**ISTD 50.035**

**Computer Vision**

**Term Paper**

Last updated on 16-Apr-2020

**Requirements**

Working **individually**, you are required to submit a 2-page term paper (Times New Roman, font size: 10) on Topic A or Topic B (**choose one only**).

To be able to finish the term paper, you need to read and have good understanding of 50.035 course materials, especially topics in the second half of the course.

It is ok for you to discuss with your classmates and refer other materials. However, the writing must be **individual and original efforts**. The level of collaboration is expected to be similar to other SUTD assignments. Strict plagiarism check will be enforced. Random interview will be conducted after the submission deadline.

**Topic A**

Read the following paper:

Chen et al. “Self-Supervised GANs via Auxiliary Rotation Loss.” Proc. CVPR 2019

<http://openaccess.thecvf.com/content_CVPR_2019/papers/Chen_Self-Supervised_GANs_via_Auxiliary_Rotation_Loss_CVPR_2019_paper.pdf>

In your 2-page term paper, answer the following questions:

1. What are the differences between this work (Self-supervised GAN) and the original unconditional GAN as discussed in 50.035?
2. In Section 2, the authors discuss discriminator forgetting. Explain what is discriminator forgetting. Why does it happen in training a GAN?
3. What are the results in Figure 3? What is the motivation of this experiment? There are repetitive dips in Figure 3(a) and 3(b). What causes these dips? Why are some dips more significant than the others?
4. What are the purposes to perform rotation degree classification in Figure 1? How is Figure 1 related to the equations in Section 3?
5. In Section 3, in the equation for *LG*, why *Pdata* is not used in the rotation-based loss?

Note that, you do not need to fully understand Chen et al. to finish the term paper. But you need to have very good understanding of 50.035 course materials.

**Topic B**

Read the following paper:

Wang et al. “Region Proposal by Guided Anchoring.” Proc. CVPR 2019

<http://openaccess.thecvf.com/content_CVPR_2019/papers/Wang_Region_Proposal_by_Guided_Anchoring_CVPR_2019_paper.pdf>

In your 2-page term paper, answer the following questions:

1. What are the differences between this work (Guided Anchoring, GA) and Faster R-CNN as discussed in 50.035?
2. In Section 1, the authors discuss alignment and consistency. Explain if Faster R-CNN can achieve the alignment and consistency requirements. Explain if the proposed Guided Anchoring can achieve alignment and consistency if the adaptation in Sec 3.3 is not used. Why?
3. Compare Sec 3.1 Anchor location prediction with Semantic Segmentation as discussed in 50.035 course materials.
4. Explain Figure 3. What are the results in Figure 3? Why the distributions are non-decreasing? Comment if the results can support their claims.

Note that, you do not need to fully understand Wang et al. to finish the term paper. But you need to have very good understanding of 50.035 course materials.

**Grading Rubric**

The grading will be based on (i) understanding of materials (80%) and (ii) clarity of writing (20%). Obviously, you need clear writing to demonstrate your understanding of materials, and you need good understanding of materials to write succinctly.