Week 7 Progress

2022-07-15

Generating Calorimeter Images

Outline

1. Past work
    a. Calo images generated with GANs
2. Future work
    a. Moving to Normalizing Flows
3. Evaluation metrics?

1. GANs (Generative Adversarial Networks)

Generative Modelling

(random input → sample)

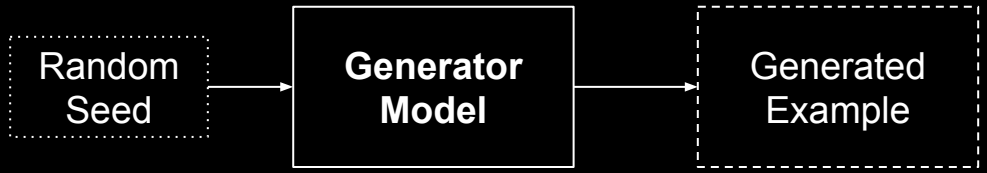
Discriminative Modelling

(sample → binary classification)

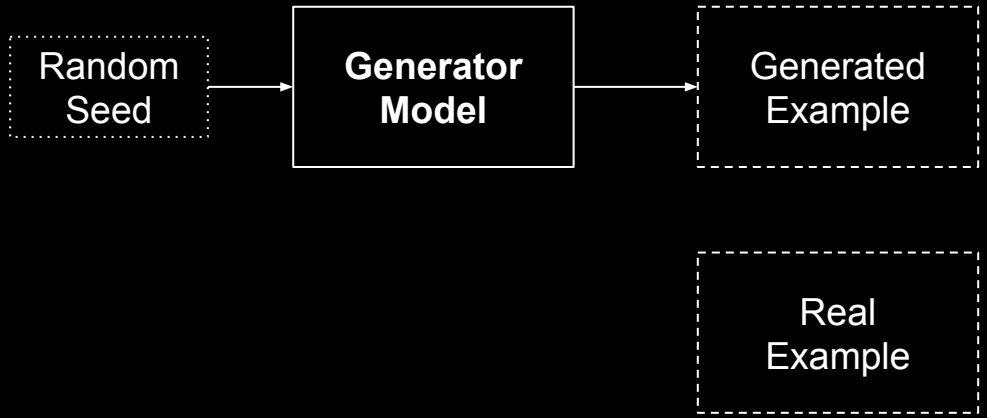
1.a. GANs (Generative Adversarial Networks)

Random Seed

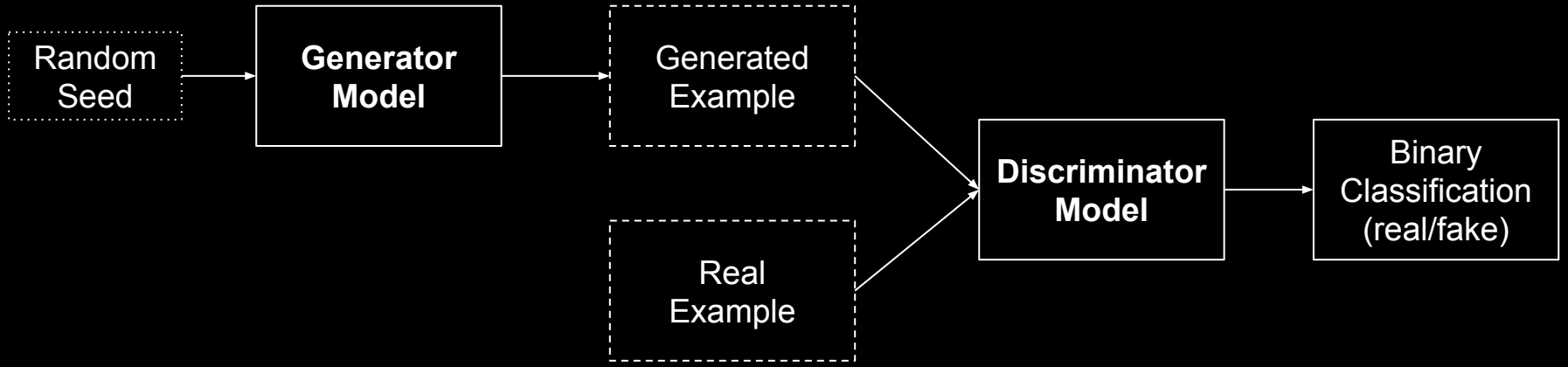
1.a. GANs (Generative Adversarial Networks)



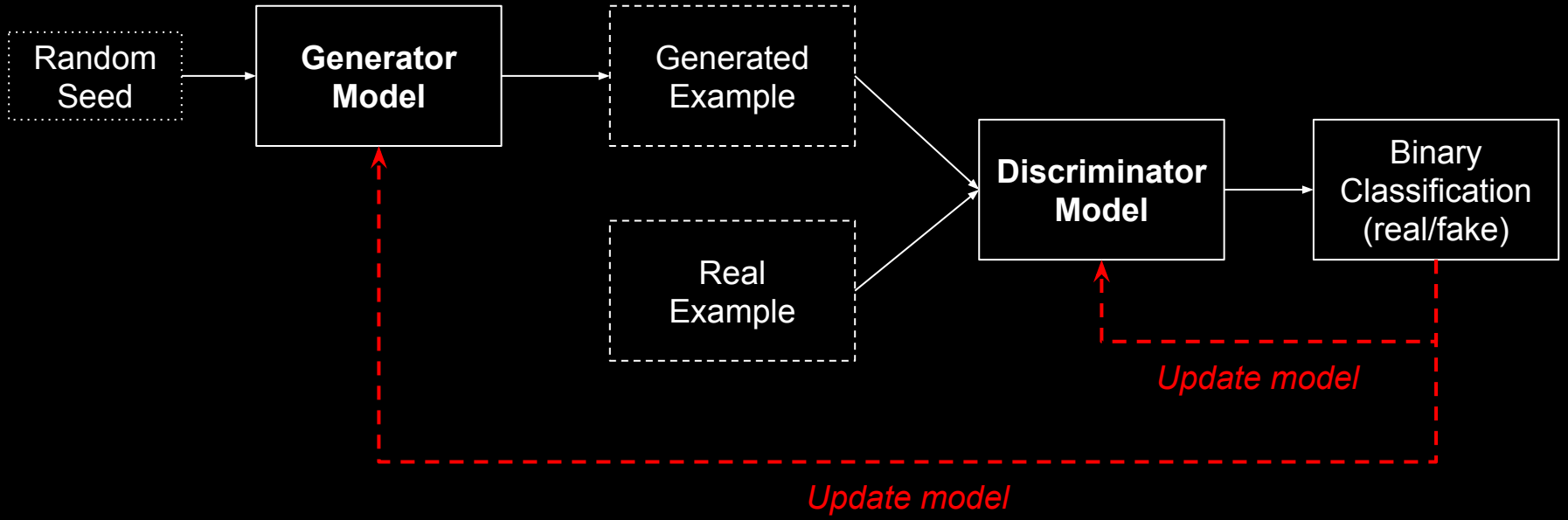
1.a. GANs (Generative Adversarial Networks)



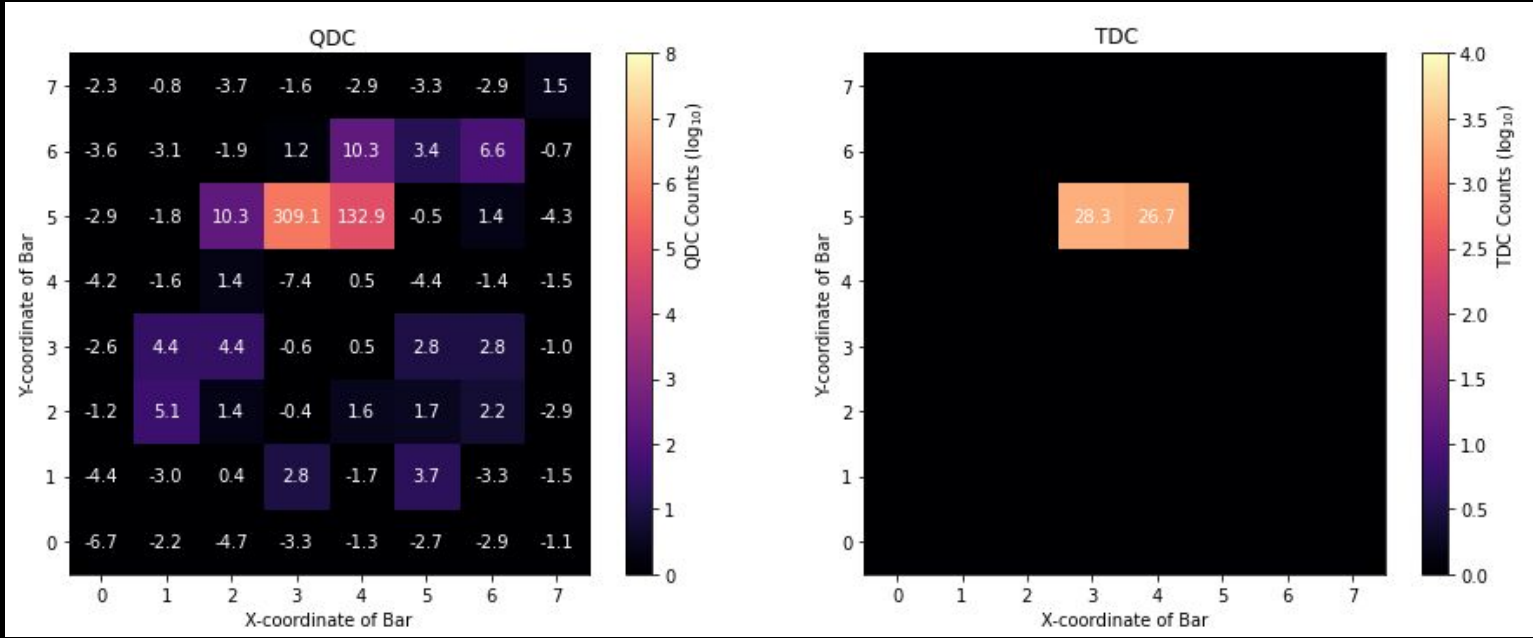
1.a. GANs (Generative Adversarial Networks)



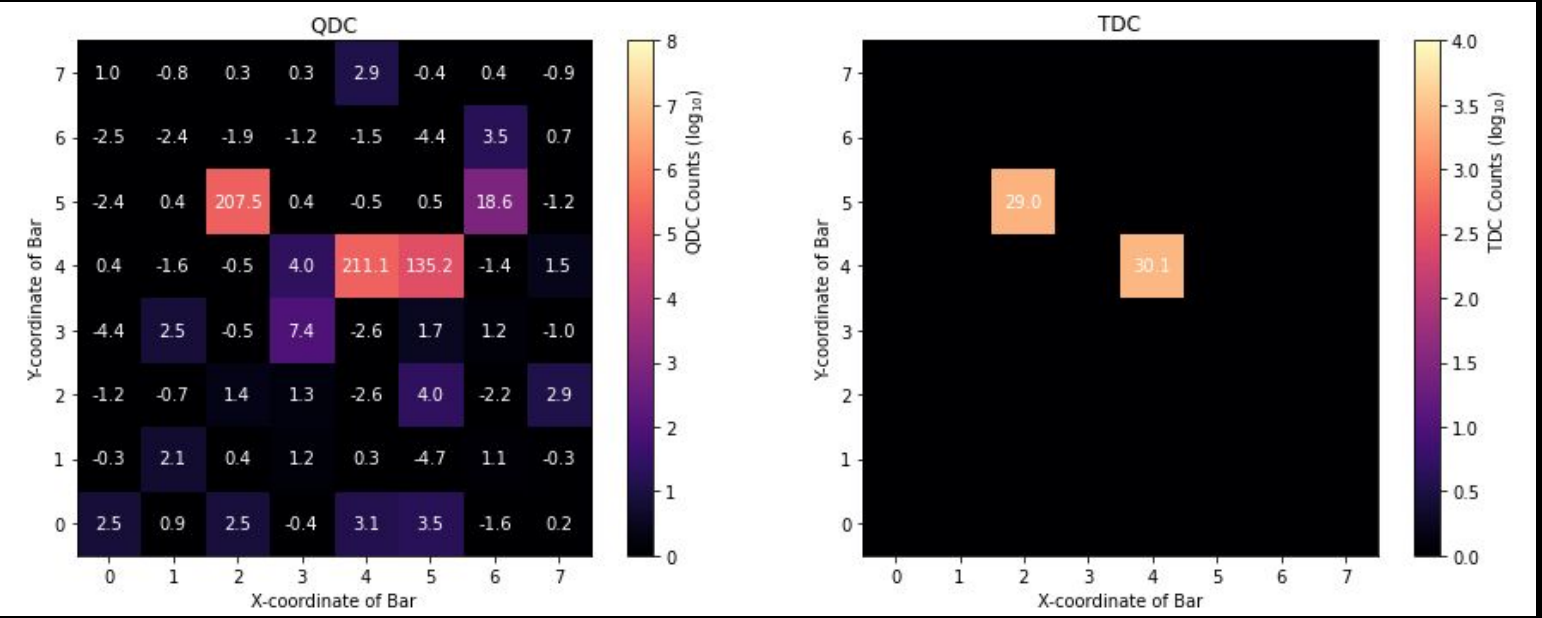
1.a. GANs (Generative Adversarial Networks)



1.b. GAN Examples (1)



1.b. GAN Examples (2)



2. Next Steps

1. Adjust hyperparameters of GAN model
2. Make new model with Normalizing Flows (more stable and convergent)
   a. Train with GEANT4 images – reach out to Stefan
3. Generate large dataset and analyze fidelity

Question: How do we evaluate fidelity of generated images?

- Histogram of total energy distribution?
- 8x8 QDC histogram (next slide) ?