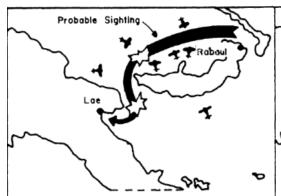
DC GAN – GO GAME

Deep Learning Final Project

SHAOQING TAN SHIHAN SUN RUI YUE



Kenny Strategy: Concentrate reconnaissance on northern route.

Japanese Strategy: Soil northern route.

Estimated Outcome: Although reconnaissance would be hampered by poor visibility, the convoy should be discovered by the second day, which would permit two days of bombing.

TWO DAYS OF BOMBING

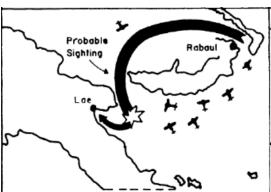


Kenney Strategy: Concentrate reconnaissance on northern route.

Japanese Strategy: Sail southern route.

Estimated Outcome: The convoy would be sailing in clear weather. However, with limited reconnaissance aircraft in this area, the convoy might be missed on the first day. Convoy should be sighted by second day, to permit two days of bombing.

TWO DAYS OF BOMBING

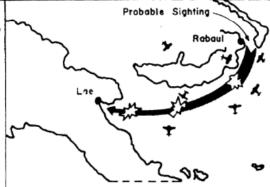


Kenney Strategy: Concentrate reconnaissance on southern

Japanese Strategy: Sail northern route.

Estimated Outcome: With poor visibility and limited reconnaissance, Kenney could not expect the convoy to be discovered until it brake out into clear weather on third day. This would permit only one day of bombing.

ONE DAY OF BOMBING



Kenney Strategy: Concentrate reconnaissance on southern route.

Japanese Strategy: Sail southern route.

Estimated Outcome: With good visibility and concentrated reconnaissance in the area, the convoy should be sighed almost as soon as it sailed from Robaul. This would allow three days of bombing.

THREE DAYS OF BOMBING

INTRODUCTION

Deep Convolutional Generative Adversarial Networks

"The underlying idea behind GAN is that it contains two neural networks that compete against each other in a zero-sum game framework, i.e. generator and a discriminator."

Game Theory (Minimax)

		Japanese strategies		Minimum of row
		*1	*2	i minimum or row
Kenney strategies	*1	2 days	2 days	2 days (maximin)
	*2	1 day	3 days	1 day
Maximum of column		2 days (minimax)	3 days	

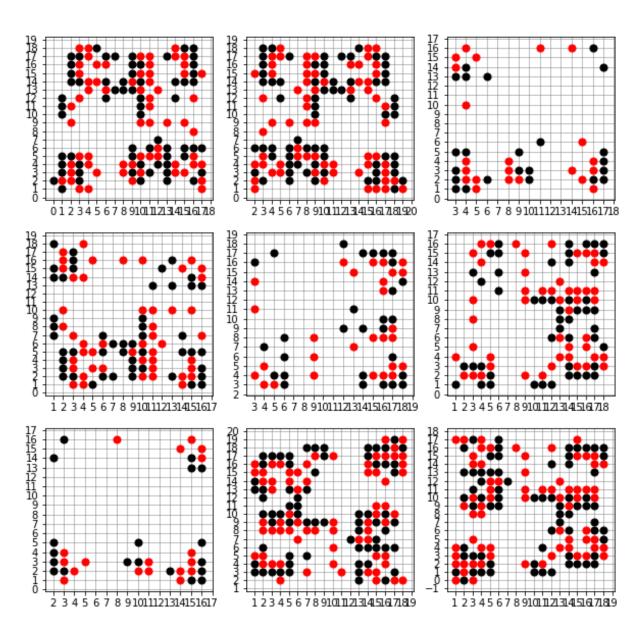
How to Play GO





Data preparation

- Source
 - ➢ github https://github.com/timlyrics/gangengo
 - Download with git clone
- > Format
 - Kifu formatted zipped text files
 B[pd]; W[dd]; B[pp]; W[dp];
 - From old professional and AI games
- > Extraction
 - > Over 80,000 games
 - > Remove bad characters
- Unrolling
 - > Replay each step and record snapshot
 - ➤ Bitmap of 20x20 (padded from 19x19)
 - > Two binary channels
 - Transpose and mirror

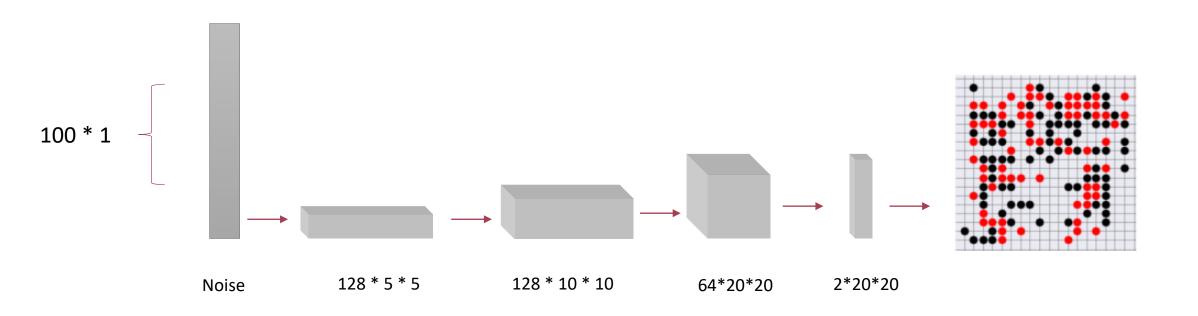


Data preparation

- Packaging
 - Over 512 GB of raw data
 - That's too much! Even after zipping
 - Dynamically unroll kifu while training
- Unsupervised training
 - ➤ All data is considered real (1)
 - > Random noise is considered fake (0)
- > Testing & validation
 - ➤ No objective way to either test or validate
 - Observe loss function to have confidence
- > Example snapshot

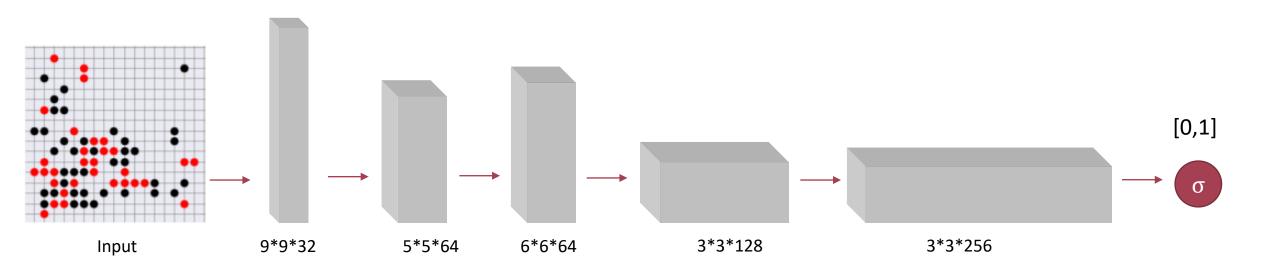
Generator

- Generative Model
- > Selection of layers
- > Regularization Method: Dropout
- Parameter
- Loss function

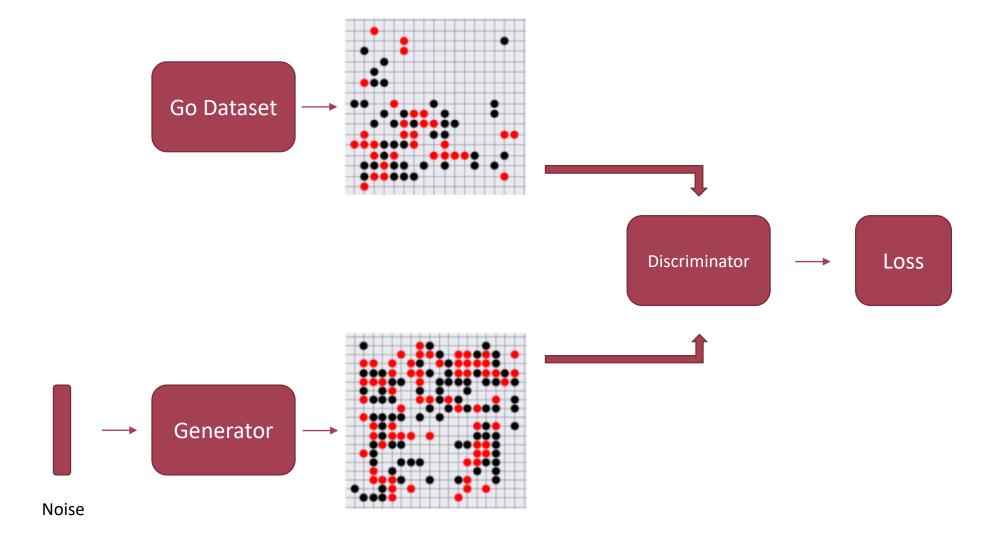


Discriminator

- Discriminator Model
- > Selection of layers
- > Regularization Method: Dropout
- Parameter
- Loss function



Loss Function

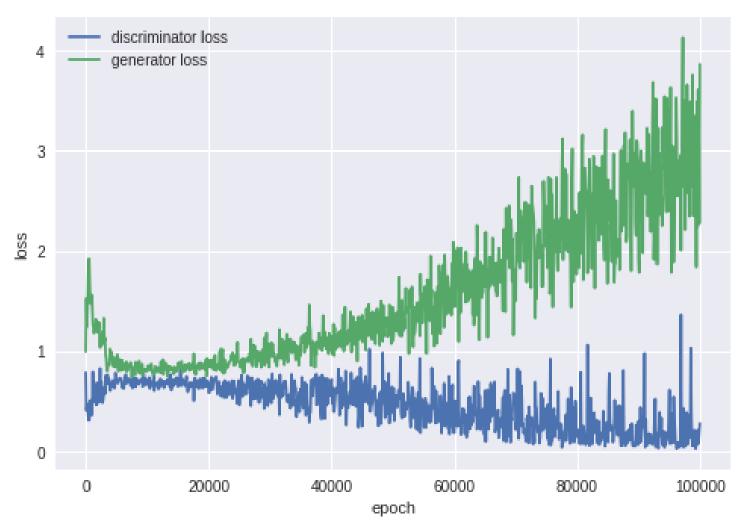


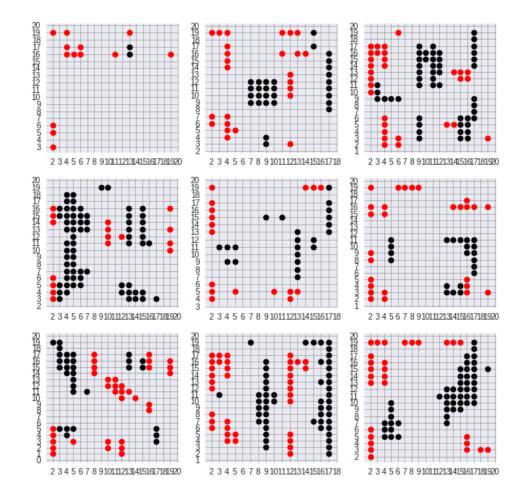


Fine Tune

- > Deviated from DC Gan reference design
 - > Each pixel carries two channel
 - > Two channels do not coincide
 - > Each channel is binary
 - ➤ Go has global and local logic
- > Learning rate
 - Discriminator can easily overpower
 - \triangleright gen=0.0001 disc=0.00002 (decay = 1e-6)
- Batch size
 - Must feed the beast slowly
 - ➤ Batch size = 128
- Generator
 - Output activation is sigmoid
 - > Latent dimension is reduced to 32
- Discriminator
 - > First CNN layer has no zero padding

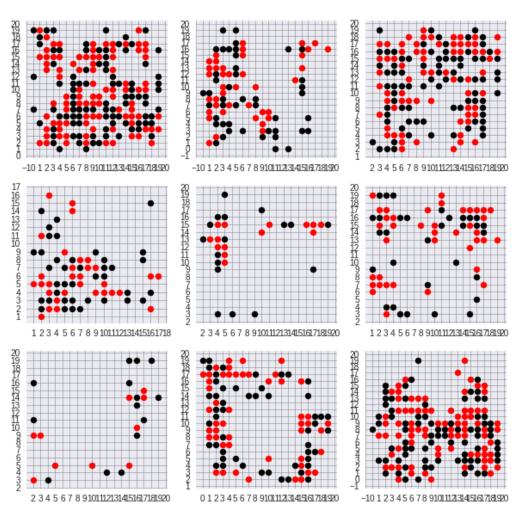
Result – Loss Function





500 Epochs

Result - Output



100,000 Epochs

Question



