

Prompt Engineering

The AI Revolution

AI PE Course (2024-2025)
Week6: Exploring Teachable Machine: Making
Machine Learning Accessible

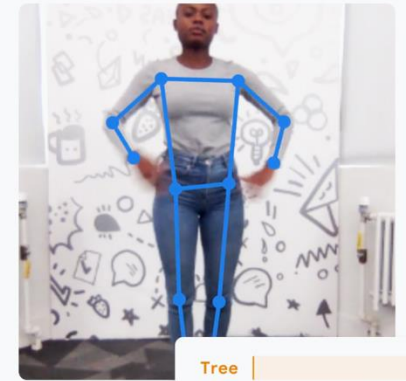
Google Classroom:
[d5hsxq3](#)

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



Tree |

Wings |

3d Grade IT Students

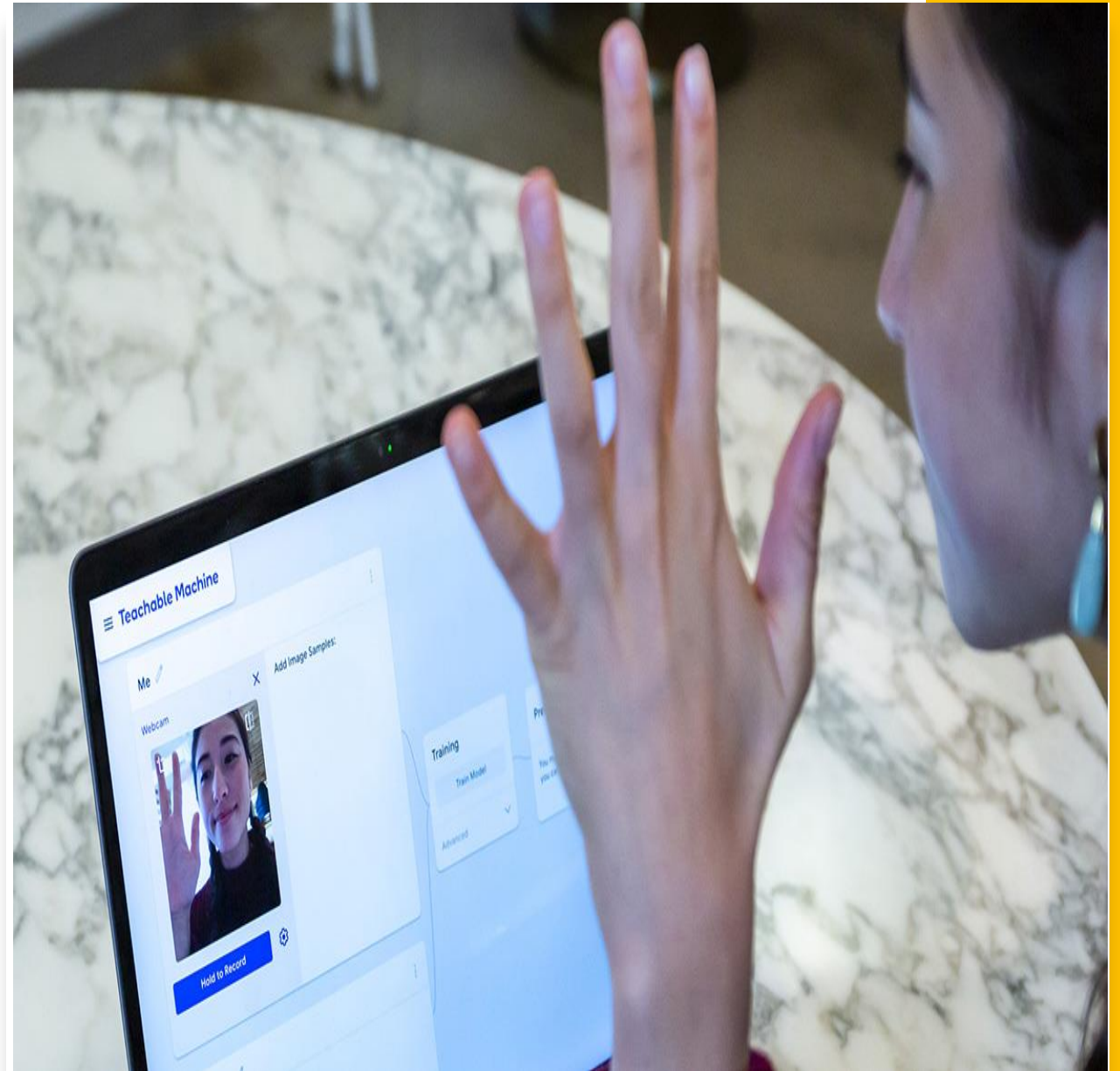
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Contents

- **Introduction to Teachable Machine**
 - What it is and why it matters.
- **How Teachable Machine Works**
 - Types of models and workflow.
- **AI Concepts Illustrated by Teachable Machine**
 - Supervised learning, feature extraction, and more.
- **Benefits and Limitations**
 - Strengths and areas to be cautious about.
- **Relevance to Prompt Engineering**
 - How it complements AI prompt workflows.
- **Ethical Considerations**
 - Data privacy, diversity, and responsible use.
- **Conclusion and Next Steps**
 - Summary and resources for further exploration.



New Project

 Open an existing project from Drive.

 Open an existing project from a file.

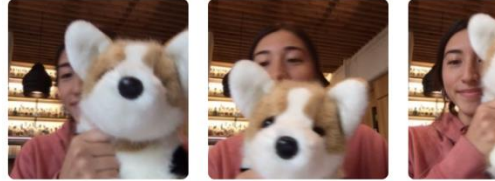
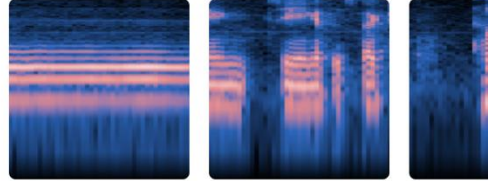


Image Project

Teach based on images, from files or your webcam.



Audio Project

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



Pose Project

Teach based on images, from files or your webcam.

What is Teachable Machine?

- Teachable Machine is a web-based tool by Google that allows anyone to create machine learning models without any coding experience.

Features:

- Simple interface.
- Real-time model training.
- Exportable models for use in apps and websites.

Q&A

Q: Which of the following is NOT a feature of Teachable Machine?

- 1.Real-time model training
- 2.Code-based interface
- 3.Exportable models
- 4.Simple interface

Q: In what ways do you think a no-coding tool like Teachable Machine is helpful for non-technical users?

Why is Teachable Machine Important?

Table: Benefits of Teachable Machine

Feature	Benefit
No coding required	Accessible for beginners.
Browser-based training	No specialized hardware/software needed.
Supports various models	Works with images, sounds, and poses.
Instant feedback	Allows real-time model testing.

Example Use Cases:

- Classroom projects.
- Rapid prototyping.
- Integrating simple AI into applications.

Types of Models in Teachable Machine

Content:

- **Audio Classification:** Detects specific sounds or phrases.
- **Pose Detection:** Identifies body positions using webcam input
- **Image Classification:** Recognizes patterns in image data.

Model Type	Input Example	Output
Image Classification	Photos of cats vs. dogs	"Cat" or "Dog" label.
Audio Classification	Sounds of clapping	"Clap" or "Noise."
Pose Detection	Camera feed of a person	Pose coordinates.

Workflow of Teachable Machine

Data Collection → Model Training → Testing & Validation → Export

Steps to use it:

1. **Collect Data:** Gather examples (e.g., using a webcam or uploading files).
2. **Train Model:** Model learns patterns from provided data.
3. **Test and Adjust:** Validate the model's accuracy using test data.
4. **Export Model:** Download for integration (e.g., TensorFlow.js).

Q&A

Q: Arrange these steps in the correct order for using Teachable Machine:

1. Export Model
2. Train Model
3. Test and Adjust
4. Collect Data

Interactive Activity:

- Describe one dataset you could create (e.g., "Smile" vs. "No Smile" for image classification).

Underlying AI Concepts

- **Supervised Learning:** Models are trained using labeled datasets
- **Feature Extraction:** Identifying key patterns in data.
- **Overfitting vs. Generalization:** Why diverse data is essential.

Concept	Explanation
Supervised Learning	Training with input-output pairs.
Feature Extraction	Identifying distinguishing patterns or features in the data.
Overfitting	When the model learns only the training data, not general patterns.

Q&A

Quiz Question (True/False)

- **Q:** Overfitting occurs when the model performs well on training data but poorly on unseen data.

Interactive Q&A:

Q: Why do you think diverse data is essential for machine learning models?



Benefits and Limitations

Benefits:

- No programming skills required.
- Quick and easy prototyping.
- Great for educational use.

Limitations:

- Not suitable for complex machine learning tasks.
- Dependent on good-quality data for accuracy.
- Limited control over model architecture.

Image Placeholder: Diagram comparing a "simple" and "complex" ML model.

Q&A

Q: Which of the following is a limitation of Teachable Machine?

- 1.No programming skills required
- 2.Limited control over model architecture
- 3.Great for educational use
- 4.Real-time model training



Relevance to Prompt Engineering

-
- **Complementary Tool:** Outputs from Teachable Machine can be incorporated into prompt-based AI workflows.
 - **Application Ideas:**
 - Using classification results in decision trees for prompt chaining.
 - Enhancing automation workflows with custom ML models.

Example: "A Teachable Machine model classifies hand gestures, and a prompt uses the classification to trigger specific chatbot responses."

Ethical Considerations in Teachable Machine

Key Points:

- Importance of diverse datasets to avoid bias.
- Ensure data privacy when using personal images/audio.
- Use responsibly for educational and ethical purposes.



Questions

Quiz Question (Short Answer)

- **Q:** List one ethical consideration when using personal data in machine learning.

Interactive Q&A:

- **Q:** How would you ensure data privacy if you're collecting images for a project?



Conclusion and Next Steps

Summary:

- Teachable Machine simplifies machine learning for beginners.
- A great tool for rapid prototyping and classroom learning.
- Useful for integrating simple AI models into real-world applications.

Next Steps:

- Explore it yourself at teachablemachine.withgoogle.com.
- Think of creative ways to use it in projects.

Questions

Quiz Question (Multiple Choice)

- **Q:** Which model type would you choose to classify body positions?
 - 1.Audio Classification
 - 2.Pose Detection
 - 3.Image Classification
 - 4.None of the above

Interactive Brainstorming:

- Try to propose and discuss creative project ideas using Teachable Machine, such as gesture-controlled applications or sound-triggered alarms.



Lab Task:

Exploring and Applying Teachable Machine

Students will create, train, and test a simple machine learning model using **Google's Teachable Machine** within 1 hour. To learn the basics of dataset creation, model training, and real-time testing.

Task Details

Step 1: Access Teachable Machine (10 minutes)

- **Open Teachable Machine.**
- Choose one of the model types:
- **Image Classification**
- **Audio Classification**
- **Pose Detection**

Step 2: Create and Collect Dataset (15 minutes)

1. Create two or three classes (e.g., "Smile" vs. "No Smile" for image classification or "Clap" vs. "Silence" for audio classification).
2. Use the webcam or microphone to collect data samples for each class.
 1. Gather at least 20 examples per class.
 2. Ensure data diversity (e.g., varying backgrounds, different poses, or noises).

Deliverable:

- Screenshot of the dataset collection process showing at least two classes.



Lab Task:

Exploring and Applying Teachable Machine

Students will create, train, and test a simple machine learning model using **Google's Teachable Machine** within 1 hour. To learn the basics of dataset creation, model training, and real-time testing.

Step 3: Train the Model (10 minutes)

1. Click on the "Train Model" button.
2. Wait for the training to complete.
3. Observe the progress and results (e.g., accuracy and loss).

Deliverable:

- Screenshot of the training completion screen.

Step 4: Test the Model (10 minutes)

1. Use live input (webcam or microphone) to test the trained model.
2. Try at least five different test cases and observe the results.

Deliverable:

- List of test cases and whether the model classified them correctly.
- Screenshot of the live testing in action.

Step 5: Reflection and Questions (15 minutes)

1. Answer the following questions:
 1. What worked well in your model?
 2. What challenges did you face during dataset collection or testing?
 3. How could you improve the model's performance?
2. Submit your reflections along with the screenshots and test results.

Submission (Lab Task 4)

Students will use the MS Word Template then must upload a PDF report including:

- Screenshots of key steps (dataset, training, testing).
- Observations and test results.
- Reflection answers.

Official Documentation and Tutorials

Teachable Machine Website

- <https://teachablemachine.withgoogle.com/>
- The official platform for creating and training models. It includes step-by-step guides.

Google Blog on Teachable Machine

- [Introducing Teachable Machine](#)
- An overview of the tool and its inspiration.

Google Developers - TensorFlow.js Integration

- [TensorFlow.js and Teachable Machine](#)
- Explains how to integrate exported models into applications using TensorFlow.js.

References



Books and Articles

1. Machine Learning for Beginners

1. Book: "*Machine Learning: An Absolute Beginner's Guide*" by Oliver Theobald.
2. Simplifies AI concepts that relate to tools like Teachable Machine.

2. Online Articles

1. "What is Supervised Learning?"
2. "The Importance of Good Data in Machine Learning"

Ethics and AI Responsibility

1. Google AI Principles

1. Google's AI Principles
2. Focus on ethical considerations in AI development.

2. Articles on Bias in Machine Learning

- "Preventing Bias in AI"

For Further Exploration

• Kaggle Datasets

- [Kaggle.com](https://www.kaggle.com/)
- Explore datasets to learn about data diversity and quality.

• TensorFlow Hub

- <https://www.tensorflow.org/hub>
- Ready-to-use machine learning models for advanced exploration.

References