Towards Artistic Image Aesthetics Assessment: a Large-scale Dataset and a New Method

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Overview

Problems

- Existing image aesthetics assessment datasets (e.g. AVA) contain mostly real-world photos and few artworks.
- Existing artistic aesthetics assessment datasets (e.g. VAPS) are small in scale.

Real-world Photos   Artworks

Our work

To address the AIAA task, we propose **a new dataset and a new method**:

- **Boldbrush Artistic Image Dataset (BAID):** our dataset consists of 60,337 artworks annotated with more than 360,000 votes.
- **Style-specific Art Assessment Network (SAAN):** our method effectively exploit the style-specific features and the generic aesthetic features of a given artwork.

Introduction

Task: Artistic image aesthetics assessment (AIAA) requires automatically evaluating the aesthetics score of an artwork.

Aesthetics score: ?

Existing public AIAA datasets, e.g. Jenaesthetics (1,628 art images) and VAPS (999 paintings), are not large enough to meet the requirements of deep learning methods. AIAA methods have not been adequately studied.

Boldbrush Artistic Image Dataset

BAID consists of 60,337 artworks annotated with more than 360,000 votes. The proposed BAID is, to our knowledge, the largest AIAA dataset, which far exceeds existing IAA and AIAA datasets in the quantity and quality of artworks.

Dataset	Number of images	Number of artistic images
DP Challenge [6]	16,509	–
Photo.Net [19]	20,278	–
CUHK-PQ [26]	17,673	–
AVA [31]	255,530	–
AADB [20]	10,000	–
FLICKR-AES [34]	40,000	–
PARA [44]	31,220	–
TAD66K [15]	66,327	1,200
JenAesthetic [3]	1,628	1,628
VAPS [11]	999	999
BAID (Ours)	60,337	**60,337**

Data Collection

- We collect the images from the Boldbrush website[1], which hosts a monthly artwork contest where certified artists can upload their works and receive public votes from online users.

- The aesthetics scores are converted from the votes using a sigmoid-like way.

Oil Lamp with Daisies

by Bianca Popa
Oil 60 x 50 cm

Entry Number: 330111
Entered in: **May 2023**

Artist's website: artbsp.com

Get New Art Alerts

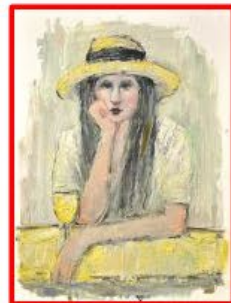Vote

9 votes

Like Sign Up to see what your friends like.

Category: **Representational**

| 4.23 | 3.02 | 3.58 | 9.37 | 8.62 | 7.44 |

Discussion About Bias

The most frequently used painting media in BAID and the average score of artworks created in these media:

Painting Medium	Number of Images	Average Score ↑
Oil	38,586	4.27
Acrylic	6,733	4.30
Watercolor	5,328	4.24
Pastel	5,156	4.22
Pencil	1,063	4.34

Correlation between scores and several hand-crafted features:

Features	SRCC ↑
Colorfulness	0.011
Contrast	0.049
Sharpness	0.029
Complexity	0.014

Style-specific Art Assessment Network
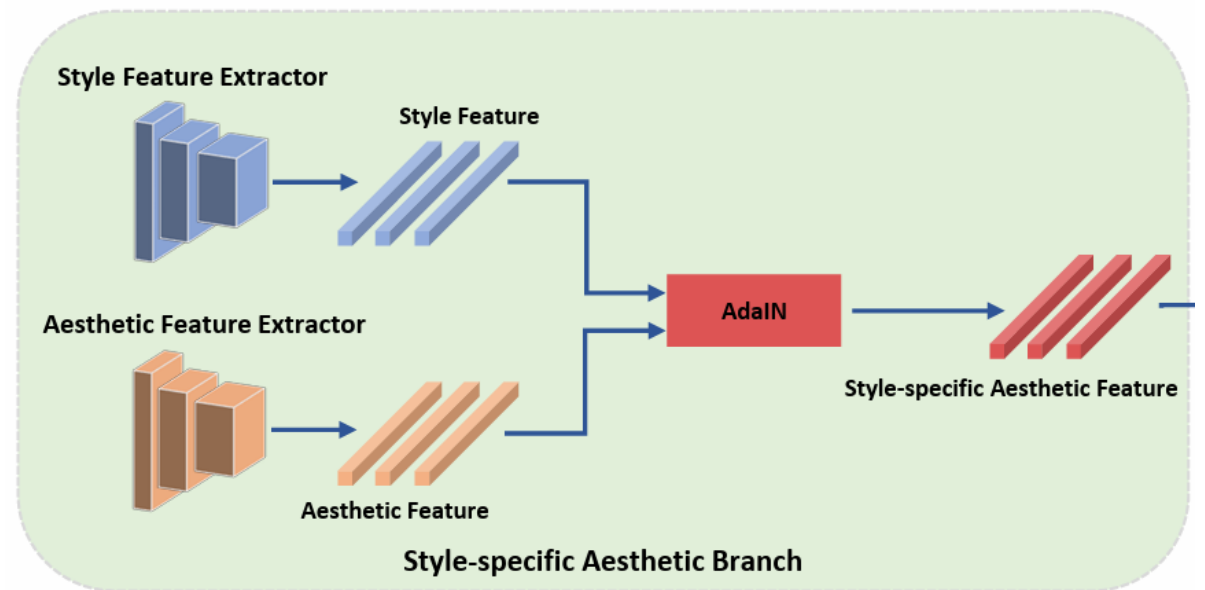
The proposed SAAN is composed of three modules:

- Style-specific Aesthetic Branch
- Generic Aesthetic Branch
- Spatial-information Fusion Module
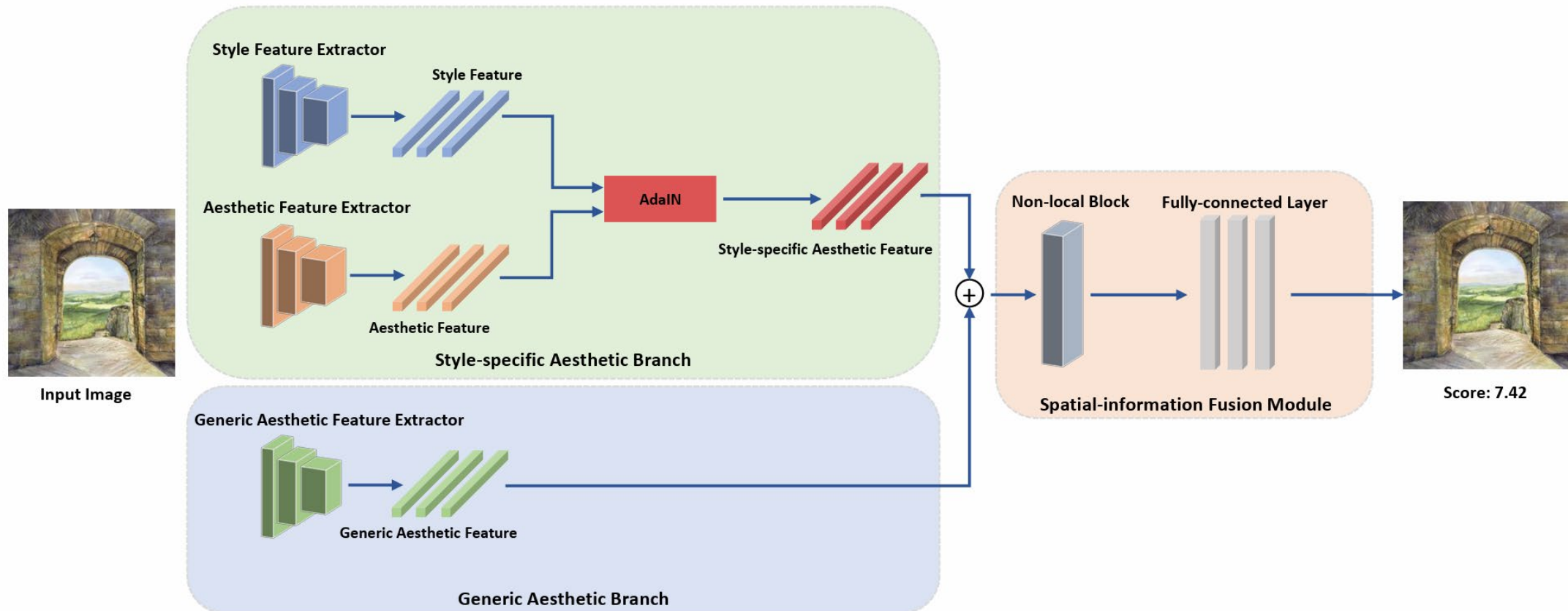
Style-specific Art Assessment Network

Style-specific Aesthetic Branch:

- We adopt different backbones to extract style feature and aesthetic feature.

- We add an AdaIN layer to integrate style information into the aesthetic feature.

Style-specific Art Assessment Network

Generic Aesthetic Branch:

- Extracts the aesthetic features shared by common categories of artworks.

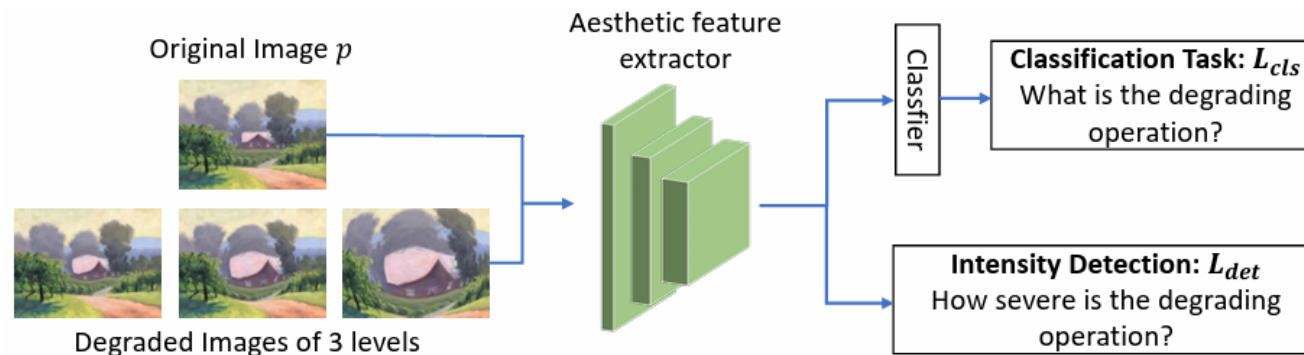- A self-supervised learning scheme is adopted to pretrain the backbone.

Spatial-information Fusion Module:

- Non-local block before the Multi-Layer Perception (MLP).

- Fuse the spatial information and implicitly detect the composition of the artwork.

Self-supervised pretraining

Two pretext tasks:

- Distortion classification

- Intensity detection

Original Image p

Aesthetic feature extractor

Classifier

Classification Task: L_{cls}
What is the degrading operation?

Intensity Detection: L_{det}
How severe is the degrading operation?

Degraded Images of 3 levels

Difference with related works[1]:

- Three levels of distortion

- Operations regarding global aesthetic factors and art-related distortions

Manipulation	Parameter
Gaussian noise	0.2, 0.4, 0.8
Quantization	64, 32, 8
Gaussian Blur	0.4, 0.8, 2
Exposure	1.5, 2.0, 2.5
Rotation	45, -45
Cropping	3/4, 2/3, 1/2
Stylization	(50, 0.6), (50, 0.3), (50, 0.1)
Convex	1/8, 1/4, 1/2
PencilSketch	(100, 0.1, 0.02), (100, 0.4, 0.02), (100, 0.6, 0.02)
CutMix [45]	32, 64, 128
None	-

[1] Revisiting image aes thetic assessment via self-supervised feature learning. AAAI 2020
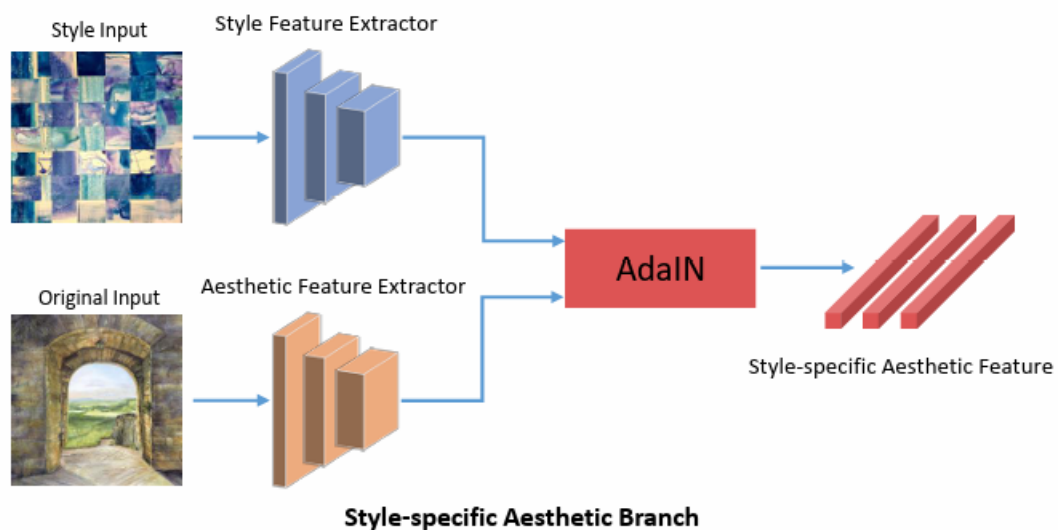
Distortion Visualization
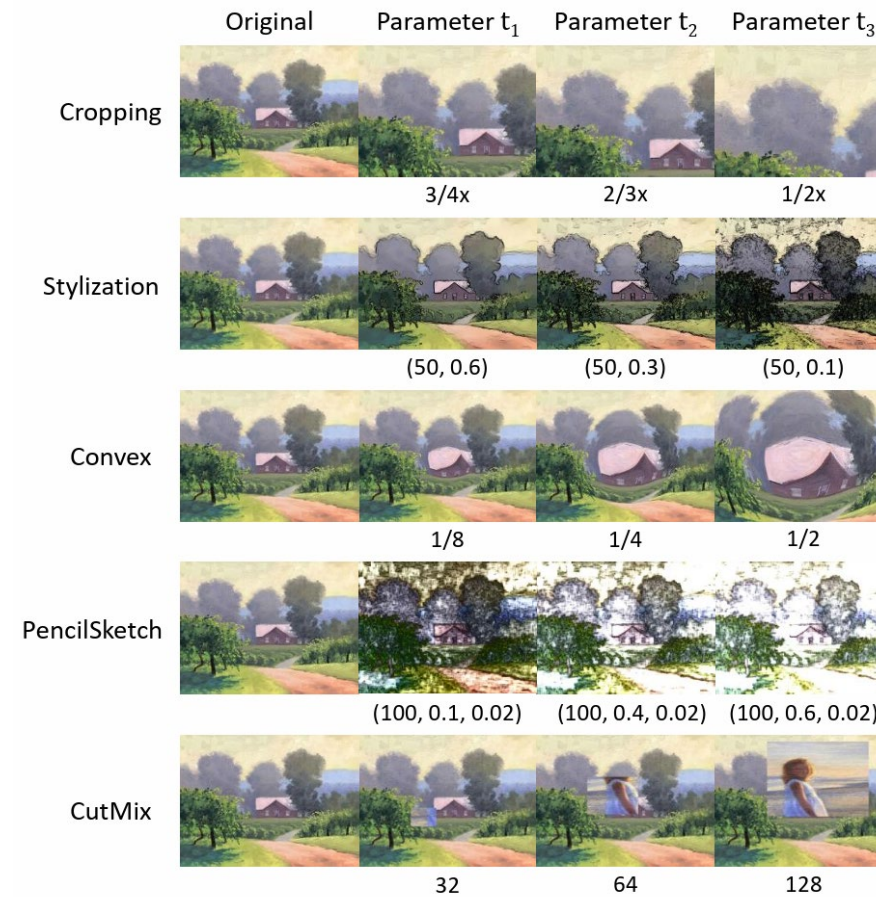
Results comparison on BAID

Methods	#Params	SRCC ↑	PCC ↑	Accuracy ↑
NIMA [41]	63.61M	0.393	0.382	71.01%
MP_{ada} [39]	63.37M	0.437	0.425	74.33%
MLSP [16]	73.97M	0.441	0.430	74.92%
BIAA [48]	97.49M	0.389	0.376	71.61%
TANet [15]	57.87M	0.453	0.437	75.45%
Ours	64.44M	**0.473**	**0.467**	**76.80%**

Validation Results

We further validate the effectiveness of the proposed style-specific aesthetic branch by making the style input different from the original artwork.

Style-specific Aesthetic Branch

Conclusion

The main contributions of our work are three-fold:

- We address the problem of artistic image aesthetics assessment, and introduce a new large-scale dataset BAID.

- We propose a style-specific artistic image assessment network called SAAN, which combines style-specific and generic aesthetic features to evaluate artworks.

- We evaluate the state-of-the-art IAA approaches and our proposed method on the proposed BAID dataset. Our model achieves promising results on all the metrics, which clearly demonstrates the validity of our model.

We hope our contributions will motivate the community to rethink AIAA and stimulate research with a broader perspective.