WPI

MQP Progress 9/9/21

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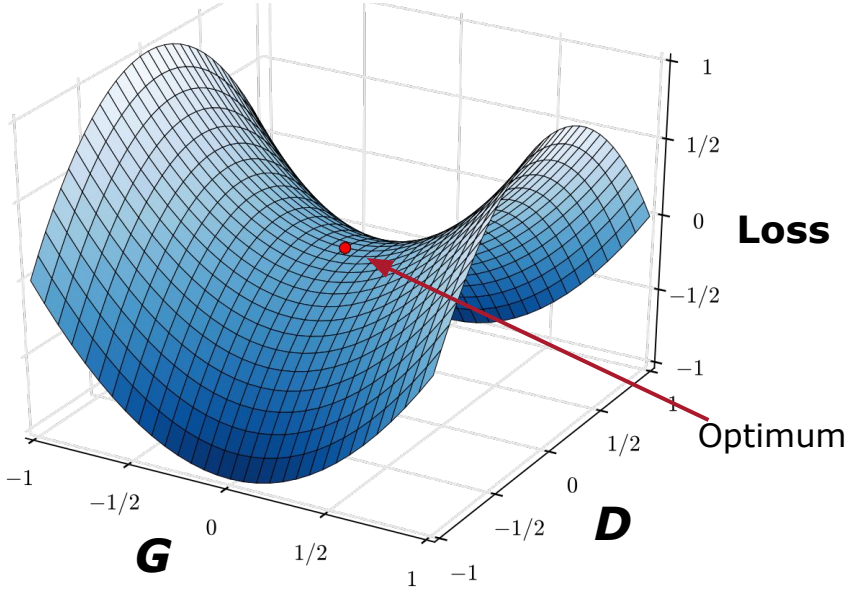
Agenda

- Literature review summary
- Machine Learning Mastery summary
- Describe next steps and receive feedback
- Determine goals for next Tuesday

Nonconvex-Concave Optimization

$$\min_G \max_D V(D,G) = \mathbb{E}_{\boldsymbol{x}\sim p_{\text{data}}(\boldsymbol{x})}[\log D(\boldsymbol{x})] + \mathbb{E}_{\boldsymbol{z}\sim p_{\boldsymbol{z}}(\boldsymbol{z})}[\log(1 - D(G(\boldsymbol{z})))].$$



- Loss imagined as a saddle
- Find pair of high dimensional functions ***D***, ***G***, that find the saddle point

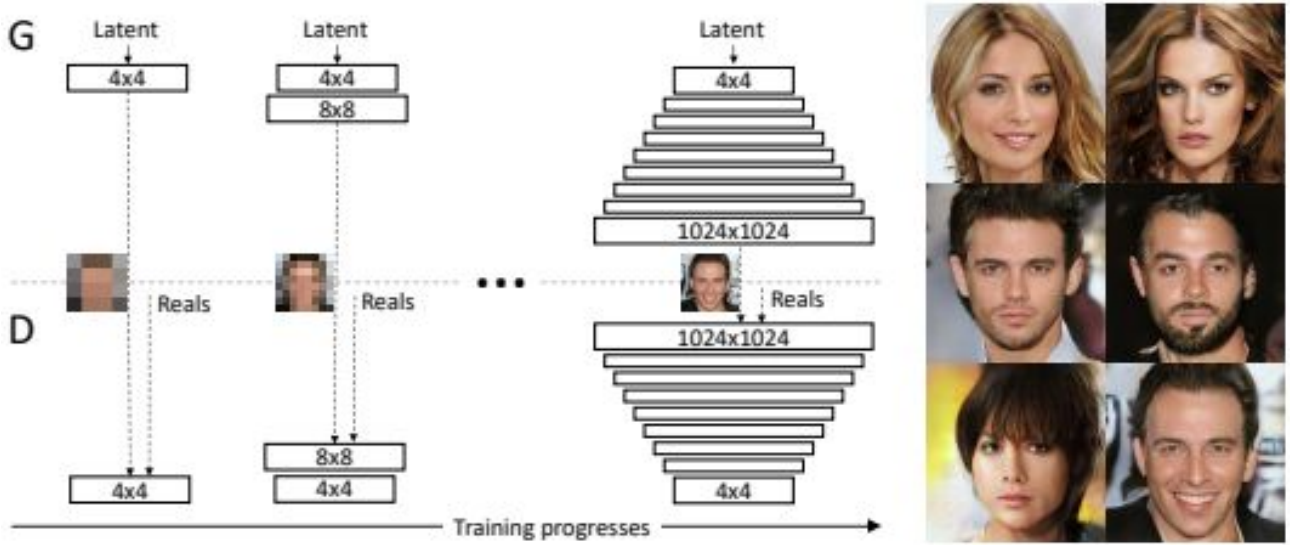
https://en.wikipedia.org/wiki/Saddle_point

Geometric GAN

- Data indistinguishable when a hard-margin SVM can’t find a hyperplane
- Loss designed from perspective of a soft-margin SVM
- G attempts to minimize margin between support vectors
- D attempts to maximize margin

Progressive Growing Gan

- GAN training method where initial training is done on very small images (4x4 pixels) and image size is gradually increased
- Somewhat more stable than basic GAN - by the time the models arrive at the more complex high-res images, they've been training for a while.



Machine Learning in Python

1. Install Python and necessary platforms (e.g., SciPy)
2. Load the data
3. Summarize the dataset
4. Visualize data
5. Evaluate algorithms
6. Make predictions

End-to-End Project Demo

Next Steps

- Finish training listed on the GitHub
- Implement a simple GAN
- Understand other types of GANs
- Explore other novel training strategies to experiment