

ART STYLE CLASSIFICATION



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Introduction

Art has developed over varied styles, each with unique features and historical relevance. This project investigates the categorization of artworks into various artistic styles based on four different methods. Through a comparison of their performance, we seek to establish the best method for correctly identifying and classifying artworks.





PROBLEM STATEMENT

- Identifying an artwork's styleis challenging due to visual complexity and subjectivity.
- Manual classification is time-consuming and inconsistent.
- This project uses a four different models to classify art styles based on image data.

OBJECTIVE:

- Build a different models to predict art styles from paintings.
- Train and test the four models on an art dataset.
- Create a simple app interface (using Streamlit) to upload images and view predictions.

Literature Review

Author/Year	Title of the paper	Insight Summary
Lee, SG., Cha,2016	Style classification and visualization of art painting's genre using self-organizing maps	Experiments have verified that the paintings can be classified by style, and SOM was visualized to enable the analysis of the correlation of painting styles of the art pieces.
Wei ta chu,li yung wu 2018	Image Style Classification Based on Learnt Deep Correlation Features	for image style classification using deep correlation features that capture intra- and inter-layer relationships in CNNs. This approach outperforms traditional CNN features by effectively learning and representing complex artistic styles

Author/Year	Title of the paper	Insight Summary
Zihan Yang,2021	Classification of picture art style based on VGGNET	In VGG-19 (visual geometry) Based on Group-19 (Group-19) network, this paper proposes a picture style recognition algorithm based on visual geometry group 19 mixed transfer learning model.
T. Wei, Y. Chen, H. Hu, X. Pan, W. Wang,2024	Classification Method of Ancient Paintings Based on Improved Swin Transformer	It uses this method to improve feature extraction and to increase accuracy in preserving and analyzing cultural heritage



Dataset



Source: Kaggle

https://www.kaggle.com/datasets/sivarazadi/wikiart-

art-movementsstyles/data

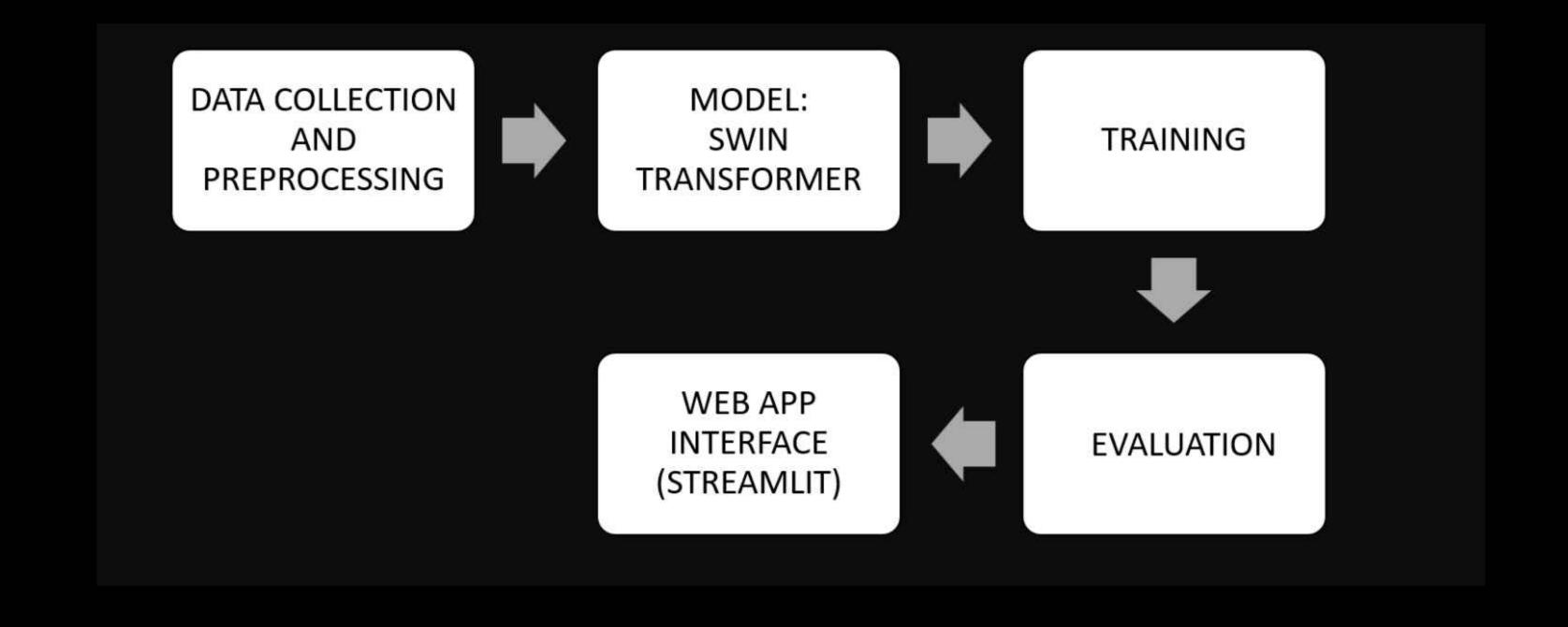


The "Surreal Symphonies" dataset offers a comprehensive collection of 42,500 JPEG images



These images categorized into 13 distinct art styles, including Academic Art, Expressionism, Neoclassicism, Realism, Renaissance, and Symbolism.

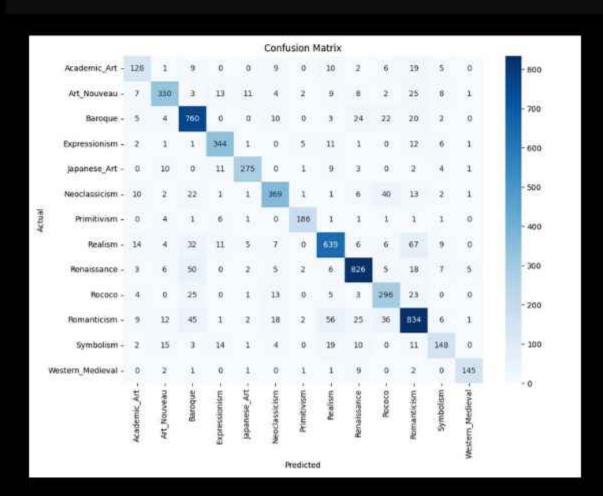
METHODOLOGY



RESULTS (swin transformer)

Art Style	Precision	Recall	F-1 Score	Suppor t
Academic Art	0.70	0.68	0.69	189
Art_Nouveau	0.84	0.78	0.81	423
Baroque	0.80	0.89	0.84	850
Expressionism	0.86	0.89	0.88	385
Japanese_Art	0.91	0.87	0.89	316
Neoclassicism	0.84	0.79	0.81	469
Primitivism	0.93	0.92	0.92	203
Realism	0.83	0.80	0.81	800
Renaissance	0.89	0.88	0.89	935
Rococo	0.71	0.80	0.76	370
Romanticism	0.80	0.80	0.80	1047
Symbolism	0.75	0.65	0.70	227
Western_Medieval	0.94	0.90	0.91	162

	Precision	Reca II	F1- Scor e	Suppo rt
accuracy			0.83	6376
Macro avg	0.83	0.82	0.82	6376
Weighted avg	0.83	0.83	0.83	6376



- 1.TRAINING ACCURACY:99.07
- 2. VALIDATION ACCURACY:83.28
- 3.TEST ACCURACY:82.81

RESULTS

VGT Transform

Architecture:

Conv2D to embed patches

Add [CLS] token and positional embedding

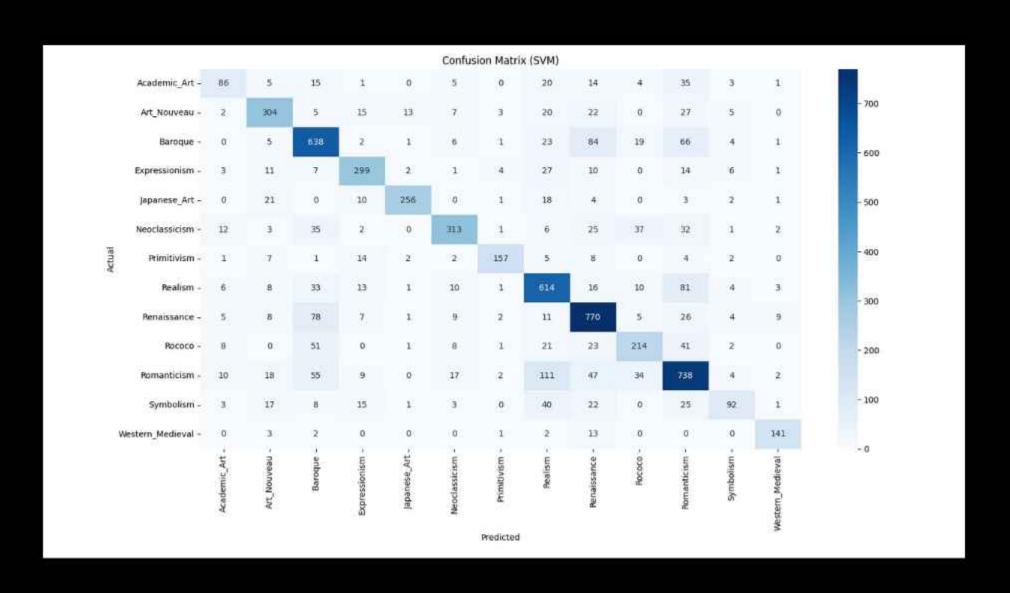
Apply 3 Graph Attention + FFN blocks

Take [CLS] token and pass through Linear layer for prediction

The Vision Graph Transformer captures both local textures and global layouts by treating image patches as a graph. This helps it recognize complex patterns and styles in artwork more effectively.

VGT testing accuaracy-57%

RESULTS SVM Model

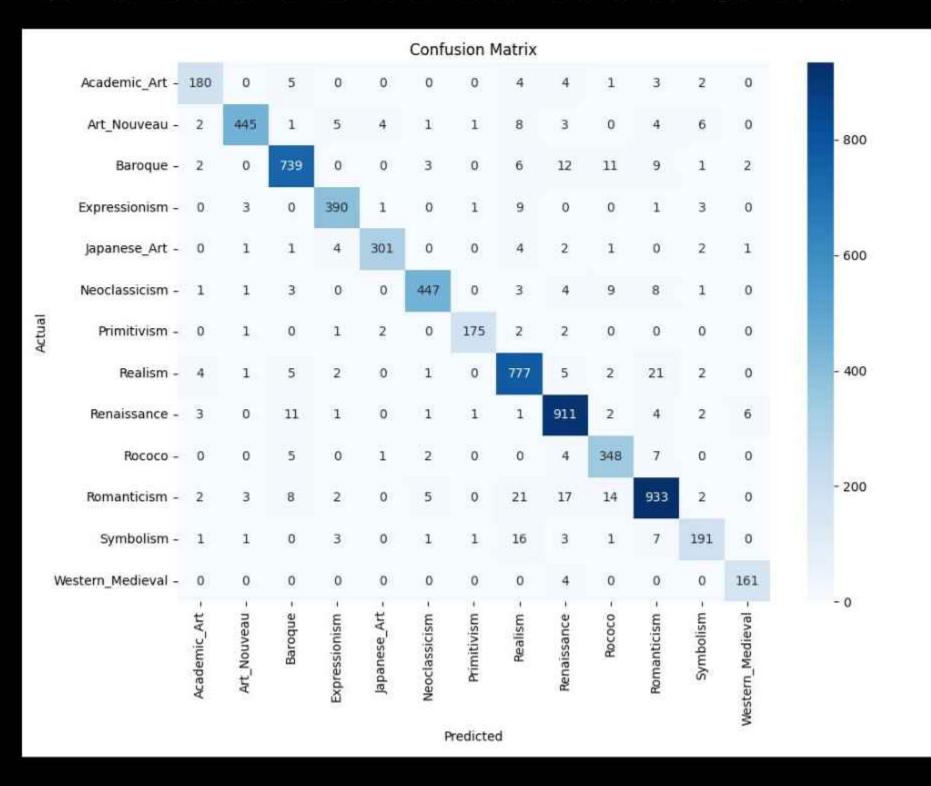


*** Final Test Accuracy (SVM): 0.7249

■ Classification Report:

	at the second			
	precision	recall	f1-score	support
Academic_Art	0.63	0.46	0.53	189
Art_Nouveau	0.74	0.72	0.73	423
Baroque	0.69	0.75	0.72	850
Expressionism	0.77	0.78	0.77	385
Japanese_Art	0.92	0.81	0.86	316
Neoclassicism	0.82	0.67	0.74	469
Primitivism	0.90	0.77	0.83	203
Realism	0.67	0.77	0.71	800
Renaissance	0.73	0.82	0.77	935
Rococo	0.66	0.58	0.62	370
Romanticism	0.68	0.70	0.69	1047
Symbolism	0.71	0.41	0.52	227
Western_Medieval	0.87	0.87	0.87	162
accuracy			0.72	6376
macro avg	0.75	0.70	0.72	6376
weighted avg	0.73	0.72	0.72	6376

RESULTS ConvNeXt Model



▼ Test Accuracy: 0.9407

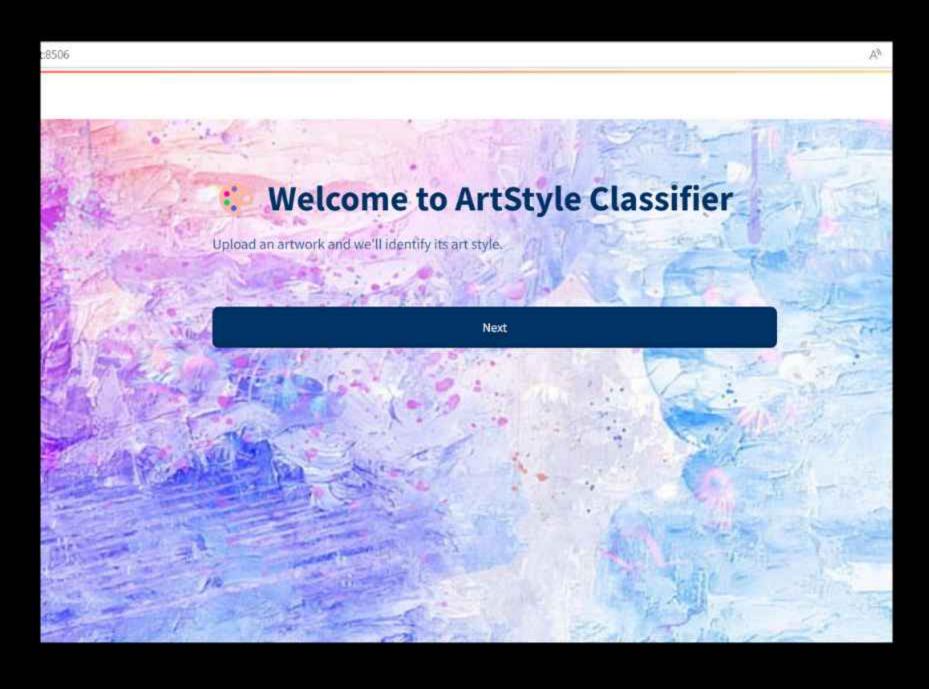
Classification Report:

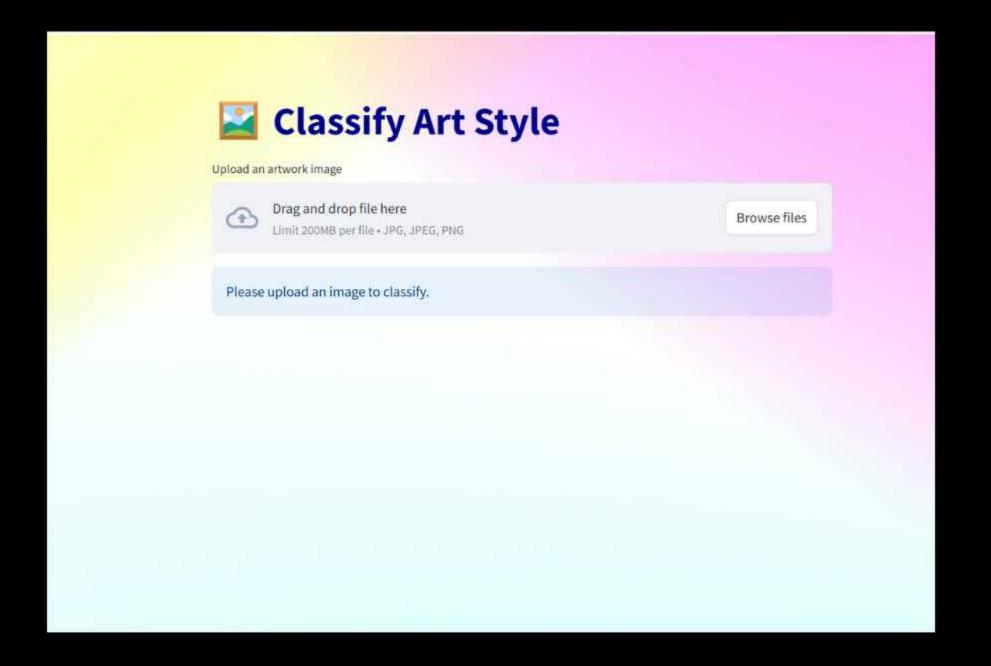
precision	recall	f1-score	support
0.92	0.90	0.91	199
0.98	0.93	0.95	480
0.95	0.94	0.95	785
0.96	0.96	0 96	408
0.97	0.95	0.96	317
0.97	0.94	0.95	477
0.98	0.96	0.97	183
0.91	0.95	0.93	820
0.94	0.97	0 95	943
0.89	0.95	0.92	367
0.94	0.93	0.93	1007
0.90	0.85	0.87	225
0.95	0.98	0.96	165
		0 94	6376
0.94	0.94	0.94	6376
0.94	0.94	0.94	6376
	0.92 0.98 0.95 0.96 0.97 0.98 0.91 0.94 0.94 0.99 0.95	0.92 0.90 0.98 0.93 0.95 0.94 0.96 0.96 0.97 0.95 0.97 0.94 0.98 0.96 0.91 0.95 0.94 0.97 0.89 0.95 0.94 0.93 0.95 0.95 0.95 0.98	0.92 0.90 0.91 0.98 0.93 0.95 0.95 0.94 0.95 0.96 0.96 0.96 0.97 0.95 0.96 0.97 0.94 0.95 0.98 0.96 0.97 0.91 0.95 0.93 0.94 0.97 0.95 0.89 0.95 0.92 0.94 0.93 0.93 0.90 0.85 0.87 0.95 0.98 0.96

Comparitive study

MODEL	EXPLANATION	ACCURACY
SWIN TRANSFORMER	Analyzes images using a smart attention mechanism	TEST ACCURACY:82.81%
ConvNeXt	Pure CNN network inspired by Transformers and claims to outperform them	TEST ACCURACY:94.07%
VGT Transform	Helps to recognize complex patterns and styles in artwork more effectively.	TEST ACCURACY:57%
SVM	Finds the best decision boundary (a hyperplane) that separates different classes.	TEST ACCURACY: 72%

Web Application Interface Overview





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Web Application Interface Overview



Description of Predicted Style

Art_Nouveau

- Became popular in the late 19th and early 20th centuries.
- Known for flowing lines and floral, organic patterns.
- Often used in architecture, design, and illustration.



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Ask anything about Artwork Style

Ask something about artwork styles:

give the history of japanese artstyle?

Al Assistant Says:

Japanese art spans a rich history dating back thousands of years, with distinct styles emerging and evolving throughout various periods. Here's a brief overview of some significant Japanese art styles:

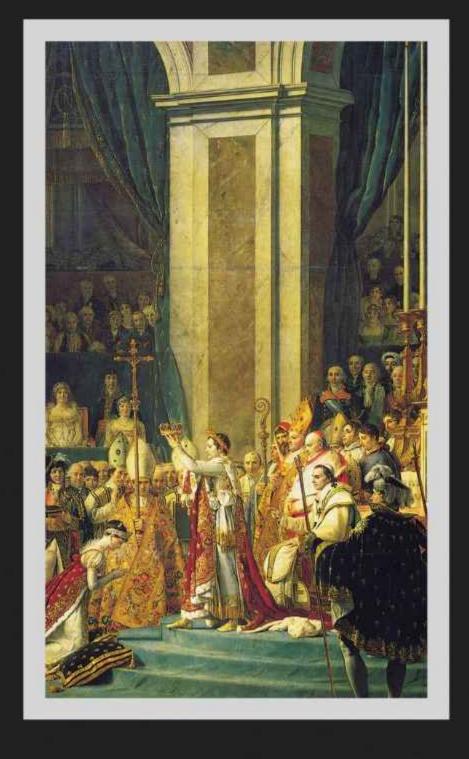
- Jomon Period (14,000 BC 300 BC): The Jomon period is characterized by the pottery with distinctive cord-markings, reflecting the hunter-gatherer lifestyle of the people.
- Yayoi Period (300 BC 300 AD): The Yayoi period brought significant changes with the arrival of rice cultivation and metalworking during the first century AD. This period is also known for its unique pottery and weaving techniques.
- Asuka Period (538 710 AD): With the arrival of Buddhism and Chinese influence, the Asuka period
 saw the development of Buddhist art including sculpture and temple architecture. The most famous
 example is the construction of the Horyuji Temple housing some of the oldest wooden structures and
 Buddhist statues in the world.
- 4. Nara Period (710 794 AD): During the Nara period, the Buddhist art style continued to flourish, and large Buddhist structures, such as Todai-ji Temple and its Great Buddha statue, were built. The Kegon school of Buddhist art developed during this time, characterized by vibrant colors and decorative

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CONCLUSION

- Successfully built a machine learning model that classifies 13 artwork styles with a test accuracy of 82.81%.
- Designed a functional Streamlit web application interface for interactive exploration, classification, and style information — tested locally.
- Demonstrated how AI can support art analysis and education.



Thank You!



