CS 370 - Undergraduate Reading and Research (Spring 2022)

TEXAS
The University of Texas at Austin

ML Model for the Stylistic Classification of Fine Art

Exploring Applications of AI/ML in Art

Tejas Saboo
Computer Science and Mathematics Student at The University of Texas at Austin

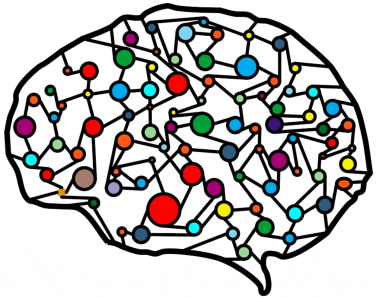
Supervised by Professor Angela Beasley

Overview

Emerging technologies are disrupting the art industry and changing the way we create and experience art. For my undergraduate research project, I decided to explore the intersection of art, design, and technology to identify and address opportunities to augment human creativity.

Experimental Process

1. Timeline and Project Scope
2. Initial Flower and Marina Dataset
3. Custom Data Loader
4. Manual Train-Test Split
5. Experimented with Neural Network Architectures
6. Found Wikiart Dataset
7. Automated Train-Test Split
8. Retrained Model for Binary Classification
9. Updated Model for Multi-Class Classification
10. Hyperparameter Tuning
11. Employed Techniques to Reduce Overfitting
12. Documented Model



WIKIART
VISUAL ART ENCYCLOPEDIA

Results

I architected a deep convolutional neural network model for the multi-class classification of fine art by its artistic style.

Binary: 95.6250% Training Accuracy, 64.5% Testing Accuracy, 78 Epochs
Styles: Pointillism and Realism

Binary: 97.125% Training Accuracy, 66% Testing Accuracy, 77 Epochs
Styles: Cubism and Realism

Multi-Class: 97.125% Training Accuracy, 46% Testing Accuracy, 70 Epochs
Styles: Cubism, Ukiyo-e, Northern Renaissance, and Pointillism

Tech Stack

- Jupyter Notebook
- Python
- Libraries
  - PyTorch
  - Torchvision
  - Matplotlib
  - Shutil
  - OS
  - Random

Future Plans

- Experiment with Computer Vision (CV) to extract visual features
- Create an algorithm to generate original titles and tags for art using extracted features
- Build an AI system to measure the creativity/craftsmanship of artwork and provide actionable feedback
- Learn about blockchain and NFTs

Thank you!
Any questions?