

Graffiti Vision: Engineering AI to See Street Art

Teacher: Tchnavia Merrick	Date: 8-1-25
Class Type: Engineering Lesson	Grade: 9th
Time Frame: 2 Class Periods	

Lesson Overview

Unit/ Overarching Focus of Lesson: Technology as a Lens: Mapping Culture through AI

The focus of this lesson is to help students understand how engineers train AI models to recognize and solve real-world problems. Building on their year-long study of AI, students will apply their knowledge by training a YOLO v11 model to identify and classify different types of graffiti. Through this process, students will explore how datasets are created, how models learn to detect patterns, and the challenges engineers face in ensuring accuracy and fairness in AI systems. By testing their trained model on graffiti images, students will evaluate whether AI can accurately classify street art and reflect on the limitations and possibilities of using AI in complex, creative contexts.

Objectives/Aims: Students will demonstrate understanding/learning around the following Big Ideas:

- Students will learn how engineers use labeled data to train models like YOLO v11 to detect and classify real-world images.
- Students will explore how AI identifies patterns in data (graffiti styles) and applies rules to classify images into categories.
- Students will evaluate the accuracy of their model, considering why AI might misclassify graffiti and how dataset quality impacts results.
- Students will investigate how AI can be applied to solve community-based or real-world problems, such as identifying or categorizing graffiti.

Aligned Standards

[\(New York State Standards\):](#)

- **HS-ETS1-4** – Use a computer simulation to model the impact of a proposed solution to a complex real-world problem.

[\(Next Gen Science Standards\):](#)

HS-ETS1-1 - Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions

[\(Common Core State Standards\):](#)

CCSS.MATH.CONTENT.HSS.ID.B.6: Analyzing relationships between variables

Key Vocabulary and Concepts:

- **Artificial Intelligence (AI)** – Technology that simulates human thinking or behavior.
- **Machine Learning (ML)** – A type of AI where computers learn from data to make predictions.
- **Model (AI Model)** – A program trained to recognize patterns or make decisions from data.
- **Inference** – When an AI model makes a prediction based on new, unseen data.
- **Algorithm** – A set of rules or steps a computer follows to solve a problem.
- **Accuracy** – A measure of how well an AI model predicts correctly.
- **Neural Network** – A model inspired by how the brain works, often used in image classification.

Materials & Resources:

- Laptop/desktop computers
- Preloaded dataset of graffiti images
- Google Collab
- Camera (to take graffiti photos)

Safety Practices:

- Be mindful of taking photos of people when taking photos of the murals.
- Some graffiti is not found in safe areas so all students need to stay with their buddy and in sight of their teacher.

Preparation for Teaching Diverse Students:

- To prepare for teaching this lesson to diverse students, I will provide multiple entry points and scaffolds so that all learners can access the content. Step-by-step coding guides with visuals, annotated screenshots, and sentence starters will support English Language Learners and students who benefit from structured directions, while visual demonstrations of graffiti images and AI outputs will reinforce concepts for visual and neurodiverse learners. By framing graffiti as both art and cultural expression, students will be able to connect their own experiences and perspectives to the lesson, ensuring relevance and engagement. Collaborative group roles such as coder, data labeler, presenter, or note-taker will allow each student to contribute based on their strengths, while flexible assessments, including oral presentations, written reflections, or posters will give students choice in how they demonstrate understanding. Preloaded technology and alternative activities, such as analyzing pre-trained model outputs, will ensure that all students can participate meaningfully regardless of their technical skill level.

Cultural context within which the lesson will be grounded, and specific ideas/practices to be included in the lesson:

- This lesson is built around the idea that graffiti is more than just art—it's a way people and communities express themselves. Graffiti can tell stories, share messages, and reflect the history or culture of a neighborhood. By

connecting our AI work to this real-world context, students can see how technology can help us understand and interact with the world around us. Training a model to identify different types of graffiti becomes not just a coding exercise, but a way to explore culture, creativity, and community.

- In the lesson, students will look at graffiti from different places and communities to see the variety of styles and messages it carries. We'll have discussions about what graffiti communicates, why people create it, and how it's viewed by different audiences. Students will also be encouraged to share their own experiences with street art and what it means to them. The images used to train the AI model will include graffiti from many different backgrounds, helping the model recognize a wide range of styles and avoid bias. We'll also talk about ethical questions, like who owns the art and what it means to use AI to categorize it.
- By grounding the lesson in culture and including these practices, students not only learn how to train an AI model but also gain a deeper understanding of the people, communities, and stories behind the graffiti. It helps students see technology as a tool to explore the world, think critically, and connect with the culture around them, rather than just something abstract on a screen.

Prior Knowledge:

- Basic understanding of AI and machine learning – knowing that AI models learn from data and use patterns to make predictions.
- Experience with labeling data – practice classifying images or sorting examples into categories so they're familiar with the idea of training data.
- Collaboration & critical thinking skills – practice working in teams and questioning the accuracy or fairness of results.

Prior Lesson:

Before doing the graffiti project, students will take part in a mini design challenge to see how AI connects directly to the engineering design process. In this challenge, students will be introduced to a real-world problem such as designing a community garden and asked to use AI as a tool to brainstorm solutions. Working in groups, they will write their first AI prompt, test the output, and then evaluate how useful the response is. Just like engineers test and refine prototypes, students will go through cycles of redesign by adjusting and improving their prompts to get better results. At the end, groups will share both their original and improved prompts, along with what they learned about how iteration and precision lead to stronger outcomes. This activity helps students see that prompting is not just about asking a question, it's about engineering better inputs to create more effective outputs, setting the stage for using AI in more complex projects like the graffiti model.

Followup Lesson:

After students train and test their graffiti AI model, students will step into the role of the AI themselves to better understand how neural networks work. The lesson will begin with students classifying different items such as shapes, colors, or even classmates' without being given clear rules, only a set of examples. Each student could represent a "node" in a neural network, where one group of students looks only at color, another group at shape, and another at texture. Together, they would pass their "yes/no" or "probability" responses along, showing how layers of a network contribute to a final decision. I will then show students neural networks using strawberries and blueberries like learned in class. Students will then reflect on why the AI made certain mistakes and compare them to their own decision-making process as human classifiers. This will help make neural networks less abstract by grounding them in student

**Students will have been introduced to AI and using AI from the beginning of the semester before this lesson.

experiences, helping them see both the power and the limits of AI classification.