No Code ML/AI Tutorial

Evelyn J. Boettcher

20231231

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1 Discover Computer Science: Teachable Machine Workshop

A No / Low Code workshop where students will learn about machine learning (ML) and **build** their own ML application.

- Training the AI/ML model is a NO code exercise.
- Creating a working web application is a *low* code exercise.
  - Students will modify a working application for their needs.

1.1 Targeted Grades

4th through 12th

This mainly targets to middle school to elementary. But there is no age limit on this workshop.

1.2 Slide Deck.

Slide Deck

1.3 Duration

60-90 minutes

1.4 Outcomes / Learning Objectives

- Students will learn about classification
- How classifications is used in Machine learning (ML)
- How to create their own ml algorithm
- Create their own application
- Be introduced to computer science.

1.4.1 Students will:

- Explain that machine learning is when computers detect patterns
- Make their own rules (a model) for describing those patterns
- Train a machine learning model using Teachable Machine
- Use conditional statements

1.5 Prep

Item	Qty
Monkey Carts Printed	1 set per group
laptop with web camera	1 per group
Internet	
Pen and Paper	1 per student

2 Lesson

Outline:

- Classes and Models (No computers, Need monkey cards)
- Finished Application Demo
- Walk through Teachable Machines
- Student build their own application (two class AI model)
- (stretch) Students build three class application
- (stretch) Students build a nicer application

2.1 Opening (15 min)

HOOK
Show finished Application Demo

Ask: How does that work?

Walk through what a class is.

Give students a set of the **green** monkey cards (from AI Unplugged). Have teams divide their chart paper into 2 classes: Biting and Non Biting.

Training data (blue paper):

- biting: 1, 2, 3, 4
- non- biting: 5-20 Have them decide which characteristics are for biting monkeys. This is done as a group.

Then show them the test data (green paper) and see how well their model did.

Test data (green paper)

- Biting: 22, 23, 24
- Non-biting: 21, 25 - 40

AI Unplugged has more example in this paper

2.2 ML Explained (2.5 min)

Overview Video on Machine Learning (~ 2 minutes)

YouTube (very simple explanation)

2.3 Train Model (10 min)

Train Model with Teachable Machines.

- Demo how to train a model on Teachable Machine
- Give students 6-7 minutes to train their own.
  - Have students go to Teachable Machine
  - Click *Get Started* and start an image classification
  - Let students create two class classification for any school acceptable hand jester.
    - Keep the images simple
    - name your classes something descriptive: Cat / Dog
    - Ask how you could account for differences: skin color, jewelry, nail color.

2.4 Run Models (10min)

- Download model.
  - Show students how to copy their model to a folder (static) in student_application_start,
  - Update the URL in the `my_model.js` (line 5)
- (stretch) Show students how to add an image to the first "if" condition. (on line 64) (hint: look at the `application_demo` folder)
  - Use Wikipedia images search for emojis
- (stretch) Ask how the Javascript syntax is different than the Python Syntax

2.5 Closing

- Have each group Demo their application
- Student Reflection:
  - How could you use ML application in your school, home, car?
  - What would you have to consider when training a model?
- Celebrate: You created a working ML models!
- Follow-up Resources:
  - AI Unplugged
  - AI for ALl summer programs
  - The Code Train
  - Google Tutorial

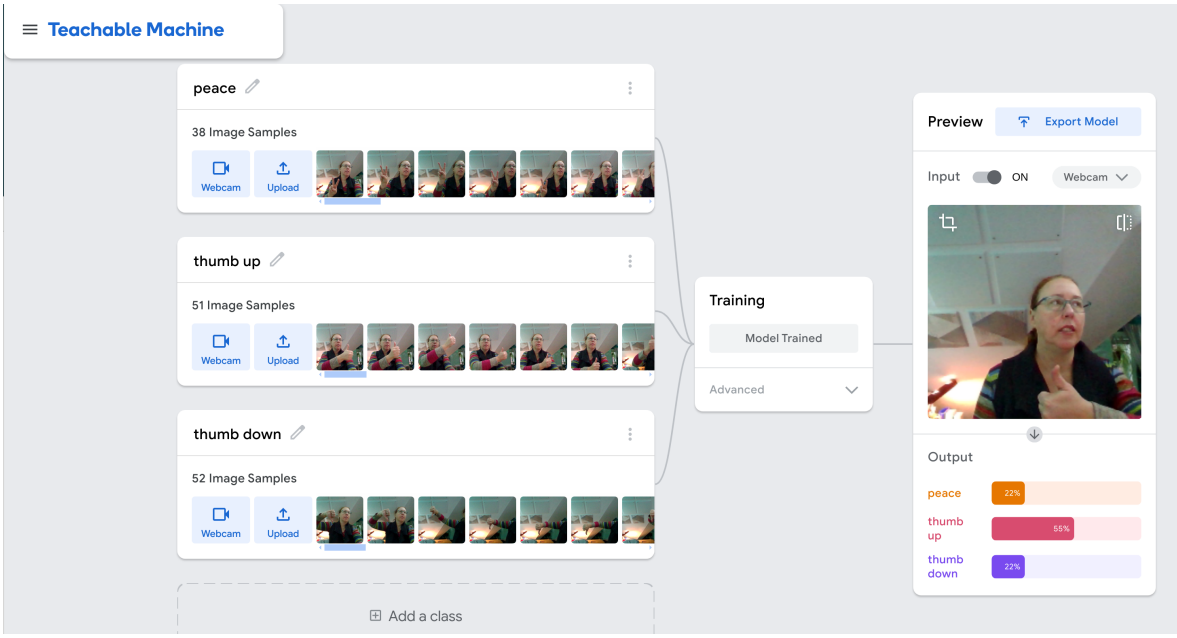
Figure 1: WTM

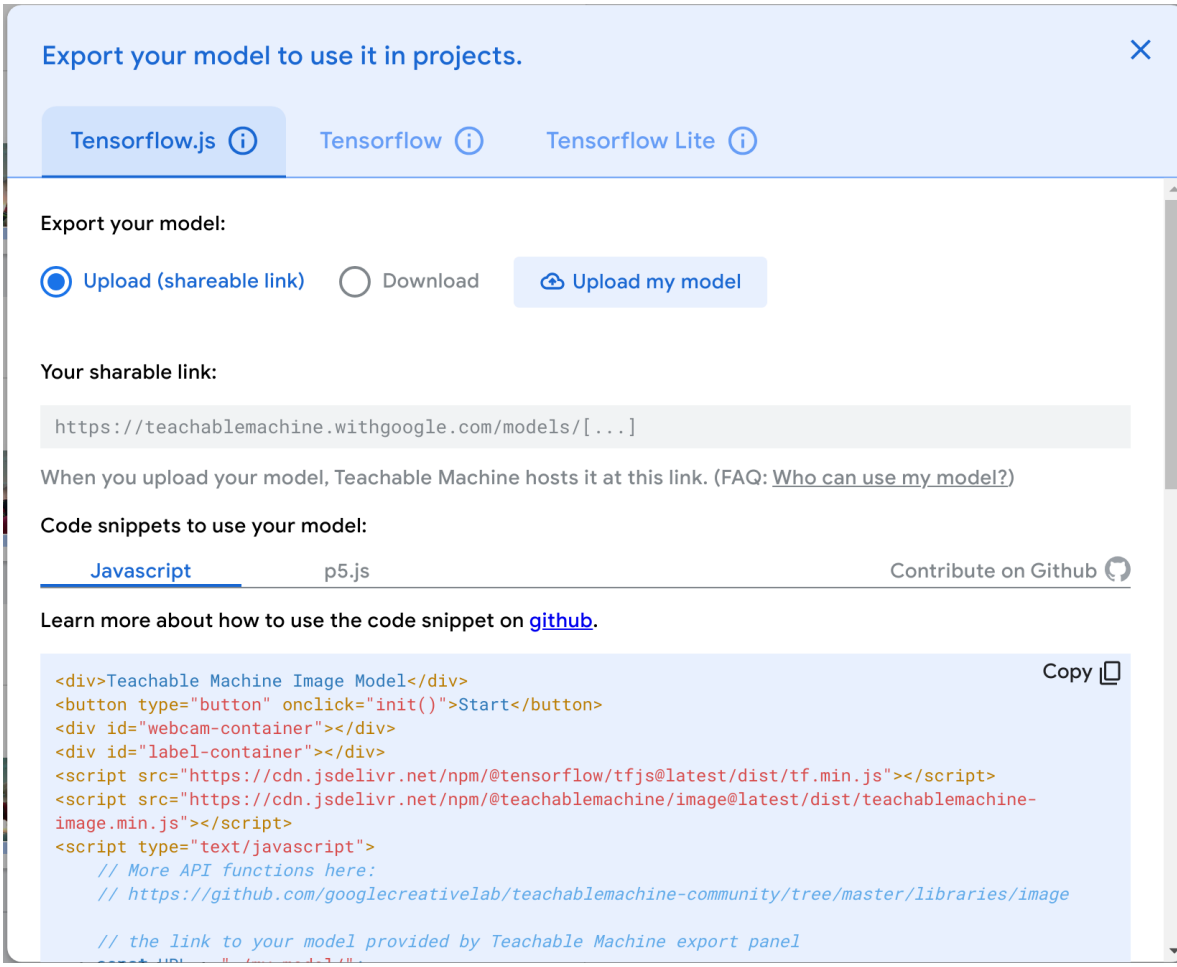
Evelyn J. Boettcher's tutorial based on a Google Women Techmakers educational tutorial on how to make an image classifier application with No/Low Code.

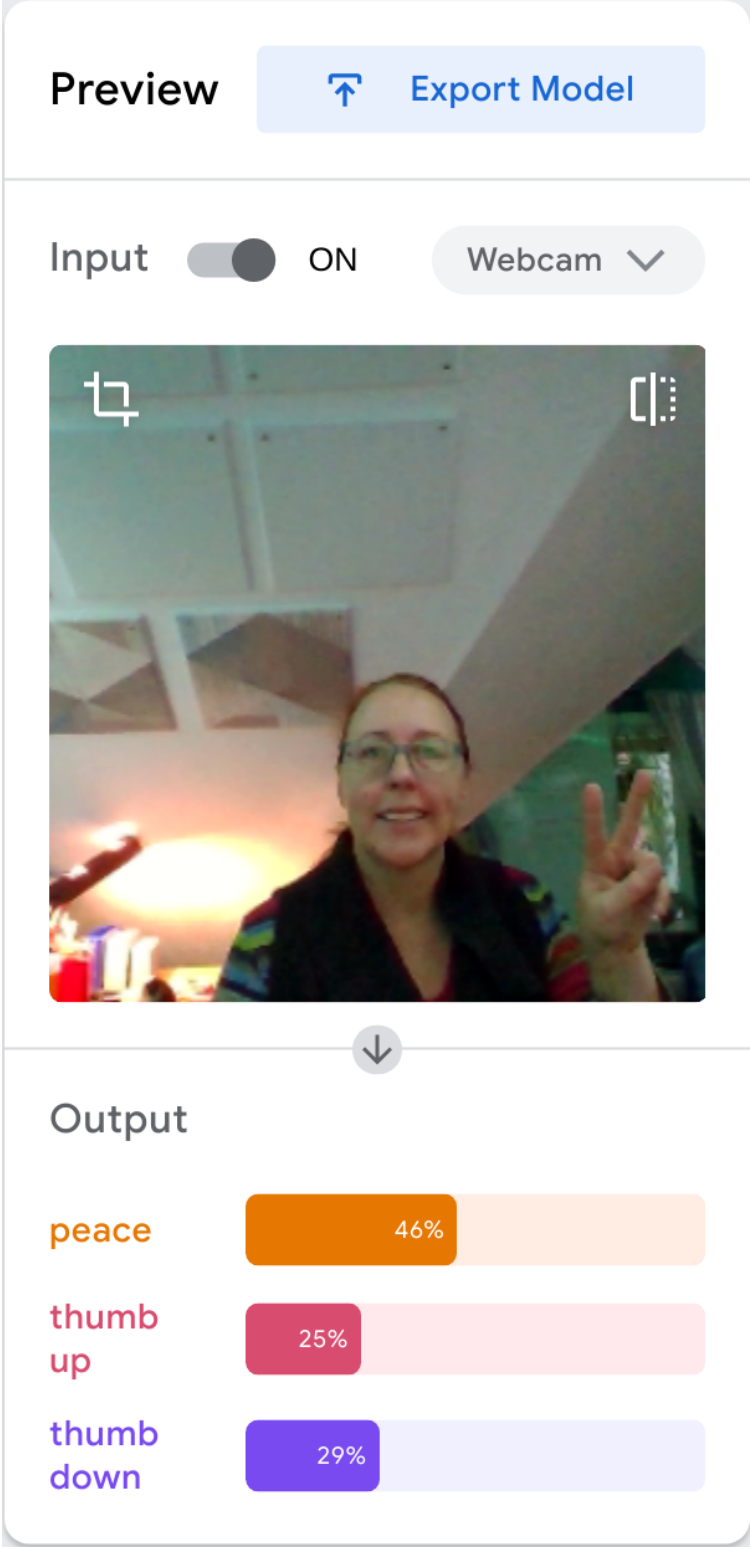
This tutorial is designed to encourage kids to go into Computer Science by gently introducing them to AI and Machine learning. No Coding or ML experience needed.

Please bring a laptop. The goal of this tutorial is to walk you through the ML/AI concepts and build your own application that can recognize hand gestures, cat etc from a web camera.

This is a step-by-step guide to build an ML image application

Subject	Image
Train a model	

Subject	Image
Export Model	

Subject	Image
Integrate Model	

Subject	Image