Project: Visualizations for Perceptron

Use this when: Students are learning about the Perceptron algorithm in CSE 151. Students should interact with this tool before (or after) the lecture on perceptrons.

What students will do: Walk through the tutorial of the algorithm, playing with the interactions and filling out the formative quiz questions along the way. There are questions that solidify a student's understanding of dot products and vector addition. Each quiz question will provide elaborative feedback to help students along.

Intended Benefits to Students: By being able to visually break down the steps of the perceptron algorithm, students will have a better intuition for what the perceptron algorithm is doing, and will be able to better grasp the details of the math taught in class, instead of trying to interpret the mathematical language into the algorithm of the linear classifier.

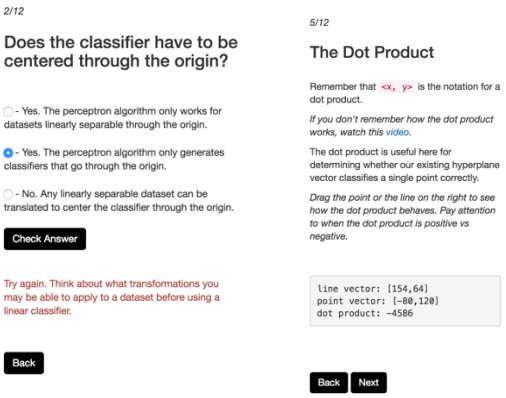
Usage logistics:

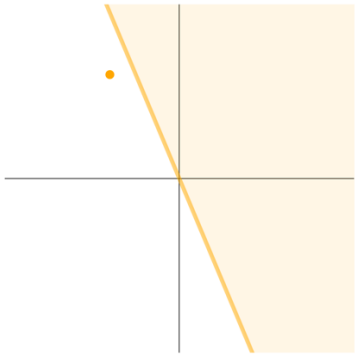
Assign When	Prior to perceptron lecture in class.
Give Points For	No points awarded for supplementary material. This interaction should be used by students who may not intuitively grasp the perceptron.
Approximate Time for Students	20 minutes for online walkthrough.
Follow up by Instructor	Ask students for any follow up questions and points of confusion regarding the tool.
Possible Questions from Students	Q: What is the value of going through the walkthrough and then covering the same material in class? A: The walkthrough allows you to become familiar with the operations that the perceptron uses to classify a dataset, which will prepare you to understand the math that gets covered in class.

Overview of materials:

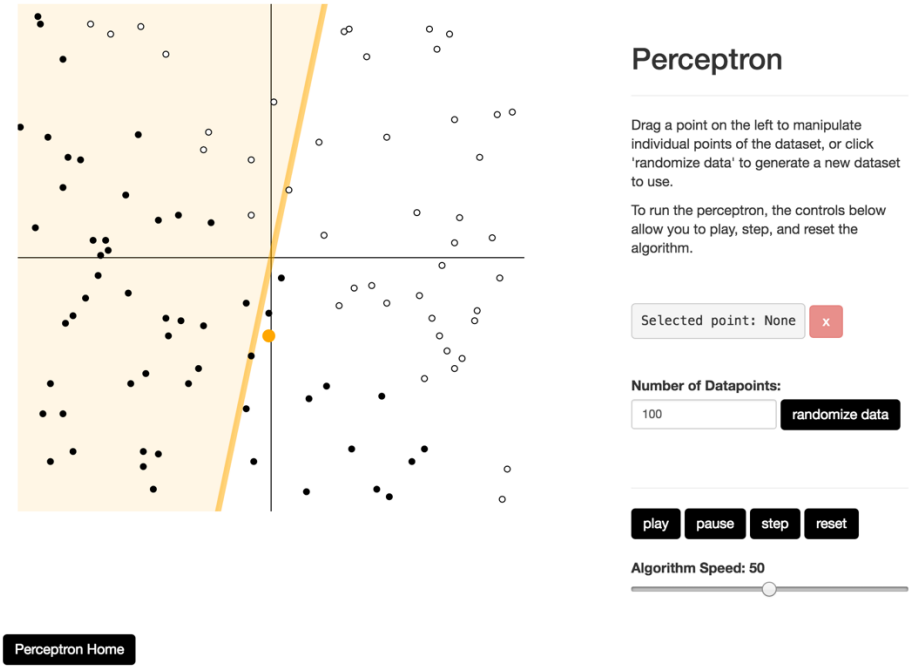
There are two main sections to the perceptron module: an interactive perceptron visualizer and a perceptron algorithm walkthrough. Students who just want to see how the perceptron behaves given a specific dataset can go straight to the interaction, whereas students who are starting fresh can walk through the walkthrough. The walkthrough is supplemented by elaborative feedback quiz questions that students can use to metacognitively gauge their understanding of the perceptron.

Here is what a student sees when they go through the walkthrough:





Here is the main interaction:



Do This	**DON'T Do This**
Encourage students to go through the walkthrough multiple times, providing feedback to the areas that are not clear.	Use the interaction as a graded aspect for class credit.
Encourage students to stop and interact with the interactions instead of skipping through pages.	
Highlight an example dataset in class, asking students to predict each step and verifying it with the visualization.	