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Interactive Neural Network Visualizer

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Problem Statement

→ Challenge:

Neural networks are powerful but often seen as “black boxes,” making it hard for learners to understand how they work.

→ Need:

Beginners and educators require an interactive way to experiment with network structure, activation functions, and datasets to see how these choices affect learning and performance.

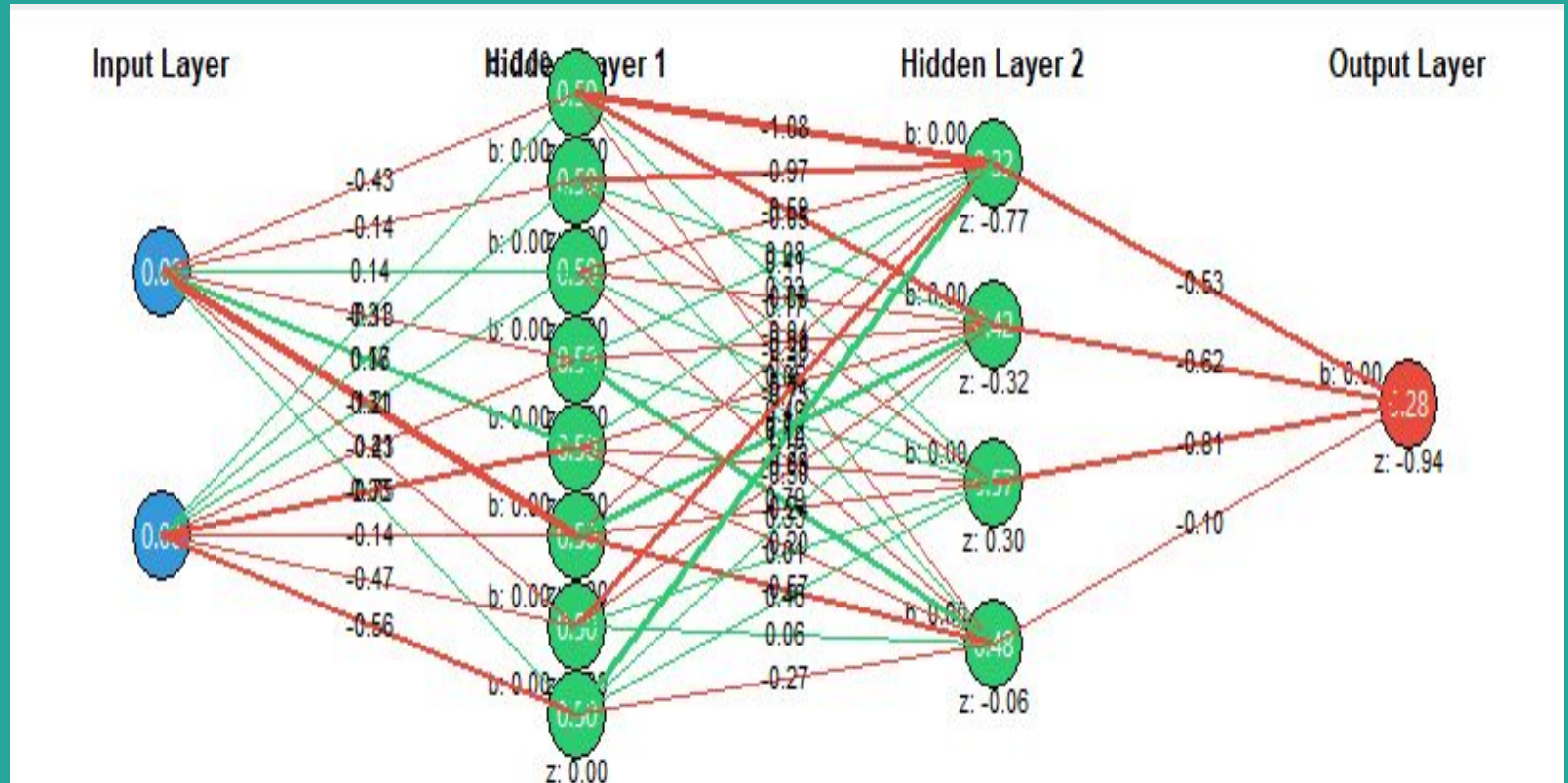
→ Goal:

Create a visual tool where users can:

- ◆ Configure and train multi-layer neural networks on classic and custom datasets.
- ◆ Observe the learning process, weights, activations, and losses in real time.

Network Architecture

- **Configurable Structure:**
 - Input layer size matches dataset features (e.g., 2 for XOR, 4 for Iris).
 - User-defined hidden layers (e.g., 8, 4) and neurons per layer.
 - Output layer adapts to task (e.g., 1 for binary, more for multi-class).
- **Activation Functions:**
 - Selectable per layer: sigmoid, relu, tanh, linear, softmax.
 - Output activation auto-adjusts for loss type (e.g., softmax for CCE).
- **Loss Functions:**
 - RMSE, BCE, or CCE, chosen based on task and output type.
- **Training Parameters:**
 - Adjustable learning rate, animation speed, and dataset selection.



Architecture of a multi-layer neural network (2-8-4-1) with sigmoid activations, visualized during NAND gate learning, showing real-time neuron activations, biases, and color-coded connection weights.

THANK YOU

