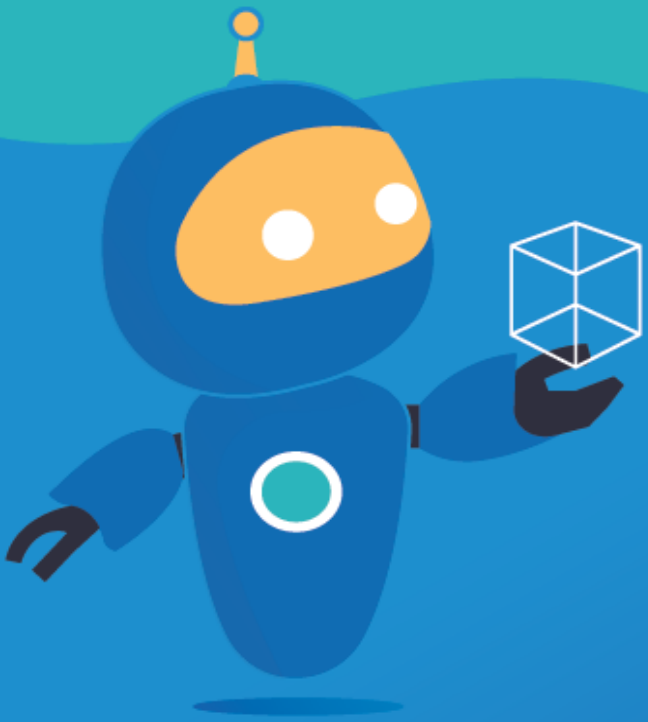
Generation AI

IO3 – School Program for Primary Education Students

Basic Challenge Tutorial

Digital Content Creation



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Challenge Tutorial Template

Name	***Can machine recognize my pet?***
Tools	• AutoDraw pairs machine learning with drawings from talented artists to help everyone create anything visual, fast without any download. It can guess hundreds of drawings and will help make drawing and creating more accessible and fun for everyone. Quick, Draw is a game built with machine learning. You draw, and a neural network tries to guess what you're drawing. You can also teach the machine with your own drawing. • "Whatis the Animal" can identify over one thousand different animals, uploading the animal's photo, waiting for the software to identify its species, and receiving the result including information for the animal. • Google Lens is a mobile app with a set of vision-based computing capabilities that can understand what you're looking at and use that information to copy or translate text, identify plants and animals, explore locales or menus, discover products, find visually similar images, and take other useful actions. • Coco is a large-scale object detection, segmentation, and captioning dataset, containing an explorer that can help us understanding what a data set is, and how machines see the data. This is achieved by gathering images of complex everyday scenes containing common objects in their natural context.

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	Students can work in groups, with their own tablets/laptops, or with the laptop of the teacher/classroom.
Aim	This gamified challenge aims to answer the main question “can a machine recognize drawings and images of pets in any form”? Students will realise that the answer is positive, due to very large data collections, but in some cases the machine can be confused and cannot recognize some pictures.
Description	The teacher asks students, some days before the activity, to bring (digital or not) 5 different photos of their favorite pet, either they have or would like to have. This challenge is based on the recognition of any pet in any form, digital or not, real or painted, consists of three activities: A. Recognizing a pet based on existing data collections. B. Exploring an AI data collection, named dataset. C. Creating examples that machine cannot recognize.
Step-by-step	**A. Recognizing a pet based on existing data collections.** 1. Students can start by watching the video of the AutoDraw Experiment.

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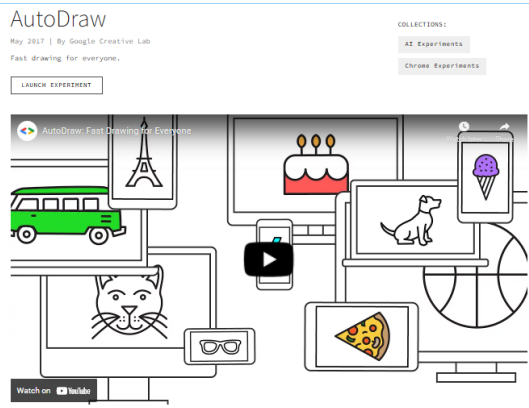
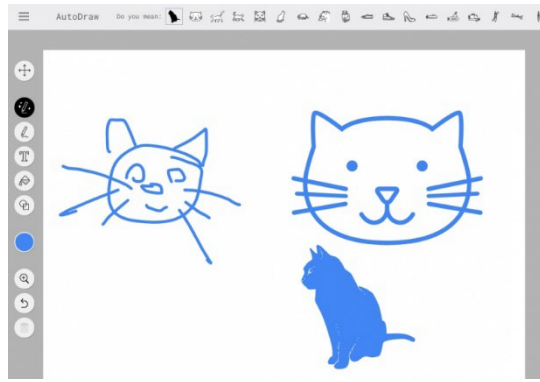


2. After that, they explore the AutoDraw application, trying to draw fast anything related to their pet and the surrounding environment. A co-operative design can start!



3. Next, students can watch the video about the Quick Draw.

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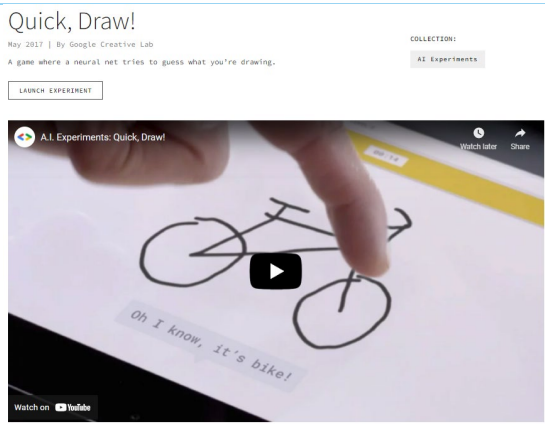

4. They are now ready to Quick, Draw their pet or other animals and things, and the neural network tries to guess what they are drawing…

5. What is the satisfaction of the students, from these two applications?

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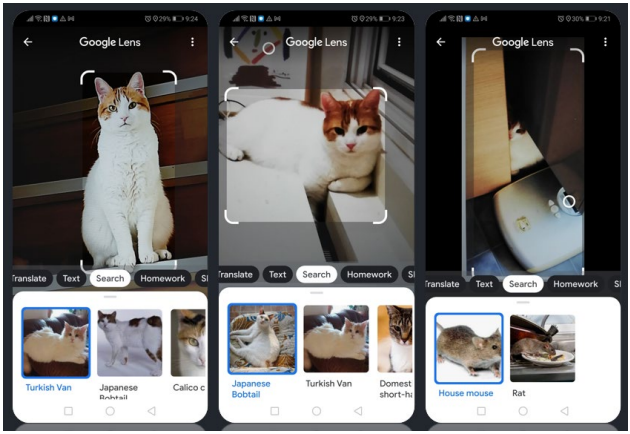
6. Now it is time for using the students' images of their pets. They "pass" them through the app (taking photos or uploading their images or photos) and the machine try to recognize them. If students have tablets, they can use Google Lens, the mobile app. If the is only one laptop/computer in the classroom, they can use the "Whatis the Animal" application.



B. Exploring an AI data collection, named dataset.

7. Over 15 million players have contributed millions of drawings playing Quick, Draw! Can you explore these 50 million drawings? Can you contribute one new drawing and find it in the dataset?

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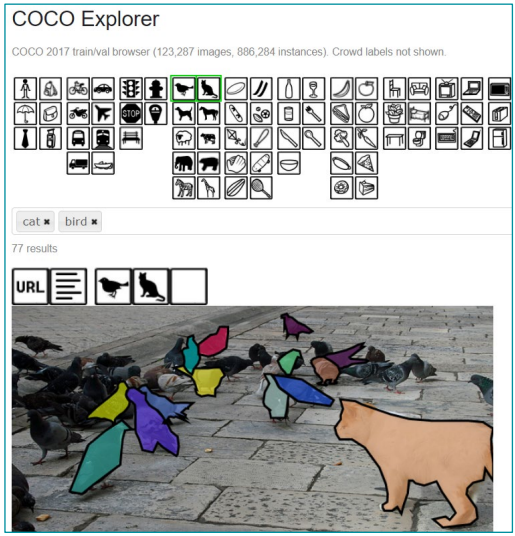
8. Another very large dataset is the Coco, which contains an explorer that combines also multiple datasets. Can you explore these 330K images, that more than 200K are labeled?



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9. Find your favorite category and try to combine it with another category. Observe and explore at least 20 images of the two combinations. Is it easy or hard to recognize two different animals or objects? Describe your findings!

C. Creating examples that machine can not recognize.

10. Is it possible to find animals and objects that a machine can not recognize? Yes it is! Give this mini project to your students, and each group can start the completion of the following table:

Recognition by…	**MACHINE**	**STUDENTS**
Image/sound 1	Yes	Yes
Image/sound 2	Yes	No
Image/sound 3	No	Yes
Image/sound 4	No	No

As a **closing reflection activity**, a discussion is suggested about the following questions:

a. Can a machine recognize pictures?
b. How does AI systems recognize the pictures?
c. Why cannot AI systems recognize some pictures or/and sounds?
d. Can AI systems learn to recognize pictures that don't know?
e. What is the difference between AI systems and human intelligence?

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Appendix: Ideas about the answers to the above questions

The way people (with eyes and ears) recognize images and sounds is very different from machines (with camera - digital images and microphones - digital sounds). The machines are trained through a very large number of images and sounds so an object or animal may not be recognized, for example, due to:

- brightness/contrast of image or the presence of noise
- different colors or shades
- short or long distances
- different angles and positions of objects
- low resolution images and sounds
- show only part of the sound or image
- existence of many objects and sounds at the same time

Source: www.freecodecamp.org

More info you can find here: AI image recognition fooled by single pixel change

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