Perceptrons Graphing

Eckel, TJHSST AI2, Spring 2024

Background & Explanation

This is a delightful way to better visualize how perceptrons work!

Install the **matplotlib** package if you haven't already. Follow the link on the course website to learn about how to create subplots in a pyplot using matplotlib.

Then, write code that will loop over each 2-bit Boolean function's truth table and:

- Completely train a perceptron as described on the Perceptrons 2 assignment.
- Output an inequality graph on a **domain and range of (-2,2)** to show the results of your training! Your graph should have:
    - A *small* dot every 0.1 units in a grid. **Color each small dot according to whether or not its coordinates return 1 or 0 when passed through your perceptron.** (Note that this means you'll pass non-integer values into your perceptron; as shown on the previous assignments, this should be fine – it's just a linear inequality after all!)
    - A *large* dot at each of the four actual input vectors from the truth table, just like you see in the Desmos graphs on pages 1 and 2 of the Perceptrons 3 assignment. **The large dots should not be colored according to the perceptron output; they should be colored according to the truth table.**
- In other words, what you'll see on each graph is big green dot(s) surrounded by little green dots, and big red dot(s) surrounded by little red dots, *except* for functions #6 and #9, where we should see at least one big dot surrounded by the wrong color!

In all, your code should output 16 separate graphs as 16 subplots in a 4x4 grid on one plot. (ie, a window should appear that contains all 16 graphs simultaneously, sized so I can see them all clearly.)

Specification

Submit your **code** to the link on the course website.

This assignment is **complete** if:

- You follow the instructions on the submission form to format your submission properly.
- Your code matches the specification above. (No command line arguments; it just runs.)