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Intelligent Machine, Tell Me How I Feel?

Document For The Educator

During the pandemic, our faces were covered with protective equipment that made it difficult to recognize and express emotions. We even saw the emergence of transparent masks around the mouth so that children could continue their emotional learning. At the same time, advances in artificial intelligence have enabled computers equipped with a camera to be able to identify objects and faces, but above all, to classify emotions using facial expressions.

Is it a reliable and desirable technology?

Workshop objectives:

1. Learn to recognize and emulate anger, joy, and sadness.
2. Reflect on the reliability and scope of an AI aiming to recognize emotions.
3. Develop ethical sensitivity in artificial intelligence (AI)
4. Discover and use a flowchart.
5. Integrate an AI model into a rule-based classical programming.

What you will need :

- A computer equipped with a functional camera for presentations.
- The slides
- PRG AI Blocks programming platform.
- Intelligent Machine - Scratch file to load.sb3
- A computer equipped with a functional camera per team for the additional activity Hungry Monkey - Scratch file to load.sb3

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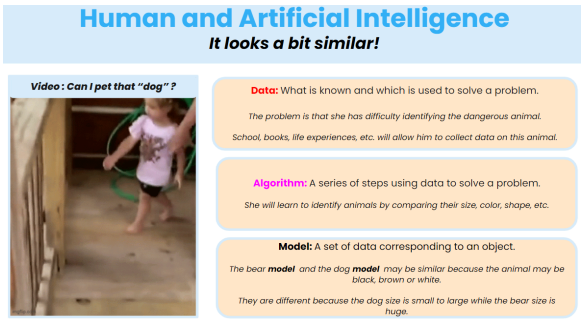
Slide overview

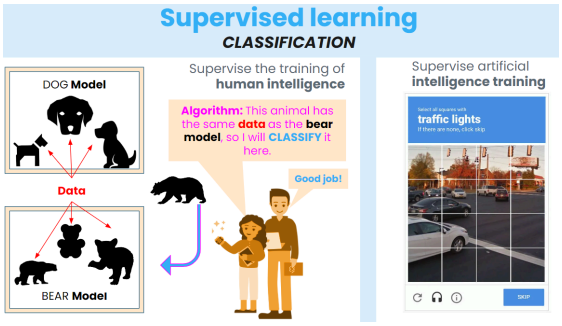


Notes:

Intention: Establish a link between human intelligence (HI) and artificial intelligence (AI).

Read the text on the slide.
Say before changing the slide:

Just like human intelligence, artificial intelligence uses data, algorithms, and models. By using a large amount of bear photos, it is possible to teach artificial intelligence to identify them.



Notes:

Intention: Establish a visual representation of the vocabulary and establish a link between the development of AI and that of IH.

Strengthen the vocabulary using the left part of the slide.Show the right part of the slide and ask learners if they have ever seen an exercise like this: it is a way to supervise the training of an AI.

Say before changing the slide:
Learning through human intelligence, like learning through artificial intelligence, can be supervised to reduce errors.

Draw a shoe!

ACTIVITY #1:

Each person must, on a common sheet or on the board, draw a shoe in 15 seconds

What does the type of shoe look like or what feature is drawn most frequently?

Why is that feature drawn so frequently ? Have you seen this type of shoe recently? Is this the right type of shoe for the season? Is it popular because of an artist or a star?

Did you draw: sneakers? high heels? cleats? ballet flats? sandals? boots?

In your opinion, which shoes will shape the following groups? Football players? People at a gala? People at the beach?

Notes:

Intention: Bring awareness that AI is not perfect and contains biases.

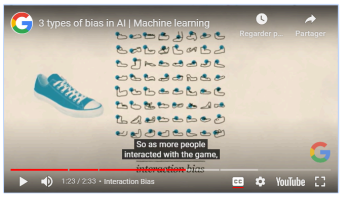
Prepare a visible place for all learners (like a whiteboard) where everyone must draw a shoe. The goal is to become aware that there are common characteristics among the shoes drawn, as the learners are part of the same group.

Ask the group all the questions and discuss the answers with them.

Say before changing the slide:
Depending on the groups to which we belong, we can be biased: we imagine things in one way or another, even a shoe!

Unsupervised learning

Possible errors!

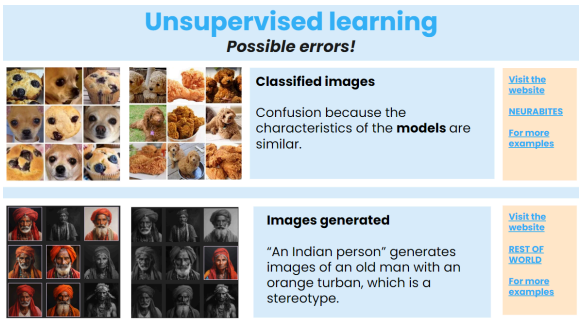


Notes:

Intention: To realize that in the absence of supervision, biases cannot be prevented from appearing.

Listen to the video.

Say before changing the slide:
Artificial intelligence that learns automatically without supervision can make mistakes that will have consequences. That is why it is important to have training data that resembles the data of the population.



Notes:

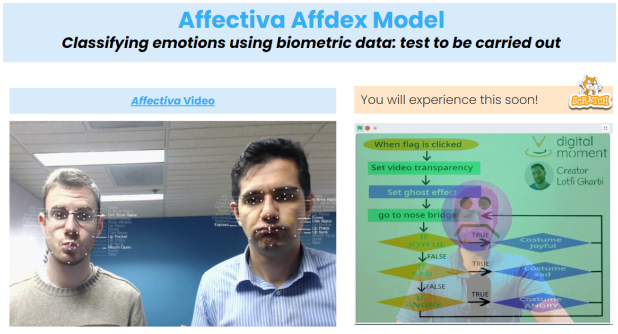
Intention: To become aware that AI can reinforce biases, but that it is possible to reduce them voluntarily by adding data that enriches the models.

Read the section titled **Classified Images** and ask the learners what characteristics the models that created confusion for chihuahuas and muffins have.
Answer. The presence of three black dots, and the beige color.

Ask students for advice: which photos should we add to reduce classification errors?
Response: Photos of the whole dog or the whole muffins. Other colors of dogs or muffins. Contextual photos (muffins in an oven or on a plate, dog in a doghouse)

Read the section **Generated Images**

Say before changing the slide:
Artificial intelligence has the potential to reinforce errors or stereotypes that exist, whether through classification AI or generative AI.



Notes:

Intention: To bring the idea that biometric data can be used by AI to recognize emotions.

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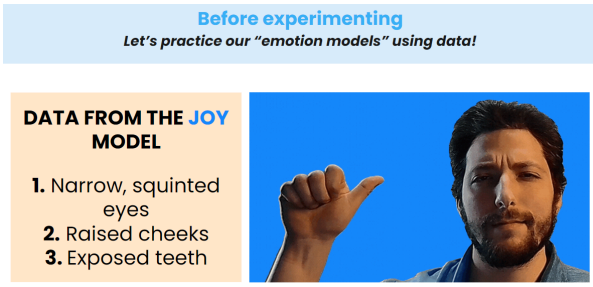
Say with the help of the image on the left:
Facial recognition AI uses biometric anchor points on the face, the position of which varies from person to person. Bio means living, and metric means measurement, so these are measurements of the living.

For example, our eyes are more or less close together, our mouth has a certain shape, our irises are different, our fingerprints too, etc.

Display the image on the right and say:

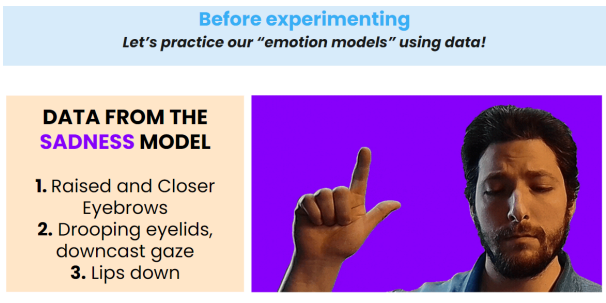
The Affectiva Affdex model, which is found in the Scratch extension that will be used today, claims to be able to use facial biometric data to recognize emotions. This is what we will experiment with.



Notes:

Intention: Practice imitating facial expressions that trigger emotional patterns.

Say:
In reality, the data from the models use the mathematics (coordinates) of your biometric anchor points and not words like "narrow and slanted eyes".
Ask the students to practice the model of joy.



Notes:

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Intention: Practice facial expressions that trigger the emotion model.

Ask the students to practice the model of sadness.

Before experimenting
Let's practice our "emotion models" using data!

DATA FROM THE ANGER MODEL

1. Lowered and Closer Eyebrows
2. Eyes wide open
3. Lips pressed tightly

Notes:

Intention: Practice facial expressions that trigger the emotion model.

Ask the students to practice the anger model.

Let's load the program!
In PRG AI Blocks load the file
Intelligent Machine - Scratch file to load.sb3

Make sure you give permission to access your camera.

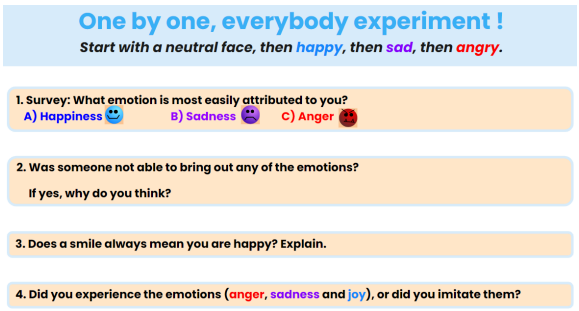
Notes:

Intention: Guide for loading the .sb3 file on the platform.

Follow the steps on the screen, you will need:

(1) Access the programming platform

(2) Intelligent Machine - Scratch file to load .sb3



Notes:

Intention: to have a discussion with learners about emotions, their expression, and their analysis by intelligent machines.

Display the questions, then ask the participants to reflect on them during the experiment.

The learners come one by one in front of the camera and must try to provoke the appearance of a happy face, a sad face, and an angry face.

Once everyone has tried, discuss the questions with the group using the following information:

1. Draw attention to the survey results. The model of joy is usually the most common.

2. Several possible reasons:
2.1 Students truly feel more joy than anger or sadness.
2.2 The resting face is closer to joy than to anger or sadness.
2.3 Eyebrow data is important for detecting anger or sadness, so recognition will be difficult if the eyebrows are either absent, atypical, hidden by hair, glasses, or other.
2.4 The code checks the first emotion first, so it may appear more often.
2.5 Atypical faces, more hairy or shaded, are more difficult to analyze.
2.6 The expressions on our face do not match those contained in the data of the models, so the AI has difficulty identifying emotions. For example, not everyone shows their teeth when they are happy.

3. No, sometimes we smile when we are embarrassed because we do not know what to do; when we want to seduce by showing our beautiful teeth; when we want to be threatening by showing our teeth, etc.

4. I can feel one of his emotions right now, but it is unlikely that smiling will make me happy immediately, just as having a hard look does not make me angry. So I imitated the emotions by contracting the muscles of my face so that the biometric

anchor points move as if I were actually angry, happy, or sad. Some students will mention being able to evoke an emotion if they focus on it, which implies that we can have some control over our emotions.

Ethical question

Let's think of the possibilities of this technology.

[What] Do you agree with the use of emotion recognition technologies ?
[Why] What are your reasons ?
[When] At which time, or following which event ?
[How] You think it could be used how ?
[Who] By which people or group of people ?

Notes:

Intention: to have a discussion with more advanced learners about the potentials and externalities brought by this technology.

Several possible answers. Generally, the situations will relate to a few aspects:

1. Yes and no, it can be used by people with good intentions as well as by people with bad intentions.

Ex: A criminal or a psychologist analyzing emotions do not have the same intentions.

2. It depends on the utility (added value)

Ex: This allows for creating more interactive games or helping people.

3. It depends on the possible consequences and the performance of the system (reducing the risk).

Ex: A police surveillance system mistakenly identifies an individual as dangerous and imprisons them.

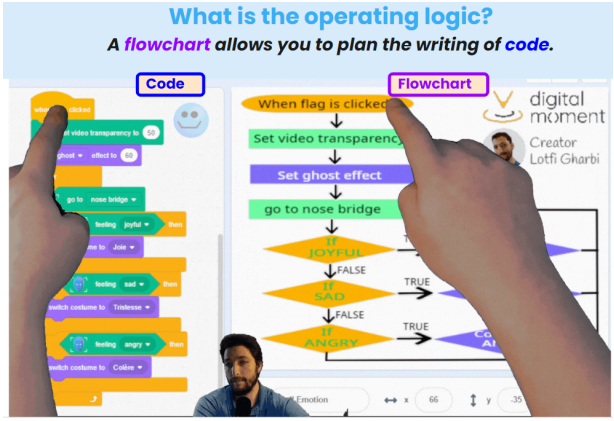
4. It depends on whether there is a human to verify (human remains in control).

Ex: An AI that analyzes a patient's emotions informs the doctor and allows them to make the final decision.

5. It depends on whether we are forced to join without being informed or explained

to (consent).

Ex: A school decides to implement an emotion analysis system at the entrance of classrooms without explaining why.



Notes:

Intention: Present the flowchart, a tool that allows you to plan your programming thoughts

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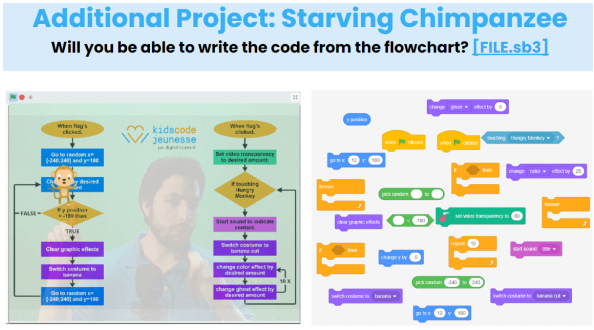
Draw attention to the code structure (left) that was created from the flowchart (right). Learners can practice writing code from a flowchart in the additional activity Hungry Chimpanzee located at the end of the presentation.



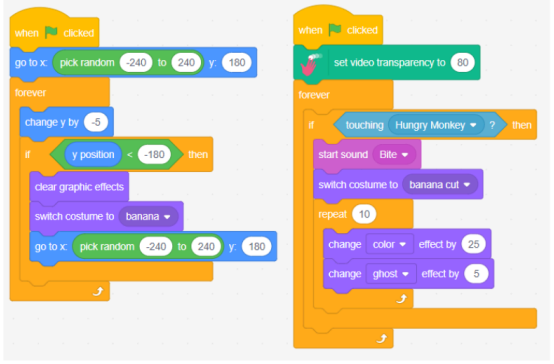
Notes:

Intention: Practice using a flowchart to write a code.

Learners can practice writing code based on a flowchart in the additional activity Hungry Monkey.

You can go back to the slide “Let’s load the program !” to help learners load the project.

Solution: Hungry Monkey



Notes:

Intention: Present the solution to the additional project.