

Ethical Coding with AI-Making Student Projects More Inclusive

Presented by: Tarquinn Curry

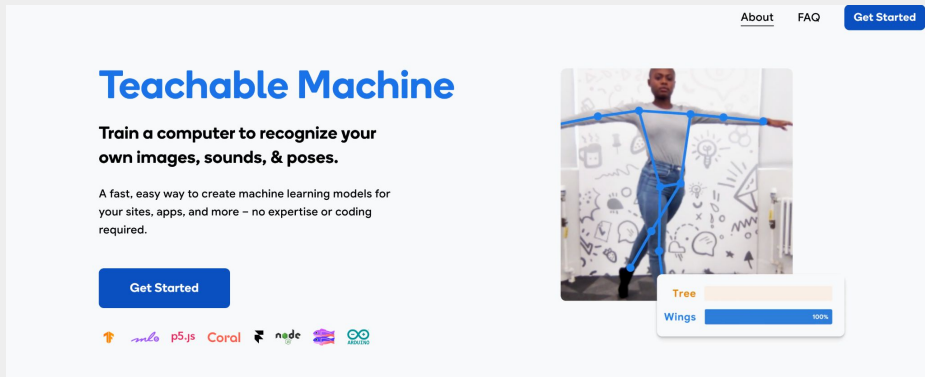
- Middle School CS & Robotics Teacher
Jefferson Leadership Academies-Long Beach, CA
- CSTA 2025



Can AI Be Biased?

<https://teachablemachine.withgoogle.com/train>

- What if a model is 90% accurate... but only for one type of person?
- Live demo coming up!



The screenshot shows the Teachable Machine website. At the top right are links for 'About', 'FAQ', and a blue 'Get Started' button. The main heading is 'Teachable Machine' in blue. Below it, the text reads: 'Train a computer to recognize your own images, sounds, & poses.' and 'A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.' A blue 'Get Started' button is positioned below this text. At the bottom left, there is a row of logos for various integrations: TensorFlow.js, p5.js, Coral, Node.js, and others. On the right side, there is a video player showing a person with a blue skeleton overlay. Below the video, there is a progress bar for 'Tree' (0%) and 'Wings' (100%).

Using Teachable Machine in Your Classroom

🚶 BEGINNER CODING – Scratch / Block Coding

🧩 Project 1: Control Sprites with Gestures

- **How:** Train a model with webcam images (e.g., hand up, hand down, two hands)
- **Use With:** Scratch + WebSockets or Scratch extensions
- **Goal:** Create gesture-controlled animations or games
- **CS Concepts:** Inputs, conditionals, event-driven programming



Project 2: AI Character Reactions

- **How:** Train expressions (e.g., happy, sad, neutral)
- **Use With:** Make characters respond to player's mood
- **Goal:** Teach human-computer interaction
- **Ethics Angle:** Does it recognize emotions equally across all students?



INTERMEDIATE CODING – HTML / JavaScript

Project 3: Interactive Websites with Real-Time Classification

- **How:** Export the Teachable model, use in HTML with TensorFlow.js
- **Goal:** Display messages or images based on user gestures
- **Code Skills:** DOM manipulation, event listeners, conditional logic
- **Lesson Example:** A website that changes background color based on pose

Project 4: Mental Health App Mockup

- **How:** Use facial expressions to simulate mood detection
- **Code Goal:** Trigger wellness tips or calming music
- **CS Ethics Add-on:** “Should AI detect emotions at school?”



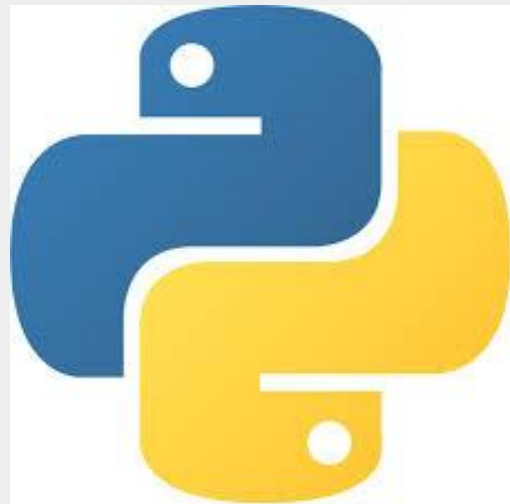
ADVANCED CODING – Python / AI / Machine Learning

Project 5: Compare Pre-trained Model vs Teachable Machine

- **Goal:** Train a model using Teachable Machine, then compare it to a scikit-learn or PyTorch model
- **Focus:** Accuracy, bias, and interpretability
- **Lesson Tie-in:** ML pipelines and fairness auditing (using Fairlearn or AIF360)

Project 6: Student Dataset Analysis

- **How:** Export labeled data from Teachable Machine
- **Use With:** Pandas, Matplotlib, or Seaborn to analyze balance and performance
- **Goal:** Teach data wrangling and model critique
- **Bonus:** Run the model inside Jupyter/Colab with TensorFlow



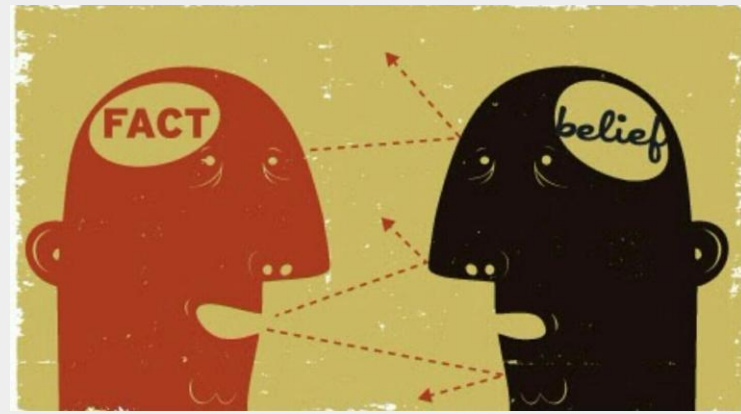
Why It Matters

- AI is everywhere
- Bias can cause real harm
- Teach fairness + function
- Help students uncover assumptions

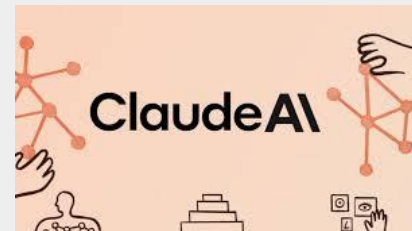


What Counts as Bias?

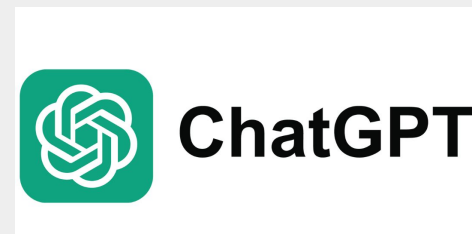
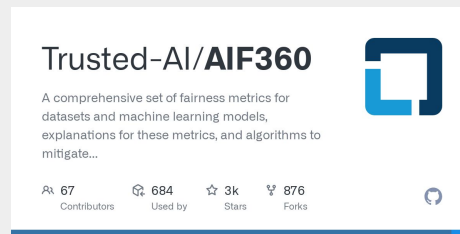
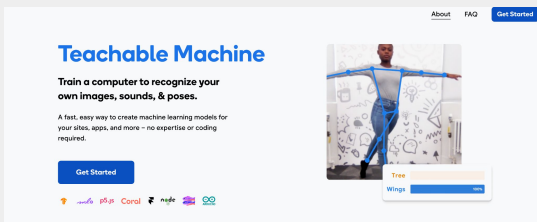
- Bias = Unequal outcomes
- Protected Attribute = fairness group (like age, gender, race)
- Disparate Impact = one group gets worse results
- "Bias reflects social values"



Free Tools You Can Use Tomorrow







- Teachable Machine (visual bias demos)
- AIF360 (measures group fairness)
- Fairlearn (visual fairness dashboards)
- ChatGPT, Claude, Google AI Studio (LLMs to check for bias)



Use Cases: Fairlearn



Title: Using Fairlearn to Detect Bias in Student Code

- 1.  **Collect Data** (Student scores, demographics, genres, etc.)
 2.  **Train a Model** (Python model predicts something like scholarship eligibility or film ratings)
 3.  **Analyze with Fairlearn** (Use `MetricFrame` to compare fairness across groups)
 4.  **Redesign if Needed** (Discuss improvements with students)

Interactive Python Notebook

If you're looking to get your own `.ipynb` file to practice or use with students, there are a few easy ways to do it:

1. Google Colab:

Go to <https://colab.research.google.com>, click **File** → **New Notebook**. That automatically gives you a blank `.ipynb` file in the browser that you can start editing right away.

2. GitHub:

You can search GitHub for educational `.ipynb` notebooks—there are thousands available. Just type in keywords like “Python fairness notebook” or “student AI activity” and look for `.ipynb` files. You can open them directly in Colab using the **GitHub tab** on the Colab home page.

3. AI Tools like ChatGPT or Claude:

You can ask them to generate code or an entire `.ipynb` file for you. For example:
“Create a fairness-checking notebook in Python using scikit-learn and Fairlearn.”

4. AI/ML Learning Platforms:

Sites like [Kaggle.com](https://www.kaggle.com), Google AI Hub, or [Microsoft Learn](https://microsoft.com/learn) often share free `.ipynb` files as part of their tutorials.”

How to use Fairlearn

Going to <https://colab.research.google.com>


Clicking **File** → **Upload notebook**

Selecting the file you just downloaded



Step 1: Setup the Tools

Install Fairlearn and load the Python libraries.

Copy this code into the first cell and press 

python
CopyEdit

```
!pip install fairlearn

import pandas as pd

import numpy as np

from sklearn.linear_model import LogisticRegression

from sklearn.model_selection import train_test_split

from sklearn.metrics import accuracy_score

from fairlearn.metrics import MetricFrame, selection_rate
```



Step 2: Create Sample Data

Build a simple dataset of 10 students.

Add a new code cell and paste:

python

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```
data = pd.DataFrame({  
    'score': [88, 75, 60, 92, 55, 73, 68, 80, 59, 77],  
    'gender': ['F', 'M', 'M', 'F', 'F', 'M', 'F', 'M', 'F', 'M'],  
    'race': ['Black', 'White', 'Latino', 'Asian', 'White', 'Black', 'Asian', 'Latino', 'White', 'Black'],  
    'gets_scholarship': [1, 1, 0, 1, 0, 1, 0, 1, 0, 1]  
})  
  
data.head()
```



Step 3: Train the Model

Use test scores to predict who gets a scholarship.

Paste this in a new cell:

python

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```
X = data[['score']]
```

```
y = data['gets_scholarship']
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, random_state=0)
```

```
model = LogisticRegression().fit(X_train, y_train)
```

```
predictions = model.predict(X_test)
```



Step 4: Check for Gender Bias

use Fairlearn to check accuracy by gender.

Paste in a new cell:

python

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```
mf = MetricFrame(metrics=accuracy_score,  
                  y_true=y_test,  
                  y_pred=predictions,  
                  sensitive_features=data.loc[y_test.index]['gender'])  
  
print("Overall Accuracy:", accuracy_score(y_test, predictions))  
print("Accuracy by Gender:\n", mf.by_group)
```


Use LLMs to Audit Fairness & Ethics

ChatGPT, Claude AI, Google AI Studio



ChatGPT

- These models can act as fairness reviewers for student projects
- Use them to simulate edge cases and diverse outcomes
- Prompt them to identify bias, exclusion, or gaps in logic



ClaudeAI



Google AI Studio

Sample Prompts for Fairness Checks

P R O M P T

Prompt Examples:

- “Does this algorithm produce fair outcomes across gender and race?”
- “Which groups might be negatively impacted by this model?”
- “What are three ethical concerns someone might raise about this code?”
- “Rewrite this function so it avoids bias toward one group.”

Privacy Reminder:

- Do not use real student data.
- Replace it with **anonymized or fictional examples.**
- Add to your rubric: *“All prompts to AI must use test or anonymized data.”*



Live Demonstration – AI Fairness Check Using ChatGPT

Demo Steps:

1. Go to ChatGPT, Claude, or Google AI Studio.
2. Use this sample prompt with fictional code:
“Please check this Python function for ethical fairness. Does it favor or exclude any groups? Suggest improvements.”



Student Safety Tip:

- Never upload school data. Use AI tools as idea starters, not gatekeepers.

Step 1: Ask ChatGPT or Claude to Create Fictional Biased Code

Use a prompt like:

“Write a simple Python function that decides whether a student should get a scholarship based on their test score and gender. Make it subtly biased toward one gender.”

This might produce code like:

python
CopyEdit

```
def scholarship_eligible(score, gender):  
    if gender == 'male':  
        return score >= 70  
    else:  
        return score >= 85
```

Then, you follow up with:

“Check this function for ethical fairness. Does it favor or exclude any groups? Suggest improvements.”

Let the model point out the issue and offer a fix.

Rubric – Grading Fairness in Student Code

Category	Excellent (4 pts)	Good (3 pts)	Needs Work (2 pts)	Unfair (1 pt)
Identifies Bias	Clearly identifies and explains possible bias in the code	Identifies one possible bias	Vague or unclear mention of bias	No awareness of bias present
Considers Impact	Describes who may be helped or harmed by the code	Notes one group that could be affected	Only considers the “average” user	No consideration of impact
Improves Fairness	Actively revises code to improve fairness for all users	Makes some effort to revise unfair logic	Minor or unclear revisions	Code remains biased or exclusive
Uses Ethical Language	Uses respectful, inclusive terms throughout code and comments	Mostly respectful and inclusive	Some outdated or careless terms used	Language is biased, exclusive, or offensive
Tested for Equity	Uses tools (e.g., AI, checklists, peer review) to test fairness	Mentions at least one fairness tool or test used	No formal testing, but some thought about it	No testing or consideration given

🧠 Ethical Coding Is the Future

Students must learn *how* to code—and *why* their code matters. Bias isn't a bug. It's a choice.

🤖 AI Will Touch Every Career

From healthcare to hiring to housing.

Students trained in fairness will shape these systems responsibly.

⚖️ Bias Awareness = Real-World Power

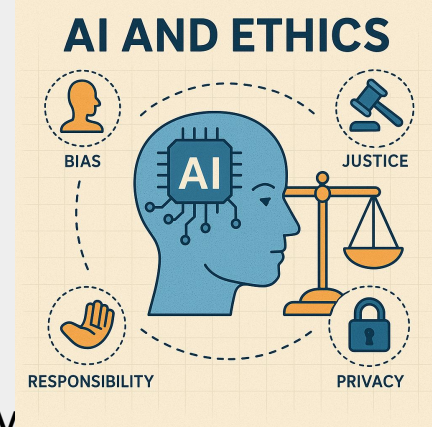
Recognizing bias helps students question systems, speak up, and build inclusive tools.

💼 It's a Job Skill Now

Tech companies are hiring people with *responsible AI* knowledge. Fairness is a career asset.

🚀 They're Not Just Users... They're Builders

Today's students will build the AI of tomorrow. Let's make sure they do it *ethically*.



Check me out Online



Let's Talk!

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