# Attentional Wavelet Network for Traditional Chinese Painting Transfer

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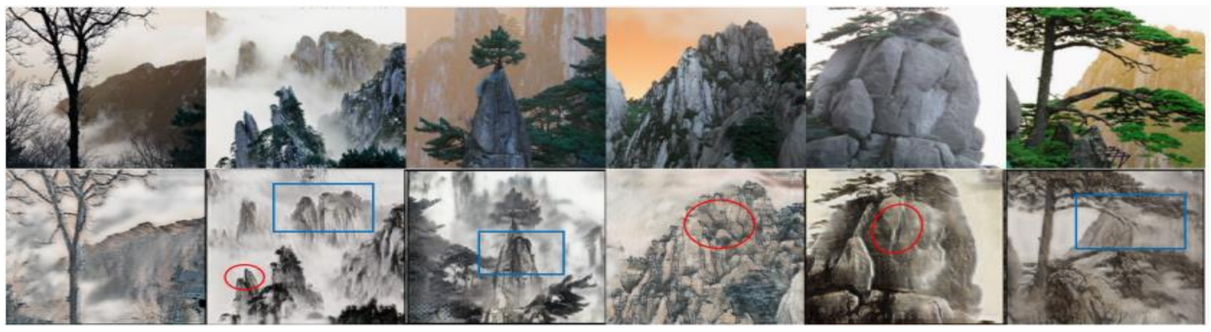
## Background

- Chinese traditional painting is an ancient artistic form of the world , compared with western paintings, it focuses more on the overall artistic conception, i.e. 'Xieyi'.
- Lack of researches and datasets on images to Chinese traditional paintings transfer task.
- In this work, we introduce wavelet transform and attention mechanism (AWNet) base on cycleGAN and provide a new dataset for images to Chinese traditional paintings transfer task.



## Motivation

- Lack of researches and datasets for images to Chinese traditional paintings transfer.
- Results of CycleGAN tend to be over 'grayscale' just like Fig.2.
- Get whole style rather than sub-style such as Fig.1.

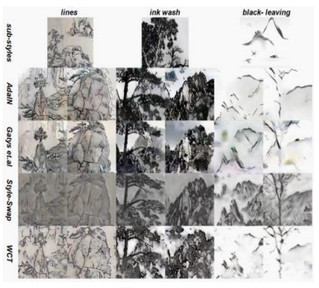


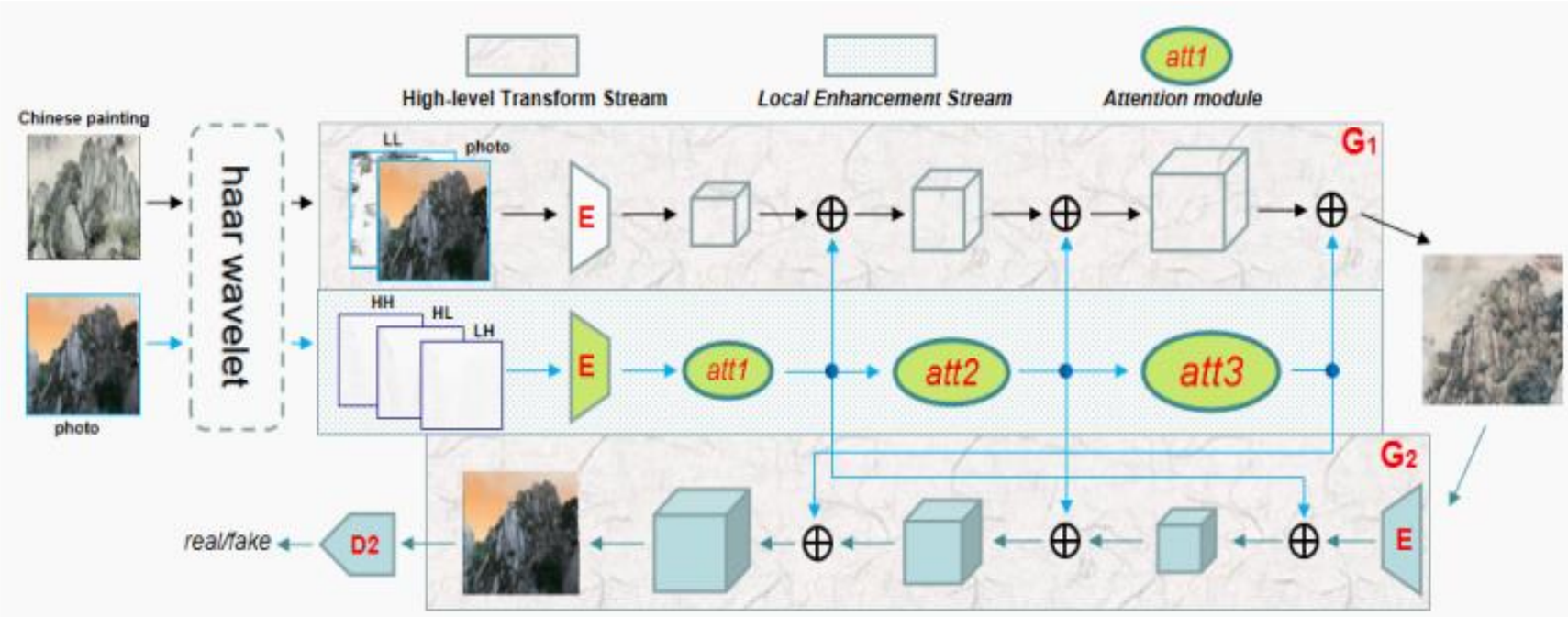
Fig.1

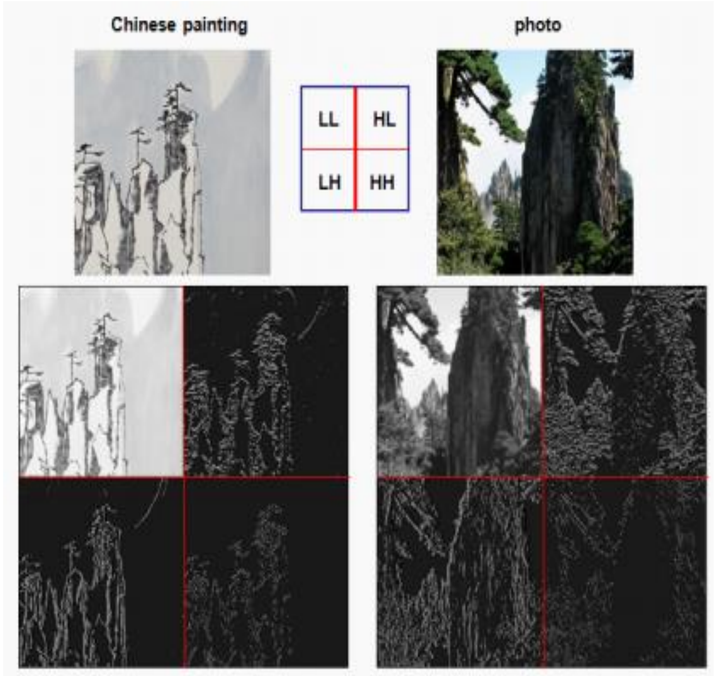
Fig.2

## Contribute

- We propose a novel AWNet for photos-Chinese paintings transferring task, which can capture high-level information and local details simultaneously.
- To better portray the local prospects, we introduce a multi-scale self-attention mechanism to select details scattered in features of each layer.
- We propose a new large dataset, named P2ADataset contains unpaired photos and traditional Chinese paintings for photo-Chinese painting transferring task.

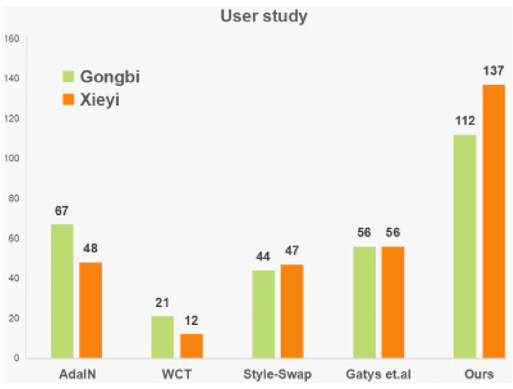
## Pipline




- We exploit the haar wavelet transform to decompose a specific image to one overall information contained in LL domain and three detail information existing in LH, HL, HH domains.
- We feed the images and LL to the AWNet simultaneously base on CycleGAN.
- We introduce a local enhancement stream as an auxiliary structure for the high-level transform stream which exploits some attention modules to pick up high-level information (rich local details).

## Quantitative Evaluation

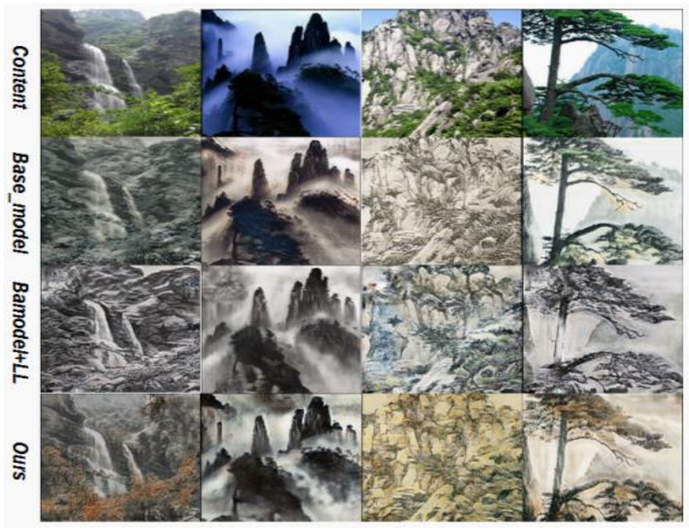



| Methods | Evaluation on P2ADataset | |
|---|---|---|
| | SSIM ↑ | PSNR ↑ |
| AdaIN | 0.27 | 10.07 |
| Gatys et.al | 0.34 | 9.14 |
| Style-Swap | 0.36 | **13.08** |
| WCT | 0.18 | 8.67 |
| Ours | **0.42** | 11.04 |

We give results of user study (**votes** from users) and some quantitative marks include **SSIM** and **PSNR** for our task.

- we exploit SSIM and PSNR to quantitatively evaluate our model against the prevalent methods i.e AdaIN, Gatys et al, Style-Swap and WCT.
- we investigate the two key arts, i.e. high-level information (Xieyi, red bars) and local details (Gongbi, green bars) in Chinese paintings.

## Qualitative Evaluation


some failure cases

## Conclusion & Acknowledgement /

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We propose a novel Attentional Wavelet Network (AWNet) to achieve Chinese painting transfer task. Low-frequency (Xieyi) was used to add style for results while high-frequencies (Gongbi) were exploited to remedy detail information. Moreover, we set up a new dataset (P2ADataset) for our task.