Weekly Report

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***Abstract*—This week I mainly put my effort on reading Apple's paper and WGAN, then made a report on group meeting.**

I. Paper reading

In this paper, they propose Simulated+Unsupervised (S+U) learning, where the goal is to improve the realism of synthetic images from a simulator using unlabeled real data. The improved realism enables the training of better machine learning models on large datasets without any data collection or human annotation effort. In addition to adding realism, S+U learning should preserve annotation information for training of machine learning models. Moreover, since machine learning models can be sensitive to artifacts in the synthetic data, S+U learning should generate images without artifacts.

They develop a method for S+U learning, which they term SimGAN, that refines synthetic images from a simulator using a neural network which called refiner network. In conclusion, the following points show our main contributions:

- They propose S+U learning that uses unlabeled real data to refine the synthetic images.
- They train a refiner network to add realism to synthetic images using a combination of an adversarial loss and a self-regularization loss.
- They make several key modifications to the GAN training framework to stabilize training and prevent the refiner network from producing artifacts.
- They present qualitative, quantitative, and user study experiments showing that the proposed framework significantly improves the realism of the simulator output. We achieve state-of-the-art results, without any human annotation effort, by training deep neural networks on the refined output images.

Fig. 1 is the overview of SimGAN. Fig. 2 the example refined test images for the NYU hand pose dataset.

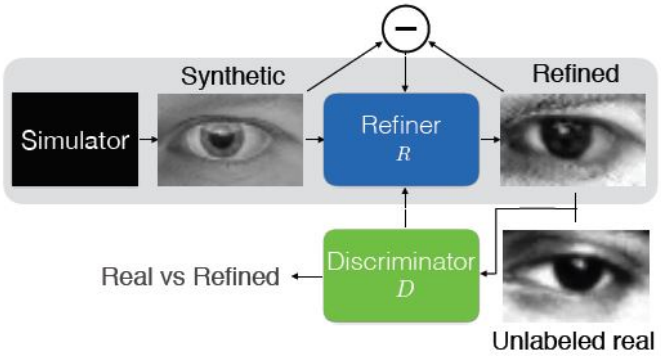

Fig. 1: Overview of SimGAN.

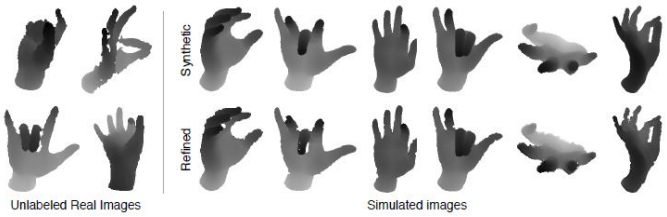

Fig. 2: Example refined test images for the NYU hand pose dataset