Explore PT - Written Response Template

Assessment Overview and Performance Task Directions for Students

Computational Artifact

Prompt 2a. Provide information on your computing innovation and computational artifact.

- Name the computing innovation that is represented by your computational artifact.
- Describe the computing innovation's intended purpose and function.
- Describe how your computational artifact illustrates, represents, or explains the computing innovation's intended purpose, its function, or its effect.

(Must not exceed 100 words)

style-GAN： A Style-Based Generator Architecture for Generative Adversarial Networks

Their goal is to generate artificial face images by learning from a dataset of celebrity faces. While GAN images became more realistic over time, one of their main challenges is controlling their output, i.e. changing specific features such pose, face shape and hair style in an image of a face.

My computational artifact illustrates the future of machine learning because the image is a basic learning but after that there will be more things machine can study and create by themselves.

2b. Describe your development process, explicitly identifying the computing tools and techniques you used to create your artifact. Your description must be detailed enough so that a person unfamiliar with the tools and techniques will understand your process

(Must not exceed 100 words)

I learned about it from a website called GitHub. It's open source on GitHub, so anyone can test it, and there's a lot of detail under the site to give you a better idea of what the program is for. There are also many materials on a Chinese website called: CSDN. This is a big IT club for programmer learn and exchange their idea. For example, I can not understand the StyleGAN at first but I was taught by other programmers. This is a useful method to understand computer science in short time.

Computing Innovation

2c. Explain at least one beneficial and one harmful effect the computing innovation has had, or has the potential to have, on society, economy, or culture.
(Must not exceed 250 words)

The benefit of the StyleGAN is very powerful. Everybody dies and everybody dies including a lot of scientists, artists, stars but having this technology allows them to go back to the modern age. Imagine if the physics class at school were taught by Einstein, hawking, etc., the students would be extremely enthusiastic because they are the creators of physics. At the same time, this technology can also help restore people's previous appearance, such as prehistoric people. This will be an unprecedented boost to culture. This will also help the gaming industry. With the continuous improvement of computer technology, the sense of reality of games is getting higher and higher. Many games depict very real human faces, so that people can identify with each other. Especially after VR games began to develop, this kind of realistic face is extremely important for games, and StyleGAN can help merchants realize this dream. However, if this technology is in the hands of criminals, the situation will be very different. Now mobile phones and other electronic devices choose face recognition, this person will use the mobile phone more quickly. This seemingly solid security system can be easily breached under this program. Then people's privacy will be threatened, and many fraudsters may use this method to cheat.

2d. Using specific details, describe:

- The data your innovation uses;
- How the innovation consumes (as input), produces (as output), and/or transforms data; and
- At least one data storage concern, data privacy concern, or data security concern directly related to the computing innovation.

(Must not exceed 250 words)

The data that my innovation uses is photo. Every photo has resolution which is the structure of all picture and screen. The higher the resolution the detailed the picture. The StyleGAN program can study the resolution of selfie can generate its own picture. The program divides the features into three types:
1.Coarse – resolution of up to 82 – affects pose, general hair style, face shape, etc.
2.Middle – resolution of 162 to 322 – affects finer facial features, hair style, eyes open/closed, etc.
3.Fine – resolution of 642 to 10242 – affects color scheme (eye, hair and skin) and micro features.
These three data will learn by different part of machine due to the performance of machine. After learning these data, the data from Coarse layer, Middle layer and Fine layer will transform to the data that can display on the screen. However, the learning process needs times, from the official website of Nvidia, we know that it costs 14days for only learn the basic structure of human face with multiple GPUs Tesla V100.
From my perspective, this kind of test only can play on the cloud. In another word, the GPU server have to play a role in this program because in our daily life, our computers' GPU is much weaker that the GPU server's multiple GPU Titan. Therefore, our computer storage is not enough to deal with these such a giant data and commercial use can be difficult right now.

References

2e. Provide a list of at least three online or print sources used to create your computational artifact and/or support your responses through in-text citation to the prompts provided in this performance task.

- At least two of the sources must have been created after the end of the previous academic year.
- For each online source, include the complete and permanent URL. Identify the author, title, source, the date you retrieved the source, and, if possible, the date the reference was written or posted.
- For each print source, include the author, title of excerpt/article and magazine or book, page number(s), publisher, and date of publication.
- If you include an interview source, include the name of the person you interviewed, the date on which the interview occurred, and the person's position in the field.
- Include in-text citations for the sources you used.
- Each source must be relevant, credible, and easily accessed.

(the author, title, source, the date you retrieved the source, the date the reference was written or posted)
The following references is in the order shows above.

1.https://blog.csdn.net/yep /article/details/87810806
(yep-screen name, style-GAN： A Style-Based Generator Architecture for Generative Adversarial Networks, CSDN CLUB， 2019/03/10, 2019/02/20 17:53:57)

2. https://www.lyrn.ai/2018/12/26/a-style-based-generator-architecture-for-generative-adversarial-networks/
(Rani Horev, Generating and Tuning Realistic Artificial Faces, Lyrn.AI, 2019/01/25, 2018/12/26)

3. https://github.com/NVlabs/stylegan
(tkarras, StyleGAN — Official TensorFlow Implementation, GitHub, 2019/04, 2019/02)

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