? Intentionally and unconsciously? Age, gender, respect of the law. Can people have different opinions? What happen if a company chooses to "always save passengers"?
Lead the conversation to highlight the importance of **RESPONSIBILITY** both from developers and policy makers.

BREAK [10 MIN]

1 AI OR NOT AI?

INTRODUCING AI
[IMPACT, IMPLICATION, MACHINE LEARNING]

INTRODUCTION [10 MIN]

Show how TeachableMachine (Google) works and what it is.
Explain the hands-on activity that participants have to do in groups.
Divide participants in groups and Zoom's rooms.

HANDS-ON [25 MIN]

In each group:

- Pick one object you would like to **teach the machine** to recognise (books, landmarks, famous people...) Let's say "**castle**".
- Collect as many "castle" images you can, downloading them from the internet. (! different shapes, colour, perspective is a plus)
- Decide one person (A) who will run the training.
- Share all the pictures downloaded, EXCEPT for (A)'s pictures on a drive folder with your **g**roup.
- (A) starts sharing the screens and goes to: https://teachablemachine.withgoogle.com/
- Get started / Image project
- Give to a class the name "**castle**"
- Add your group **dataset** by clicking upload to load your "castle pictures".
- Train it! (be patient it takes a while)
- Test the model with (A)'s "castles", "castles" that the machine have never seen before. What happens?
- ADD a screenshot of your trained model on your e-portfolio.

Always walk around listen to participants discussions/chats and push them with some hints to make them reflect more and improve their models.

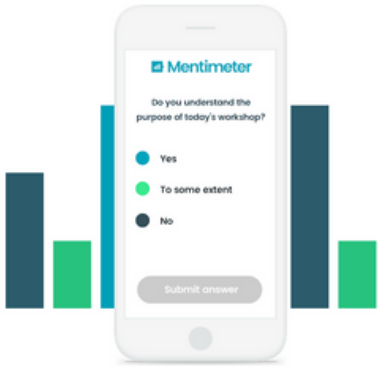
HINTS:
How is your data set? Have you considered rotating the object? Zoom the object in and out? If you pic as object "book" try to use several books to train the model. Anyone though about adding a class "not_book"? Test the model with other books to see if it is robust enough.

WRAP UP [15 MIN]

Each group show its screenshot of the model (2 min each).
Thanks and see you tomorrow.

1 AI OR NOT AI?

INTRODUCING AI
[IMPACT, IMPLICATION, MACHINE LEARNING]



***PRESENTATION DETAILS**

Mentimeter deck (only for the presenter):
menti.decks.ai@gmail.com | MentiDeckAI
Go to "Your presentation"
> Present

Anyone from the audience can interact writing answers, words or pick preferences, using smartphones or laptop.
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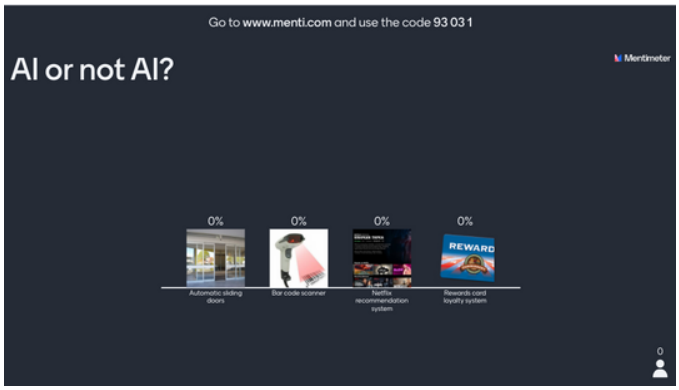

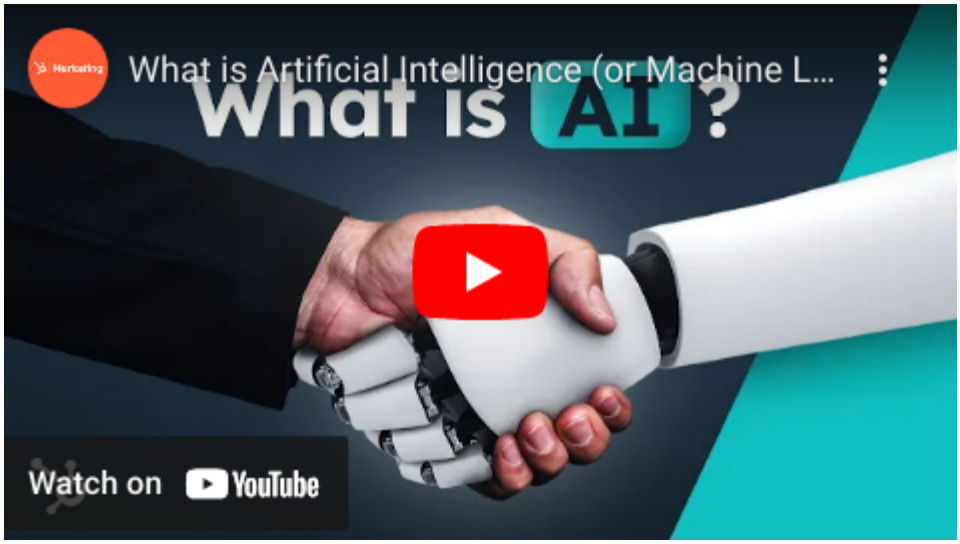

https://youtu.be/mJeNghZXtMo

2 AI FOR GOOD

IDEATION PROCESS USING DESIGN THINKING TO EXPLORE HOW WE CAN USE AI TO HELP!

"Beyond the fence" - Goro Fujita

OVERVIEW

This 2 hours long sessions aims to combine AI and Design. Participants will experiment design thinking process to generate ideas. They will use machine learning model based on images, audio or poses to build a prototype of their concepts and share it with their peers.

PURPOSE / KEY IDEAS

Explore how it is possible to find creative solutions to real world problems. Understand how AI/Machine Learning can be a powerful tool to help and support human ideas with a good impact on society.

OBJECTIVES / SKILLS

Participants will learn to critically research and understand nowadays social issues. Discuss about possible solutions and share their ideas and thoughts.

SETTINGS

ONLINE ZOOM meetings and brake out rooms.

MATERIALS CHECKLIST

- [ ] ZOOM
- [ ] Stationary
- [ ] Google deck for e-Portfolio
- [ ] _____
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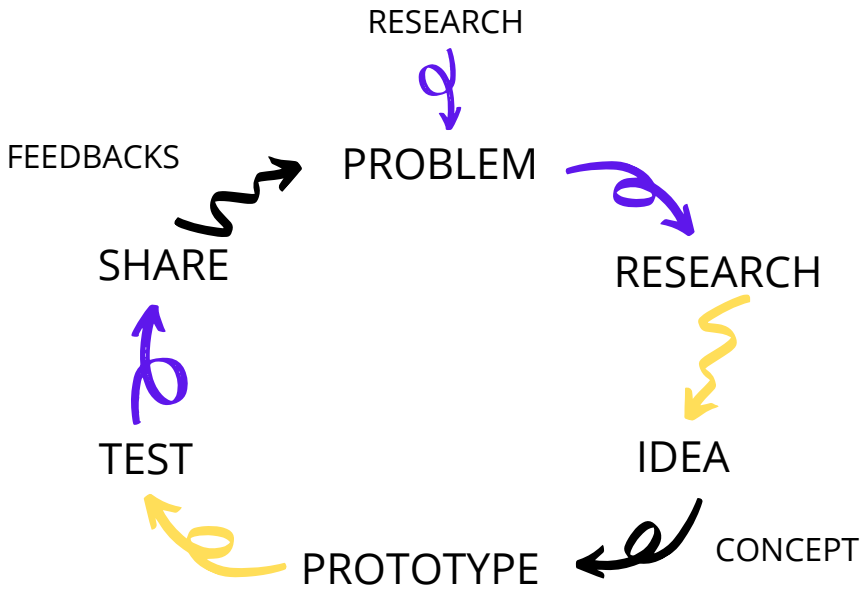
2 AI FOR GOOD

IDEATION PROCESS USING DESIGN THINKING TO EXPLORE HOW WE CAN USE AI TO HELP!

WARM UP [15 MIN]

MAIN ACTIVITY



INTRODUCTION [10min]

Use Mentimeter Deck* to introduce the objective of the activity, and how AI can help.
Design thinking process is a cycle, so asking participants to order the steps is just a way to make them reflect on it. How they usually "think" when they have to solve a problem.
The picture here above is the simplified cycle for our activity.

RESEARCH [20min]

Brainstorm using Mentimeter Deck*
WHO / WHAT are the problems/actors we can try to solve/help.
Letting participants brainstorm is a way to ensure they care about the activity.
[Problem examples: garbage in the oceans, museum experience for visual impaired...)

Tools: Tell participants that they will use Teachable Machine to build a prototype to help solve the problem they will pick (image, audio, pose)

BREAK [10 MIN]

2 AI FOR GOOD

IDEATION PROCESS USING DESIGN THINKING TO EXPLORE HOW WE CAN USE AI TO HELP!

DEFINE [5 min]

With Zoom open the breakout rooms, lead the group work by broadcasting messages to give them timing and tasks.
Each group define/pick a problem to solve.

RESEARCH AND IDEATION [10 min]

Participants can search online for inspiration and facts/information.
Facilitators always walk around to listen to ideas and give hints. Encourage creative thinking, thinking outside the box, thinking from different perspective, and point of view.

FROM THE IDEA TO THE CONCEPT [10 min]

Encourage groups to narrow their idea to a single key concept to build a prototype for.

Example:
IDEA: I want to help visual impaired in museums.
CONCEPT: A model that can recognize paintings in museums for visual impaired.
=> Participants can train TeachableMachine model to recognize different paintings.

!! Encourage students to write done their thoughts and ideas on paper.
Facilitators can take some cool shots of sketches and words...

PROTOTYPE [20 min]

Using TeachableMachine (image, audio, pose).
Train the model and test it as done in the first activity.

SHARE [15min]
Everyone back to the main room. Each group show its idea and the screenshot of the model.
[put the screenshot in the e-portfolio]

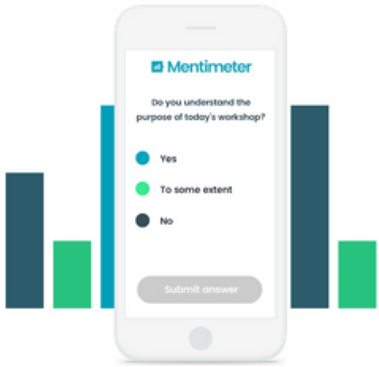
WRAP UP [5MIN]
Congrats to everyone for stick into it and their brilliant ideas and how well they collaborate (not easy for anyone).

EXAMPLES OF IDEAS / PROJECTS can be useful to be kept in mind to give some insights if groups are stuck:

- People with disability can use our model to open a door if is hand is and close it if it is down. (Pose estimation)
- Hearing impaired people can use our model to see written real time conversation. Participants can train the model with some words to be recognize. (Audio)
- Scientists can use our model to find dolphins and whales in the ocean to monitor species. (Image classifier)
- Smart traffic light can turn green for pedestrians if the camera see them move. Participants can train the model to recognize walking pose. (Pose)

2 AI FOR GOOD

IDEATION PROCESS USING DESIGN THINKING TO EXPLORE HOW WE CAN USE AI TO HELP!



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Go to "Your presentation"
> Present

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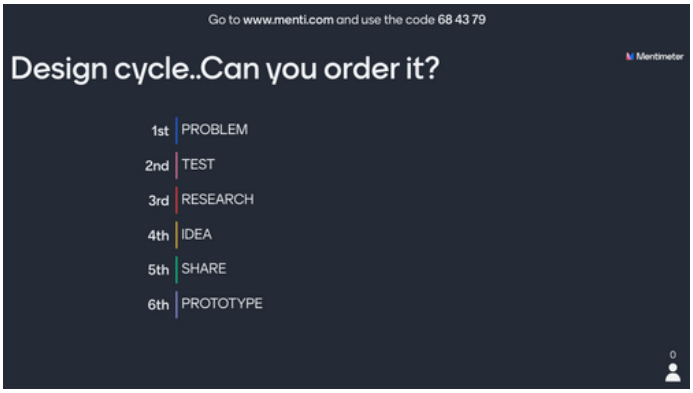
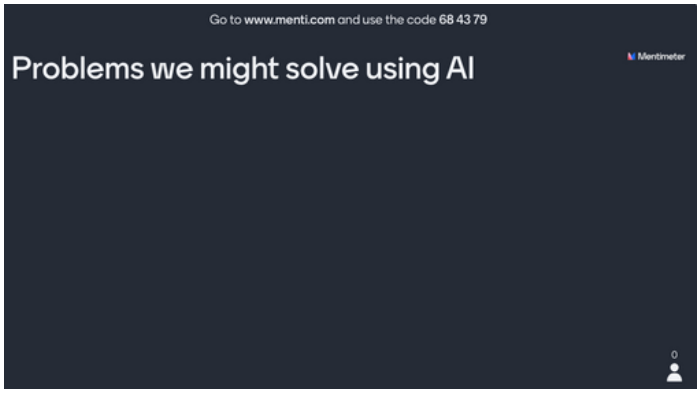
Go to menti.com
Insert the code
START!

KEEP THE LAST SLIDE PROJECTED AS BACKUP FOR RESEARCH AND IDEATION PART

After the end of the session, download results as pdf for record or diretly delete them pressing "Reset results / All slides"

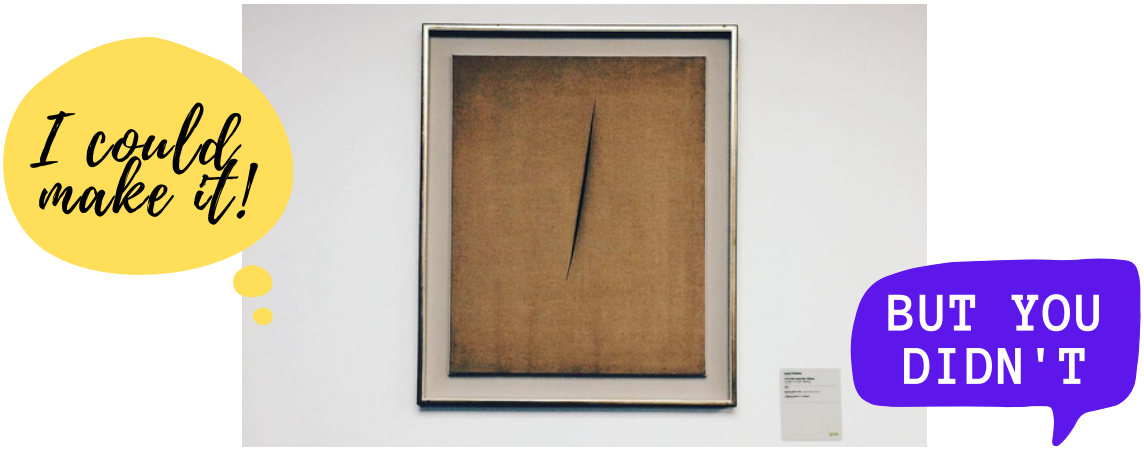
https://www.youtube.com/watch?v=Bpuoj1Op1kY





3 AI AND THE ARTS

EXPLORE BRAND NEW APPLICATION OF AI ALGORITHMS TO CREATE PAINTINGS, MUSIC, POEMS



- Lucio Fontana, Museo del Novecento

OVERVIEW

This 2 hours long sessions involves participants in exploring AI in arts. They will use tools based on AI that can generate music pieces with different genres, that can transfer styles from a painting to another, that can generate poems from a text.

PURPOSE / KEY IDEAS

Explore how researchers are trying to find ways to "replicate" human creativity. Participants will reflect on dilemmas such as: What does make a poem rather than a text? If algorithms can generate creation, can we consider them works of art? Why?

OBJECTIVES / SKILLS

Participants will learn to critically understand what's behind machine learning application on text, music, and drawing. Recognize power but also weaknesses.

SETTINGS

Zoom meeting and breakout rooms.

MATERIALS CHECKLIST

- [ ] ZOOM
- [ ] Stationary
- [ ] Google deck for e-Portfolio
- [ ] _____
- [ ] _____
- [ ] _____

3 AI AND THE ARTS

EXPLORE BRAND NEW APPLICATION OF AI ALGORITHMS TO CREATE PAINTINGS, MUSIC, POEMS

WARM UP [15 MIN]

MAIN ACTIVITY

INTRODUCTION [15 min]
Use Mentimeter Deck* to introduce the activity. Encourage reflection and discussion.
Give them time to express ideas/opinions, always ask for reasons. They can suggest work of art in music, paintings... to share with peers.

HANDS-ON [20min]

Assign one APP (from the list below) to each group.
Divide participants in groups and Zoom's rooms.
Each group has to try the app.

BREAK [10 MIN]

HANDS-ON [20min]
Prepare a 4 slides on the app (template in the e-portfolio)
Prepare to show and explain it to everyone. [5 min each group]

SHARE [30 min]
Each group has to share and explain how the application works and some examples they did.
5 min each.

WRAP UP [10 MIN]
Ask again for general attention. Congrats to everyone!
Then ask to switch off laptops and return them. (Clean keyboards if needed.)

APP LINKS:

https://thought-starter.com/bot3.html

https://thought-starter.com/bot4.html

https://experiments.withgoogle.com/autodraw

https://experiments.withgoogle.com/keyboard

https://experiments.withgoogle.com/ai/beat-blender/view/

https://experiments.withgoogle.com/ai/melody-mixer/view/

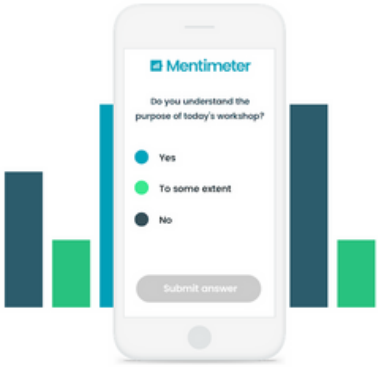
https://experiments.withgoogle.com/living-archive-wayne-mcgregor

https://quickdraw.withgoogle.com/

https://theselyricsdonotexist.com/

3 AI AND THE ARTS

EXPLORE BRAND NEW APPLICATION OF AI ALGORITHMS TO CREATE PAINTINGS, MUSIC, POEMS



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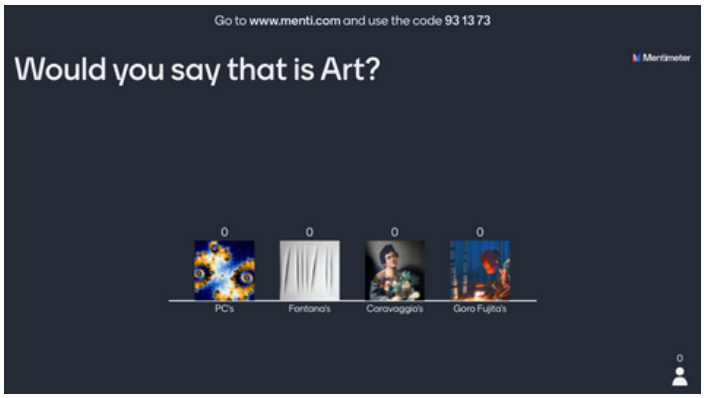
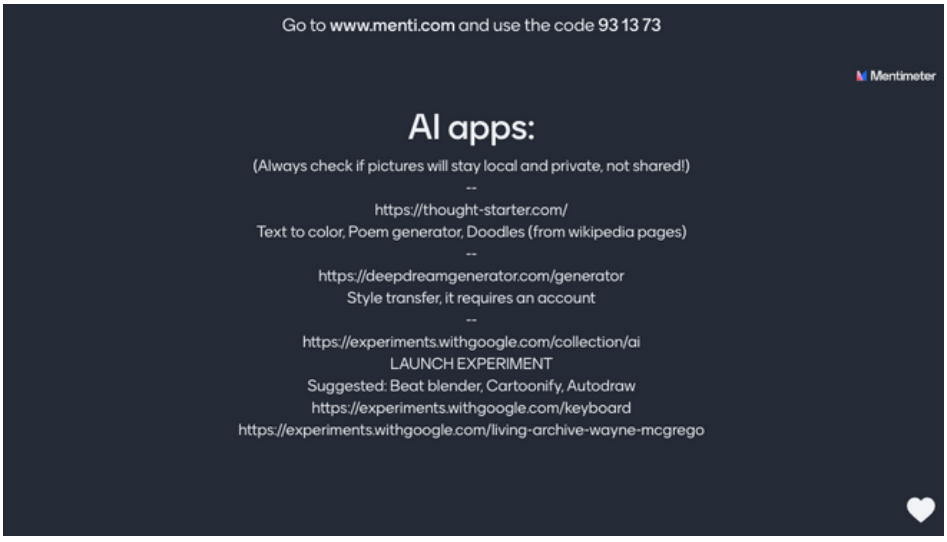




4 AI+HUMAN EXHIBIT (1/2)

HUMAN AND MACHINE INTELLIGENCE TO CREATE AN ART EXHIBITION BEYOND ANY BOUNDARIES

"The robot uprising" - Bryn G Jones

OVERVIEW

In this 2 hours long sessions participants will work in groups to ideate and create a corner of an exhibition where Artificial Intelligence and Human Intelligence collide.

PURPOSE / KEY IDEAS

Participants will use all the skills and competencies acquired from the previous activities to build together something new and meaningful. Exploring again key ideas and dilemmas.

OBJECTIVES / SKILLS

Participants will learn to work in groups for a common goal. They will use the design thinking process for a new objective. Participants will have the chance to train their abilities to express and share ideas.

SETTINGS

Zoom meeting and breakout rooms.

MATERIALS CHECKLIST

- [ ] ZOOM
- [ ] Stationary
- [ ] Google deck for e-Portfolio
- [ ] _____
- [ ] _____
- [ ] _____

4 AI+HUMAN EXHIBIT (1/2)

HUMAN AND MACHINE INTELLIGENCE TO CREATE AN ART EXHIBITION BEYOND ANY BOUNDARIES

WARM UP [15 MIN]

MAIN ACTIVITY

INTRODUCTION [15 min]
Introduce participants on the idea of creating all together and exhibition on AI and Human arts and creativity.

Find together a cool title for the exhibit! (Use Mentimeter)

HANDS-ON [1h 30min]

Participants are divided in groups.

Participants have all the skills and tools to work autonomously.
Their work is up to them.

If there is the chance, say that the exhibition will be presented to an audience / public / online.
This should motivate them!

Each group should:

1. Find a meaningful idea / messages they want to communicate in their exhibition
2. Define a title for the exhibition
3. Find **different ways**/with different media (music/painting/poem..) to express it using several AI tools and creativity [at least one poem, one piece of music...]
4. Use different materials if it is possible !!!!! Paper/paint/textile.. take pics.
5. Prepare all your creations (download, save on Drive, pictures)
6. Build the exhibition using emaze.com

TOOL ONLINE to create the exhibition: emaze.com
Sign-in and use the **"gallery" template**. With this template you can create your own exhibition as it was a slide presentation, adding a slide at a time with pictures, videos, link to music and so on and so forth.
(Each group needs to be able to have a unique account and create a presentation only with their works.)

TOOLS: Everything they learned and experimented in the previous activities. In particular the ideation process to find a valuable idea and concept to share.

IDEAS EXAMPLES:
What is art?, Computer art is art?, How AI can help see things from different point of view..

Facilitator can walk around and support the work.

WRAP UP [10 MIN]
Ask again for general attention. Congrats to everyone!

5 AI+HUMAN EXHIBIT (2/2)

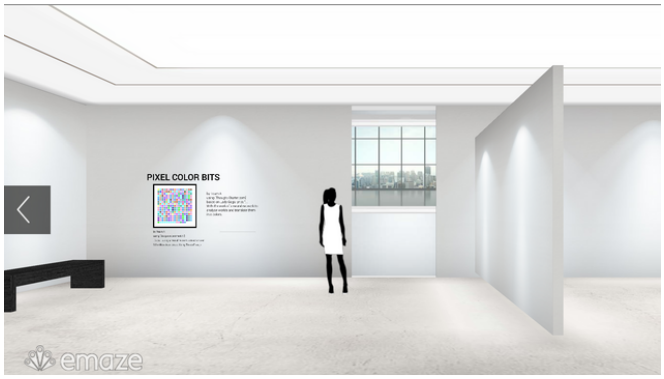
HUMAN AND MACHINE INTELLIGENCE TO CREATE AN ART EXHIBITION BEYOND ANY BOUNDARIES

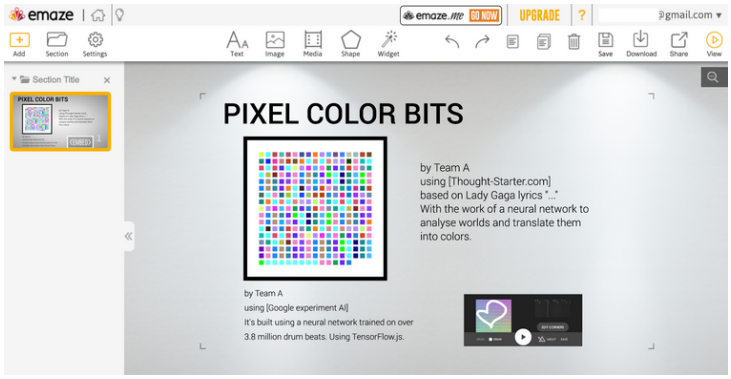
EXHIBITION -ONLINE-

SET UP [50 MIN]
Participants can prepare how to show and present their exhibition.
Final touches.

BRAKE [10 MIN]

(EXHIBITION LAUNCH [5 MIN])
(Brief introduction to the audience about the overall background of the program)





FINAL EXHIBITION [50 MIN]
Facilitators start with a brief introduction to the audience about the overall background of the program and how the session online will work.

Then each group can show their own exhibition created by sharing the screen (10 minutes each team).

Final congratulations, end of works.

AI LABS

Designed by Enrica Amplo
for SCIENCE GALLERY DUBLIN

2020 - Used as part of Intel TY's camp