# Will AI Replace Art?

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01. Introduction

The current rising of AI in the art world has established fear of being replaced in many artists. In 2018, an AI-generated painting was sold for $432,500 at an auction, which angered many artists. There have been numerous research discussing the validity and ethicality of AI art and how it can be perceived as the industry grows using human test subjects. However, few studies were found on using machines to identify AI vs. human created art. Using neural networks, this project aims to contribute to the growing literature and determine whether AI-generated art can replace human art.

02. Data Collection

There are numerous images of art online and to narrow the scope, this project will focus on abstract paintings. An AI-generated abstract painting dataset with 1689 images was collected from Art AI Gallery.

Human created   AI created
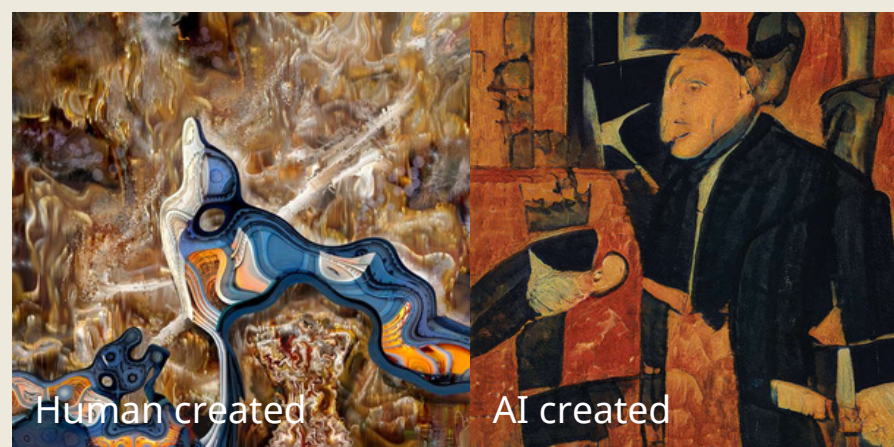
The human created abstract paintings dataset with 7391 images was retrieved from Kaggle, but due to the small size of the AI art dataset, the human art dataset was scaled down to 1689 images for an even distribution. Therefore, there were 3378 observations in total.

03. Methodology

Before running the images through the convolutional neural network, both the training and test data were preprocessed using Keras ImageDataGenerator to transform the images. Afterwards, the images were ran through a pre-trained ResNet50V2 model in Keras that's been parameterized to best differentiate across ImageNet's imagery classes and adjusted to get the most accurate results. Categorical crossentropy was chosen as the loss function and categorical accuracy was picked as the metric of accuracy as they improved the accuracy the most. Due to time constraints, only 5 epochs were run.
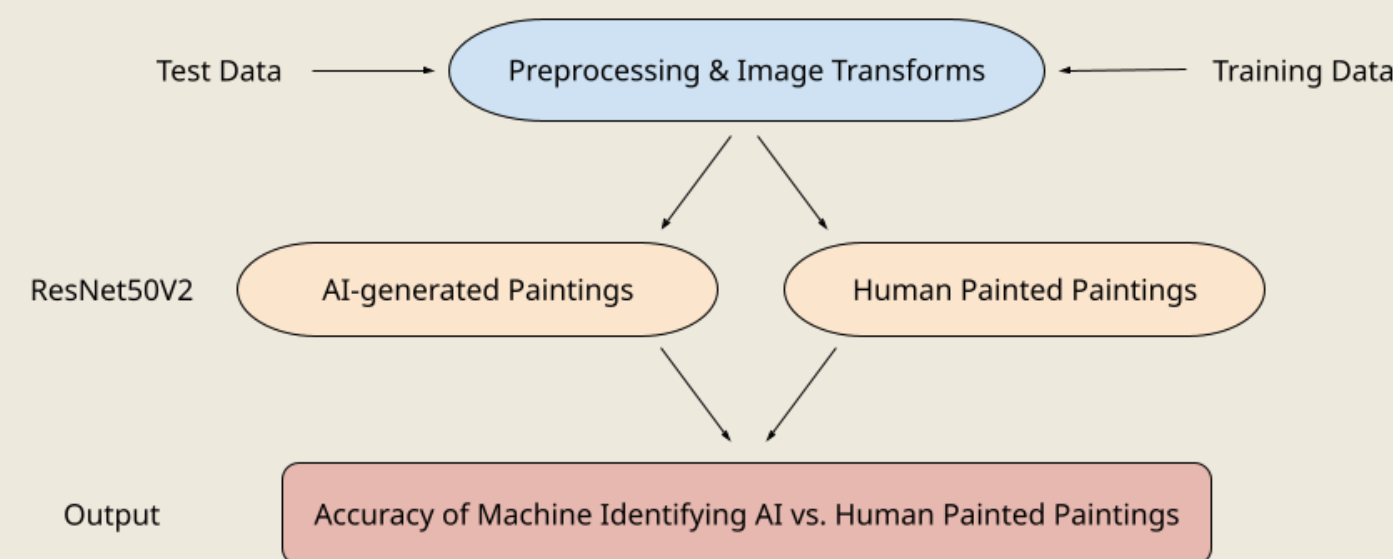
05. Results

By running the neural network, our accuracy started at 51.98% on the first epoch. Until epoch 4, our accuracy was increasing to 68.81% but on the 5th epoch it fell to 64.85%. The overall accuracy of distinguishing AI vs. human created abstract paintings from the results then comes to 62.18%. This shows that the neural network built was able to differentiate between the two groups to a certain extent. 62.18% is still not as accurate as we wanted it to be, however, it's still a significant number.
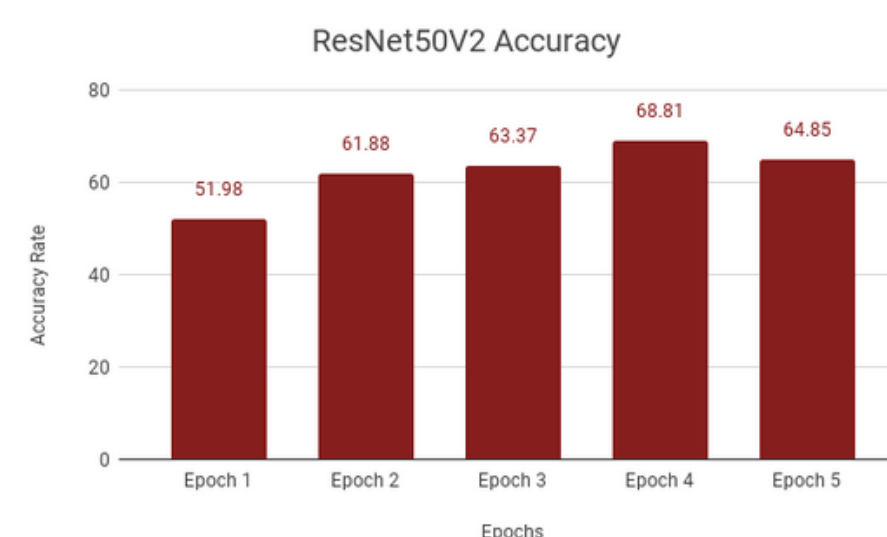
	ResNet50V2
Epoch 1	51.98%
Epoch 2	61.88%
Epoch 3	63.37%
Epoch 4	68.81%
Epoch 5	64.85%
Overall Accuracy	62.18%

Original Van Gogh Painting

06. Conclusion

Distinguishing AI and human created art is possible using this neural network, however, there's still room for improvement. For future works, more data needs to be collected and broadening the data to different types of art styles would give us a more holistic view. The network parameterization can be more fine-tuned to obtain a higher accuracy score. This project shows the challenges machines have to go through to differentiate between AI and human art. Although it's trained on human creativity, that could indicate how AI will have a hard time obtaining the imperfect and unpredictable human aspect in art. However, it can be a great assistance tool for artists and even be called its own art form.

Van Gogh Inspired AI Painting