

Digital AI Studio – Teacher PD Workshop Module

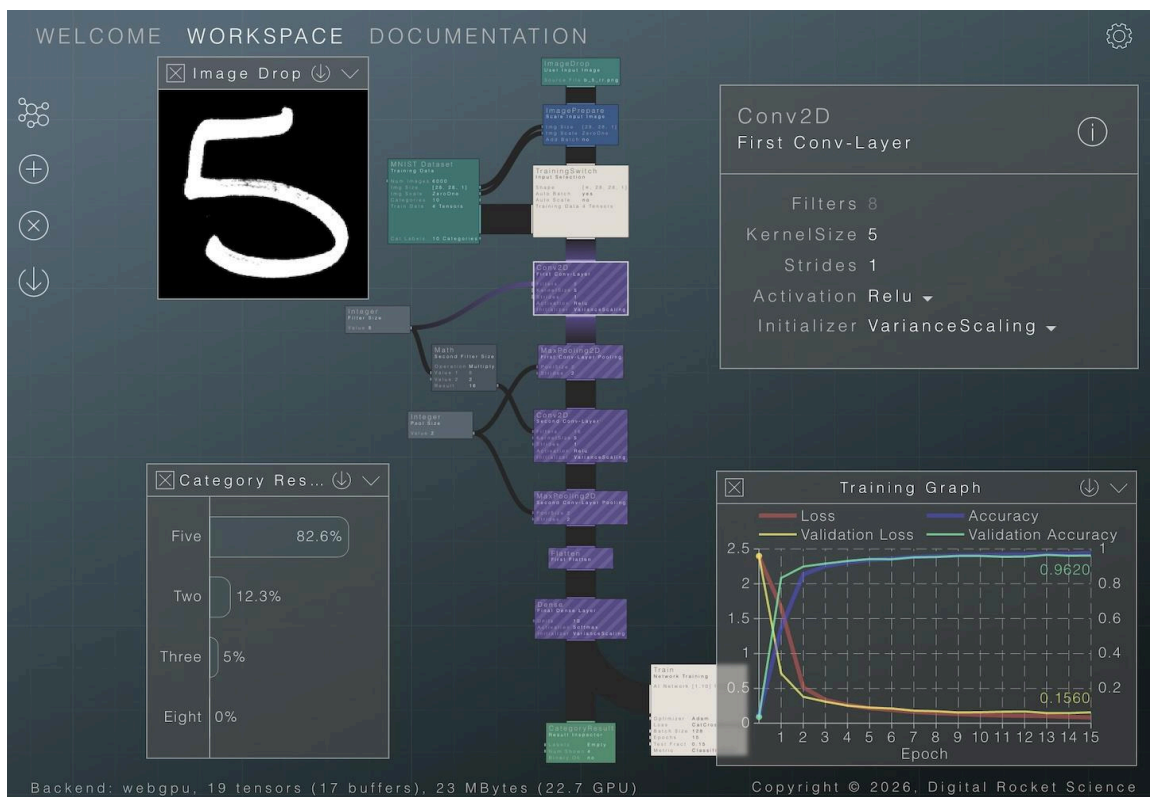
Visually Explore and Train a Digit Classifier

Overview

This professional development workshop introduces educators to core artificial intelligence (AI) concepts through a hands-on, visual, and interactive approach. Using Digital AI Studio, a browser-based platform, participants explore and train a neural network model that recognizes handwritten digits (0–9).

Rather than writing code, educators interact directly with a visual model representation, allowing them to see how data flows through the network, how training improves predictions, and how AI systems learn from examples.

This module is designed to make AI concepts accessible and classroom-ready, and can be used both for teacher professional development and as a classroom activity for students.



A Visual AI Model Representation within the Digital AI Studio's Workspace

Learning Goals

By the end of this session, participants will:

- Understand the basic structure of an AI model (inputs, layers, outputs)
- See how image data is processed and transformed within a neural network
- Observe how training improves model predictions over time
- Gain confidence introducing AI concepts in the classroom without requiring programming
- Experience a visual, interactive tool for teaching AI concepts in an accessible way

Workshop Format (60–90 Minutes)

1. Introduction to AI Concepts (10–15 min)

- What is an AI model?
- Inputs, outputs, and learning from data
- The challenge of “black-box” AI

2. Guided Model Exploration (15–20 min)

- Open a pre-built digit classification model in Digital AI Studio (no setup required)
- Visually trace how an image flows through the model
- Identify key components: input, layers, and output

3. Hands-On Model Training (20–30 min)

- Train the model directly in the browser
- Observe how predictions improve over time
- Interactively adjust settings and immediately see results

4. Interactive Testing and Exploration (10–15 min)

- Input or draw sample digit images and view predictions
- Explore how the model responds to different inputs
- Discuss what the model has learned

5. Reflection and Classroom Connection (10–15 min)

- How could this activity be used with students?
- What concepts does this make easier to teach?
- Q&A and discussion

Example Activity: Digit Recognition with MNIST

In this activity, participants work with a pre-built neural network trained on handwritten digit images.

They will:

- Load a working model instantly (no installation or setup required)
- Train the model and observe learning in real time
- Input images of handwritten digits and view predictions
- Visually follow how data moves through the model

This activity provides an intuitive introduction to AI by connecting familiar visual inputs (digits) to model predictions, all within an interactive, code-free environment.

Try the demo (no login required):

<https://www.digitalai.studio/demo/mnist>

Watch a 2-minute overview:

<https://youtu.be/EZQwTKOt7ok>



Handwritten digits alongside their trained model predictions.

Bringing This Into the Classroom

While this module is designed for teacher professional development, the same activity can also be adapted into a ready-to-use classroom lesson.

Classroom Lesson: Single-Class Version

This version is intended as a teacher-ready classroom lesson that can be used with students in a single 45–60 minute class period.

Objective

Introduce students to how AI models learn from data through direct interaction with a working model.

Activity Flow

1. Introduce the Problem (5–10 minutes)

- What is an AI model?
- How can a computer recognize handwritten digits?
- Brief discussion of inputs and outputs

2. Explore a Working Model (10–15 minutes)

- Load the pre-built digit classification model (no setup required)
- Input sample digit images
- Observe predictions
- Discuss: What is the model doing?

3. Train and Observe Learning (10–15 minutes)

- Run training directly in the browser
- Observe how predictions improve
- Watch how accuracy changes over time

4. Test New Inputs (10–15 minutes)

- Draw or input new digit images
- Try unusual or messy inputs
- Observe model behavior

5. Reflect on What Changed (5–10 minutes)

- What changed after training?

- Why does the model sometimes make mistakes?
- What do you think the model is “learning”?

Key Takeaways for Students

- AI models learn from data
- Predictions improve through training
- Models can make mistakes and are influenced by inputs
- AI systems are built from understandable components

Teacher Notes

- Best suited for introductory high school computer science, AI, or STEM exploration classes
- No prior programming experience required
- No installation or setup required (runs in browser)
- Can be used as a standalone lesson or as part of a larger unit

What Makes This Approach Effective

- **No Programming Required**
Fully visual and interactive — teachers and students engage directly with models without writing code
- **No Setup Required**
Runs entirely in the browser — ideal for school environments and Chromebooks
- **Visual and Intuitive**
AI models are represented as interactive node graphs, making abstract concepts tangible
- **Immediate Feedback**
Users can train models and see results instantly
- **Designed for Understanding**
Focuses on how AI works, not just how to use it
- **Classroom-Ready**
Activities can be used directly with students with minimal preparation

Alignment with AI & Computer Science Education Goals

This module supports emerging goals in AI and computer science education, including:

- Introducing foundational AI concepts in an accessible, student-friendly way
- Promoting conceptual understanding over tool usage alone
- Supporting inquiry-based and exploratory learning
- Helping students understand how data influences model behavior
- Providing interactive experiences aligned with modern computational thinking practices

The visual, model-based approach aligns well with CSTA's emphasis on understanding computing systems, data, and the impact of computing, while lowering barriers to entry for both teachers and students.

Extending the Learning (Optional Next Module)

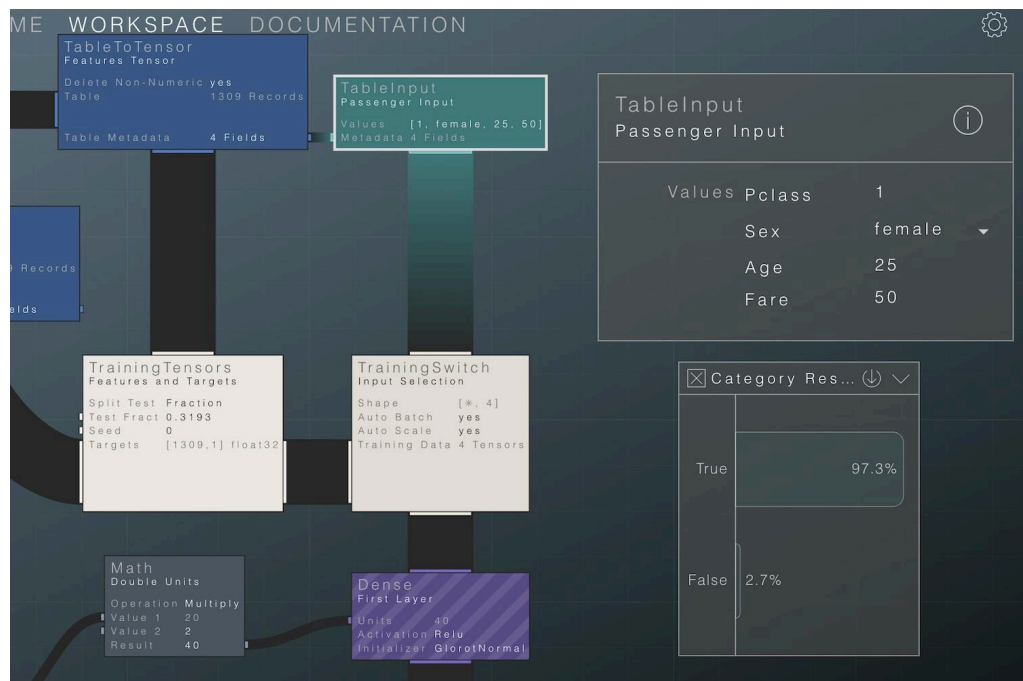
After this introductory experience, educators can extend into more real-world datasets and applications.

For example:

- **Passenger Survival Prediction (Titanic Dataset)**

Explore how AI models work with structured, table-based data to understand how features like age, class, and fare influence predictions

This progression allows teachers to move from intuitive, visual examples to more applied data science scenarios.



Titanic table dataset (class, sex, age, fare) flowing into a trained model to predict survival (True or False).

Classroom Applications

This approach can support:

- Introductory AI and machine learning lessons
- Data science and modeling activities
- STEM exploration modules

- Cross-disciplinary projects involving data and prediction

Because the platform is visual and browser-based, it is well-suited for high school and early college learners and can be adapted for different levels of depth.

About Digital AI Studio

Developed specifically for STEM education, Digital AI Studio is a browser-based platform by Digital Rocket Science. It enables students and educators to build, train, and explore AI models using an interactive, visual interface.

The goal is to make AI accessible, engaging, and understandable, helping learners move from simply using AI tools to understanding how they work.

Next Steps

We're actively looking to collaborate with educators and organizations to bring these kinds of experiences into classrooms.

- Pilot professional development sessions
- Live workshops and demonstrations
- Integration into teacher training programs

To learn more or explore collaboration opportunities:

<https://www.digitalai.studio>

<https://www.digitalrocket.com>

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Create | Train | Understand

Helping students and teachers explore AI from the inside