

A.I. & Future Society

Practice using cases of A.I. and SW technology,
Think about the impact that digital technology will have on society in
the future.

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- Create a fruit classification web app - **web app** production practice
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- Discuss
 - What does it mean to use a computer/A.I./program?
 - What should I teach?

Create a fruit classification model

- How do humans distinguish fruits?
 - The human eye can see the fruit.
 - Remember the shape of the fruit and the shape of the fruit you saw before,
 - Classify fruits by comparing color, shape, aroma, and taste of fruits in memory.
 - Neurons in the human brain do something to remember and compare.



Create a fruit classification model

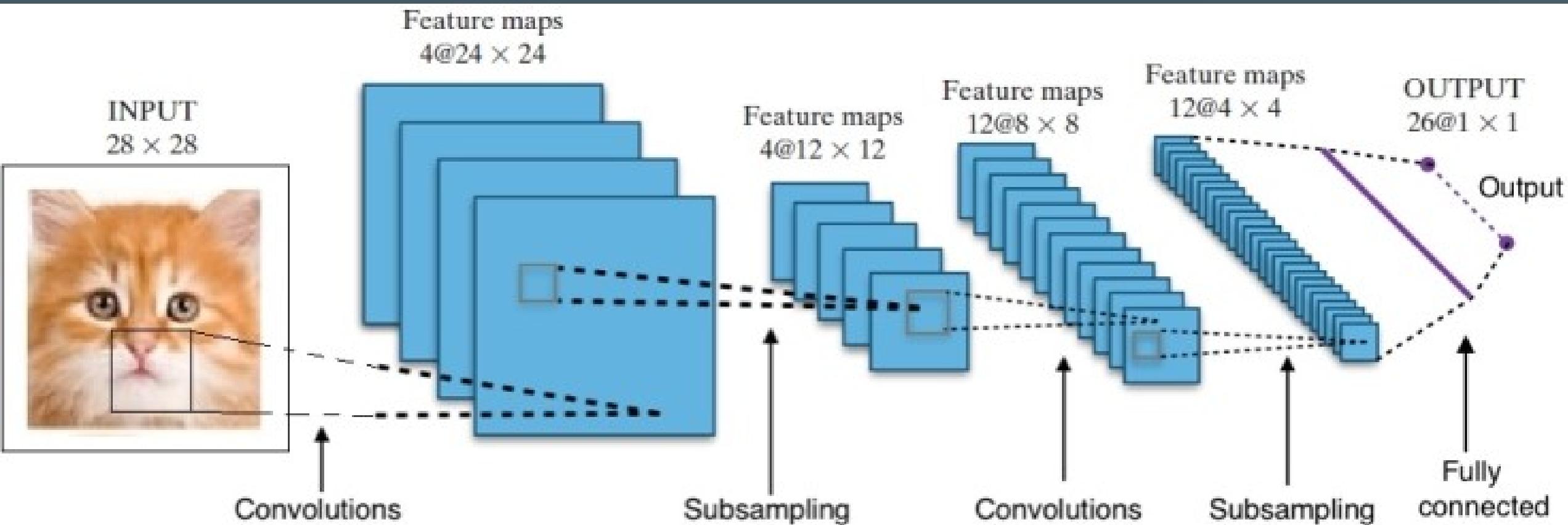
- How does a computer classify fruits?
 - You can view the fruit with a camera connected to the computer.
 - The shape of the fruit is stored as a number (binary number of 0 and 1),
 - Calculate the numbers well, find the representative values, and compare these values with the representative values of other fruit images.
 - The computer calculates a lot of numbers and compares the values.



A grid of binary code consisting of 10 rows and 13 columns. The binary digits are represented by green numbers on a black background. The first few rows show patterns like 1010000111, 0100100110, and 0101110001. The last few rows show patterns like 0010001111, 0110110010, and 1010010101. The patterns represent different fruit shapes, such as an apple, an orange, and a banana respectively.

1	0	1	0	0	0	0	1	1	1	1	1	1
0	1	0	0	1	0	0	1	1	1	0	0	0
0	1	0	1	1	1	0	0	0	1	0	0	1
0	0	1	0	0	0	1	1	1	1	1	1	1
0	1	1	0	1	1	0	0	1	0	1	0	0
1	0	1	0	0	1	0	1	0	1	0	1	0
1	0	1	1	1	0	1	1	1	1	1	1	1
0	0	0	0	0	1	0	0	1	0	0	1	1
0	0	0	1	0	0	1	1	0	0	0	1	0
0	1	0	0	1	1	1	0	1	0	1	1	0

Create a fruit classification model



Create a fruit classification model

- machine learning
 - The process by which machines learn new things, just like humans, is called machine learning.
 - Once you learn, you can remember the name of the fruit.
 - If you show me a new fruit, can you guess its name?

Create a fruit classification model

- Let the computer learn fruits.
 - After preparing the fruit to learn,
 - Tell the computer the name of the fruit and make it remember it.
 - Show the same fruit with a slightly different appearance,
 - Guess the name of the fruit.

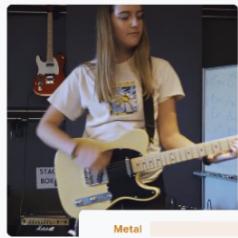
Teachable Machine

Teachable Machine

Train a computer to recognize your own images, sounds, & poses.

A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.

Get Started



New Project

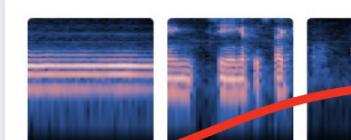
Open an existing project from Drive.

Open an existing project from a file.



Image Project

Teach based on images, from files or your webcam.



Audio Project

Teach based on one-second-long sounds, from files or your microphone.

New Image Project

Standard image model

Best for most uses

224x224px color images

Export to TensorFlow, TFLite, and TF.js

Model size: around 5mb

Teachable Machine

- Let the computer learn
 - Naming the class
 - Take (or upload) images by class
 - Click "Train Model"

Teachable Machine

- Make sure you've learned well
 - Preview > Show each image and check if it is well classified
 - If the classification is not good, add image data and train again.

Create a fruit classification web app

- web application, web app
 - Software that runs in a web browser
- Prepare
 - Export Model > Upload my model > (After uploading) Copy link for sharing

The image shows two screenshots of the Teachable Machine web application. The left screenshot displays the 'Preview' tab with a camera feed of a Pikachu-like character. A red box highlights the 'Export Model' button. The right screenshot shows the 'Export your model to use it in projects.' dialog. It has tabs for 'Tensorflow.js' (selected), 'Tensorflow', and 'Tensorflow Lite'. Under 'Export your model:', there are two radio buttons: 'Upload (shareable link)' (selected) and 'Download'. A red box highlights the 'Update my cloud model' button. Below it, the 'Your sharable link:' field contains the URL <https://teachablemachine.withgoogle.com/models/JN05-JGLe/>, which is also highlighted with a red box. A 'Copy' button is next to the URL. At the bottom, a green checkmark indicates 'Your cloud model is up to date.'

Preview

Export Model

Input ON Webcam

Switch Webcam

Pikachu-like character in camera feed

Export your model to use it in projects.

Tensorflow.js *i*

Tensorflow *i*

Tensorflow Lite *i*

Export your model:

Upload (shareable link) Download

Update my cloud model

Your sharable link:

<https://teachablemachine.withgoogle.com/models/JN05-JGLe/>

When you upload your model, Teachable Machine hosts it at this link. (FAQ: [Who can use my model?](#))

✓ Your cloud model is up to date.

Copy *C*

Create a fruit classification web app

- Prepare
 - Go to Sample Web App > <https://tm-image-demo.glitch.me/>
 - Click "Remix this site on Glitch"

Create a fruit classification web app

- Modify the code
 - Choose "index.html"
 - Change the URL address of the copied model
 - let URL = 'new url address';
 - Check out the finished web app
 - "PREVIEW"

Improving the fruit classification web app

- Improving the code using chatGPT
 - chatGPT <https://chat.openai.com/>
 - chatGPT is a conversational artificial intelligence service using a pre-learned model
 - Think of chatGPT as a programmer and ask for code improvements.
 - The goal is to modify the description to fit our fruit classification model.

Improving the fruit classification web app

- Tell chatGPT which code to modify
 - "we are going to edit the html code."
 - "the html code to be modified is as follows."
- Find what is shown on the screen
 - "tell me what to show on screen in this html code."
 - "in the model session, let me know what content is displayed on the screen."
- Modify what is displayed on the screen
 - "Modify the phrases "Fruit classification web app" and "Show the fruit on the webcam" to be displayed on the screen. And show only the modified code from the previous code."



we are going to edit the html code.



Sure, I can help you with editing HTML code. Do you have a specific HTML file that you want to edit, or are you starting from scratch? Also, what do you want to achieve by editing the HTML code?



the html code to be modified is as follows.

```
<!DOCTYPE html>  
<html lang="en">  
  <head>  
    <title>Image Model Demo - Teachable Machine</title>  
    <!-- don't mind these: -->
```



Great! What changes do you want to make to this HTML code? Please provide so that I can assist you better.



tell me what to show on screen in this html code.



This HTML code creates a webpage with a machine learning model that can detect how ripe a banana is when you hold it up to the webcam. Here's what will be shown on the screen:

1. A page title: "Image Model Demo - Teachable Machine"
2. A section with an ID of "model" that contains:
 - A heading that says "I taught a machine learning model to tell how ripe bananas are."
 - A subheading that says "Hold up a banana to the webcam."
 - A div with an ID of "webcam-wrapper", which is initially empty but will display the webcam feed when the model is ready.
 - A div with an ID of "graph-wrapper", which is initially empty but will display the model's predictions as a bar graph.
3. A section with an ID of "info" that contains:
 - A heading that says "This machine learning model was made using Teachable Machine." The text "Teachable Machine" is a hyperlink to the Teachable Machine website.
 - A subheading that says "Learn how we made it without coding." The text "Learn how we made it" is a hyperlink to a Medium article.
4. A footer that contains:
 - A heading that says "Remix this site on Glitch." The text "Remix this site" is a hyperlink to a Glitch project where you can edit the code yourself.
5. Several scripts that load various libraries and modules needed to run the machine learning model and display the results on the page.

Is there anything specific you want to change or add to this HTML code?



in the model session, let me know what content is displayed on the screen.



In the `<section id="model">` session, the following content is displayed on the screen:

- A `<h1>` heading that says "I taught a machine learning model to tell how ripe bananas are."
- A `<h2>` subheading that says "Hold up a banana to the webcam."
- A `<div>` element with `id="webcam-wrapper"` which contains a `<div>` element with class "loader". This is where the webcam feed will be displayed once the user grants permission to access the camera.
- A `<div>` element with `id="graph-wrapper"`. This is where a bar graph will be displayed showing the probability of the different classes predicted by the machine learning model.



Modify the phrases "Fruit classification web app" and "Show the fruit on the webcam" to be displayed on the screen. And show only the modified code from the previous code.



Sure! Here's the modified code with the updated phrases:

html

 Copy code

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>Fruit classification web app - Teachable Machine</title>
    <!-- don't mind these: -->
    <meta charset="utf-8" />
```

Improving the fruit classification web app

- chatGPT gives a plausible answer. (Hallucination)
- Don't trust the answer as it is, be sure to check it.

Supervised Learning

- supervised learning,
 - It is a way to tell the correct answer and learn.
- Other learning methods include,
 - Unsupervised learning is a way to learn without telling the correct answer
 - Reinforcement Learning is a way to teach only the rules and learn in a winning direction.

Supervised Learning

- What is the difference between human learning and computer learning?
 - **Human** can learn from a small number of experiences and examples. Human can discover new information through various failures in the process of imagining wildly unfamiliar fields or establishing and verifying hypotheses.
 - **Computer** need much more training data than humans. Computer can build models that classify more accurately if there is a lot of data provided. They classify faster and sometimes more accurately than humans.

Discuss

- Using computers, artificial intelligence, and programs means
 - How will the social world in which I live change?
 - What will happen? What can you do?
 - Do computers benefit us? does it make you uncomfortable?
- What should I teach in the future?
 - Should I teach programming languages and how to code?
 - What to do and what not to do?

Thanks! 