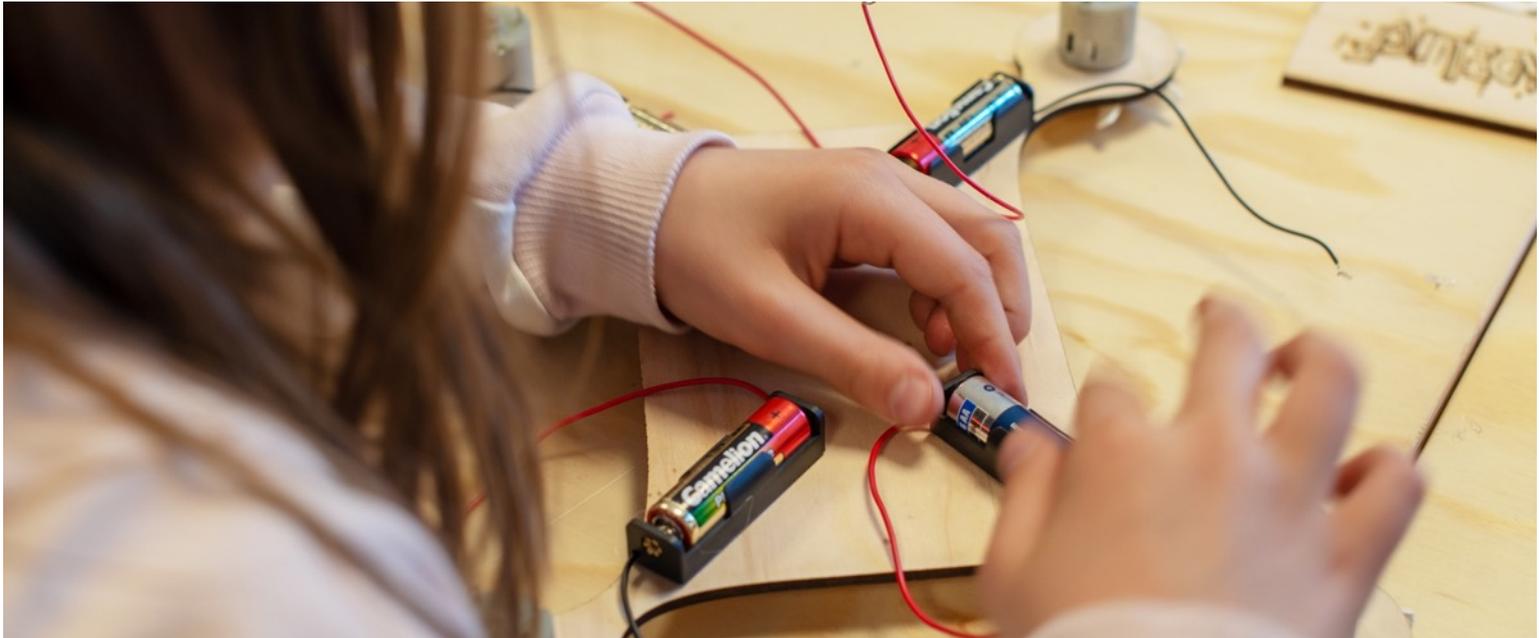




Entrepreneurial skills  
for young social innovators  
in an open digital world



## Workshop Description

# **DOIT AI**



**waag**  
technology & society



This project has received funding from  
the European Union's Horizon 2020 research and innovation  
programme under grant agreement No 770063



CC BY 4.0  
(<https://creativecommons.org/licenses/by/4.0>)  
DOIT <http://DOIT-Europe.net> | H2020-770063



## DOIT AI (Waag)

In this workshop consisting of 4 units, children will learn about AI, train their own model and make a prototype of an AI application. The programme is great to introduce children in the world of AI and at the same time let them critically think about the applications of AI.

It requires prior knowledge and experience of the facilitator with the Cognimates platform. There are tutorials on [cognimates.me](http://cognimates.me) and since it is largely based on Scratch, following some Scratch tutorials will also be a good base to get started.



**Duration:** 4x3 hours

**Setting:** in school & visit to makerspace

**Group size:** 10 – 20 children

**Age:** 12 – 16 year

## Materials

Each group of three students needs the following:

- Laptop with wifi connection
- Microbit
- USB-webcam
- Bluetooth speaker with microphone

The other materials are generic crafting materials and tools:

- Scissors, gluegun
- Cardboard, paper
- Foamboard
- Etc.





## Unit 1 - Exploring AI & Cognimates

---

The aim of the first unit is for the students to get an idea about what AI is and what the applications might be.

### 15 Minutes - Introduction in AI

give an interactive presentation about what AI is and what various application fields are. Ask a lot of questions, to get the students in an active mode and get a sense of what level of knowledge they have about AI.

### 75 minutes - Explore some online AI tools and reflect

Let the students in couples explore the online AI examples. Just play around with them and try to understand what happens. About 15 minutes per example.

- <https://affinlayer.com/pixsrv/>
- <https://teachablemachine.withgoogle.com/v1/>
- <http://www.square-bear.co.uk/mitsuku/turing/>

After each example ask the students what information was needed for the example to work (e.g. words, faces) and how it got the information (e.g. webcam, microphone). Let the students in the same couples come up with two scenarios in which this technology can be used:

- one positive scenario: how can you use this technology if you want to do good for society, or ask “what would a super hero do with this technology?”
- One negative scenario: how can you use this technology if you want to to society harm, or ask “what would a villain do with this technology?”

### 90 minutes - technical Exploration of Cognimates:

Start the technical exploration of cognimates (<http://cognimates.me/>). Let the children explore the coding part of the platform by using the example codes. Also let them play around with the various hardware: microbit, Bluetooth speaker and webcam. If they have the code and the hardware running, challenge them to make their own adaptations to the code. Use the AI Kit Tool on the DOIT platform ([doit-europe.net](http://doit-europe.net)) to get started with the hardware.

If they have the feeling they are done with that, you can let them do some generic Scratch tutorials: these will be very useful since the platform is built on Cognimates.





## Unit 2 – Ideation

The aim of unit 2 is coming up with ideas (ideation) and start prototyping.

### 20 minutes - ideation

Divide the children into groups of two or three. These groups will stay the same for the rest of the workshop series. Give the children an open-ended design prompt. In this workshop we have the following design prompt: How can you make an AI product for Health Care? You could also have a prompt on other topics, for example: how can you make an educational toy with use of AI?

Make sure all children understand the prompt and let them come up with ideas. When they have some ideas they want to work further on, they fill in the concept canvas (appendix 1)

### 30 minutes – paper prototyping

After the children filled out the concept canvas, they will make a paper prototype. This is a simple prototype with basic materials such as paper and cardboard. This is a way to continue on the ideation and make the ideas physical. Use colorless and plain materials (white paper, corrugated cardboard, etc.).

### 20 minutes – prototype canvas

Let each group fill out the prototype canvas. This canvas can later be used as a ‘to-do’ list, since it will have all main components of the project on it.

### 110 minutes – training a model

After the ideation, paper prototyping and filling out the canvasses, the groups should have a pretty clear idea of what they want to make. The first step is training a model in cognimates. From the prototype canvas should become clear whether they are going to train a text-based model or an image-based model. Let the groups collect the data and train a model and test it. If the models do not work the first time, try to find the problem. It could be that more images or words are needed to improve the accuracy of the model. It could also be that the model recognizes different information than intended: for example, the background of the picture instead of the object. Work through debugging together with the kids, this is a very learnfull step in this workshop.





## *Unit 3 - Prototyping*

The aim of this unit is to finish the prototyping. In the beginning of the session let all groups make a list of the things that need to be done. Together you can sit with them to prioritize the to do list. Make sure to get the core interaction working first, and build further from that.

## *Unit 4 - Presenting*

The aim of this unit is to present the results from all the work that has been done by the students.

### **30 minute – last minute finishing of prototype**

The first half hour is reserved for urgent repairs or updates on prototypes. In case of a completely non-functioning prototype, spend time with the group to find the things they can present: the process, concept and reflection are also valuable to present.

### **90 minutes – prepare presentation**

Ask the children to present their presentations. You can give them all freedom in that, or you could set up a list of things that need to be in the presentation:

- Demonstration of the prototype
- Explanation of the concept & technical details
- The process of making it, what were the steps, what was difficult, what didn't work.
- Critical reflection on use of AI:
  - Privacy issues
  - What happens if the model makes a wrong assessment?

### **60 minutes – presentations**

The presentations are the last part of the workshops. Let every group present and make sure to leave time for questions after each group. Thank everyone for their participation!



# prototype canvas

name of the makers:

title of the project:

write down what should happen in the code in cognimates

software:

which information or data enters the AI system

input

what happens with this information in cognimates

hardware:

which hardware does your prototype use (microphone, webcam, microbit)

operation

how does the outside of your prototype look like, what material is it made from

casing:

what does the prototype send back (e.g. sound, text, etc.)

output



# concept canvas

*name of the makers:*

describe the health care issue in which your product helps. For example, ageing, illness or disabilities

*health care issue:*

describe who the user of the product will be

*user:*

*title of the project:*

describe the solution and how it works

*solution:*

make a sketch or drawing of your solution

*drawing:*

