Custom Template

python 101

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No one, I have no authority*:*
Classified on 2022-09-08*:*

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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

```python
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 ag
                 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
[Monkey Carts Printed](#)	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