Final Project Proposal

Definitions

Team name: AI Artist

Team members: Lingyu Ma, Dawei Si, Yichen Chai, Cancan Huang
Note: Once one person uploads the report to Gradescope, please add all other team members to the submission within the Gradescope interface (top right on your submission).

If you need to find team members, please use the 'Search for Teammates!' top-level post on Piazza—pitch an idea!

Project

- **What are the skills of the team members? Conduct a skill assessment!**

    - Lingyu Ma: Python, Matlab

    - Dawei Si: Python, Julia

    - Yichen Chai: Python, C++

    - Cancan Huang: Python

- **What is your project idea?**

    In our project, we want to investigate various algorithms of neural style transfer(NST). It is receiving increasing attention and a variety of improvements or extensions are proposed since the seminal work of Gatys et al. [1], which creates artistic imagery by separating and recombining image content and style. Our first aim is to compare current existing models of neural style transfer. And if time allows we could also compare NST with previous style transfer methods without neural networks. A more ambitious goal is to write our own model, if we come up with a good idea. We also plan to deploy an online demo for students to play with.

    This review helps a lot. Neural Style Transfer: A Review

- **What data will you use?**

    In terms of the data, the style transfer would need as few as two photos as data. And most current papers includes links to data they used for their models. We would like to devote more time on understanding methods.

- **What software/hardware will you use?**

    We would like to implement several popular style transfer models ourselves using Tensorflow or Pytorch. To train our models, we would utilize GPUs on Google Colab, GCP and possibly on CS Grids.

- **Who will do what?**

- – Lingyu Ma: Model exploration and implementation
- – Dawei Si: Model implementation and training
- – Yichen Chai: Model implementation and training
- – Cancan Huang: Model training and Web demo deployment

- How will you know whether you have made progress? What will you measure?

  We'll compare our results with those in the paper to see if the models are working correctly. We would also measure the effects of different models on same image pairs and score them manually.

- What technical problems do you foresee or have?

  The most hard part is to understand different methods described in papers.

- What is the socio-historical context that this project lives in? (2-3 sentences)

  Style is an interesting and mysterious topic of images, and following the development of style transfer works, we can see how the definition of style changes and how they compare to each other. This may also inspire further consideration of style in images.

- Who are the stakeholders for this project? (3-4 sentences)

  The stakeholders for this project might be the artists who generate the original master pieces, the photo owners, and the people shown in photos or portraits.

- What are the benefits of a technology such as this? (2-3 sentences)

  Train robots to be an artist. Using the extracted style to generate more realistic images[2]. Artists may use them for inspiration.

- How might a bad actor misuse this technology and who would it harm? (2-3 sentences)

  It can be used to create fake works, which will harm the original artist. It may also annoy artists who takes a high pride in their works.

- Is there anything that we can do to help? E.G., resources, equipment.

  We would be appreciate with any support of model construction, web application, and code style regulations.

Feel free to use these as paragraph headings, and also please include any media, references, etc.

References

[1] Leon A Gatys, Alexander S Ecker, and Matthias Bethge. A neural algorithm of artistic style. *arXiv preprint arXiv:1508.06576*, 2015.

[2] Tero Karras, Samuli Laine, and Timo Aila. A style-based generator architecture for generative adversarial networks. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, pages 4401–4410, 2019.