

# Custom Template

python 101

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No one, I have no authority:  
Classified on 2024-09-08:

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## Week 3 Lesson 1: Linear Regression

### Problem 1

- Explain what np.polynomial does in this script. \*\* And what are my options besides Polynomial

```
import numpy as np
import pandas as pd

df = pd.read_csv('../data/co2_weekly_mlo.txt', skiprows=49,
                 names=['yr', 'mon', 'day', 'decimal', 'ppm', ' #days', '1 yr ago', '10 yr ago'],
                 delim_whitespace=True)

clean_df = df[df.ppm != -999.99]
pp = np.polynomial.Polynomial(np.polyfit(clean_df.decimal, clean_df.ppm, 1))
plt.scatter(clean_df.decimal, clean_df.ppm)
plt.plot(clean_df.decimal, pp(clean_df.decimal), color='red')
plt.show()
```

## 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.

### Targeted Grades

4th through 12th

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

## Slide Deck.

[Slide Deck](#)

## Duration

60-90 minutes

## 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.

## 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

## Prep

Item	Qty
<a href="#">Monkey Carts Printed</a>	1 set per group
laptop with web camera	1 per group
Internet	
Pen and Paper	1 per student

## 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

## 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](#)

## ML Explained (2.5 min)

Overview Video on Machine Learning (~ 2 minutes)

[YouTube](#) (very simple explanation)

## 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.

## 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

## 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](#)