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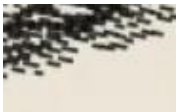
AI Final Project Proposal

A) Introduction

I'm planning to implement an AI artist that can draw arts based on some given input descriptions. The goal is to use AI to recreate a famous generative arts project called *Meridian* (artblocks.io/project/163) by Matt DesLauriers. Here are a few of the artworks from his project:

B) High-level Pseudo Code

I plan to use p5js and JavaScript to generate the arts. The generation process looks roughly like this:

1. Randomly draw a number *p* to be the number of pencils from a distribution.
2. Start all *p* pencils from the left side of a canvas.
3. Let all the pencils move randomly from left to right, simultaneously. I will use AI to get the pencils to move coordinatively.
4. For each region between two pencil strokes, color the region using AI in one of two ways:
   a. A color like the color of adjacent regions, but different in shades. Like these two colors:
   
   b. A color that are different but goes well with adjacent regions' colors. Like these examples:
   
   

C) Use of Artificial Intelligence

The algorithm, without any use of AI, would be a random walk of different strokes from left to right, with random coloring between the regions. This means that each stroke resembles white noise patterns, and the coloring pattern seems like a coin-flip and random between each region. So, we can implement artificial intelligence to mimic the strokes and the coloring that would be made by a human. A q-learning algorithm will be in place. To go from state to state is to make another step of a stroke, and the rewards will be evaluated based on some criteria where I think the coloring, each stroke individually, and all strokes in a whole picture would look like something made by a human. For example,

a) Strokes don't go in opposite directions too often.
b) There are a lot more valleys and mountains shaped strokes, rather than white noise shaped
c) The coloring doesn't follow a pattern of random flipping back and forth between a few colors

D) Two Parts Breakdown and Grading

1st part	Learn p5js and implement the pseudocode to draw out the arts, show clear use of random pencil movements and coloring.	M: The pseudo-code is implemented, and arts are shown with evidence that pencil strokes are used. E: Arts with colors are outputted. Code runs fast (~1 second).
2nd part	Implement the q-learning algorithm for the strokes and the coloring mimic something that is created by humans.	M: Q-learning has been implemented and influences the output. E: A write-up is submitted to compare the produced images created without AI and with AI to illustrates the use of q-learning. The effects of changing the rewards structures are explored.