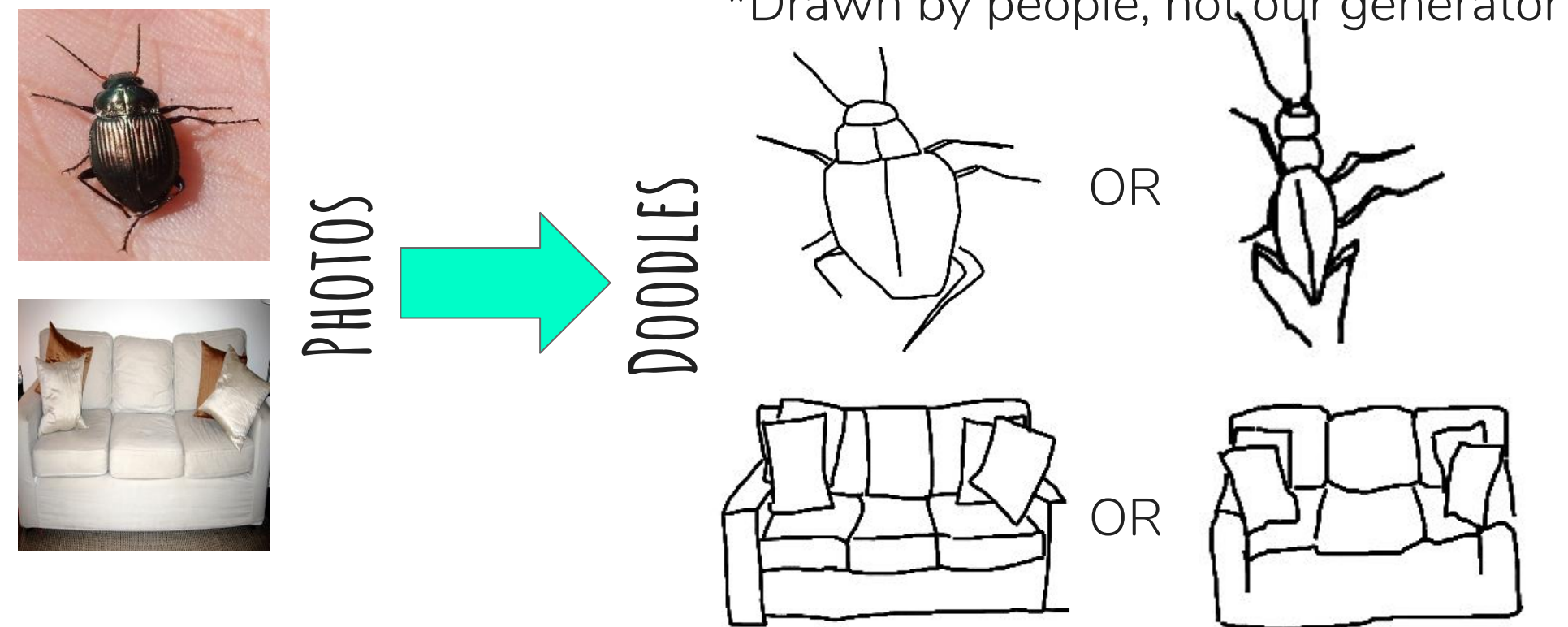


# PHOTO TO DOODLE GENERATOR USING GAN

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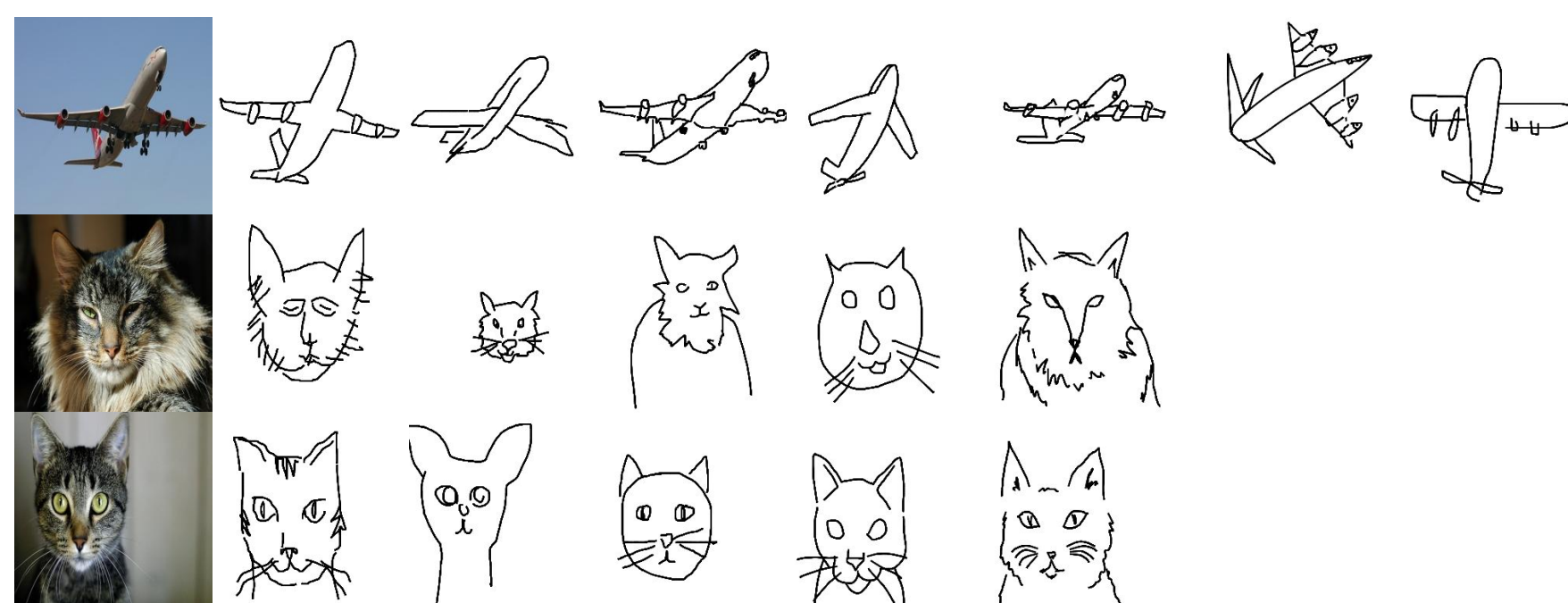
Video: <https://www.youtube.com/watch?v=6SUxvH39eA>

## INTRODUCTION



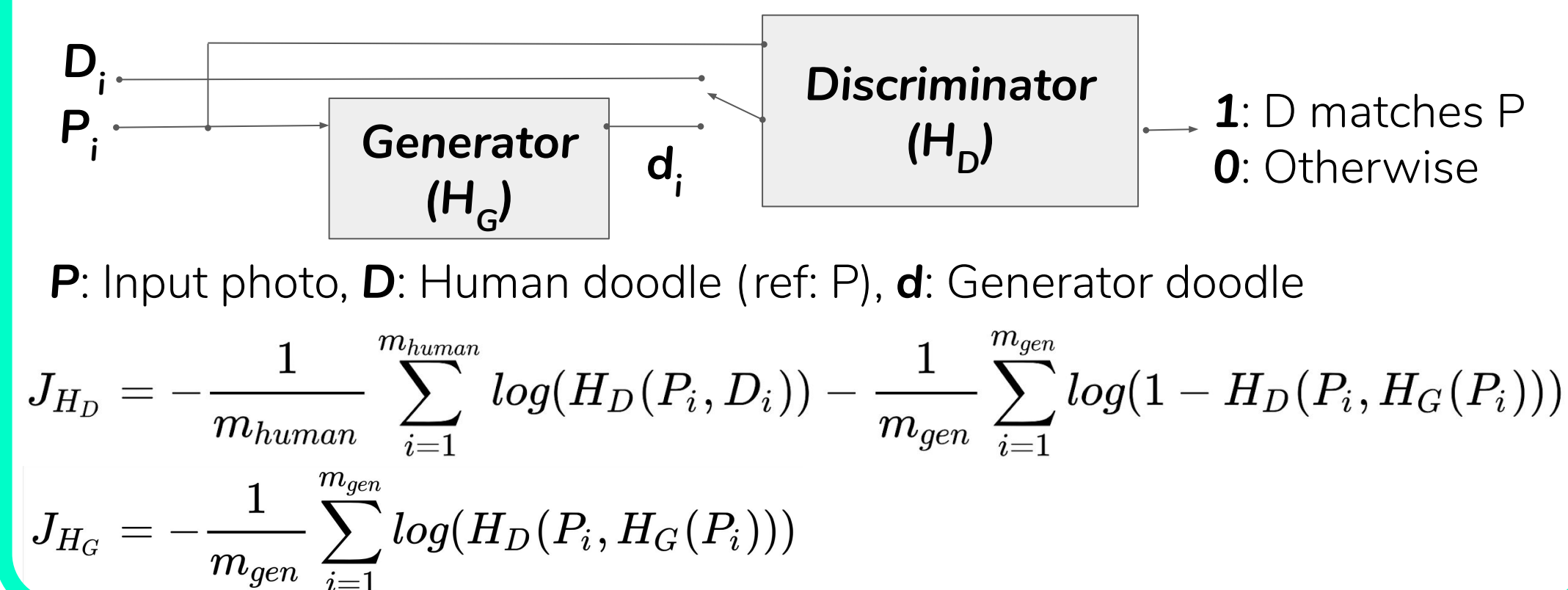
- **Goal:** Generator that converts photo to a doodle. Prior art only covers search not doodle generation.
- **Challenge:** High variation in doodles made by people. No simple loss function for training a generator.
- **Solution:** GAN - Train classifier that matches photos to doodles, and make a generator “fight” it
- **Result:** Good early results, more training and model iteration needed.

## DATASET

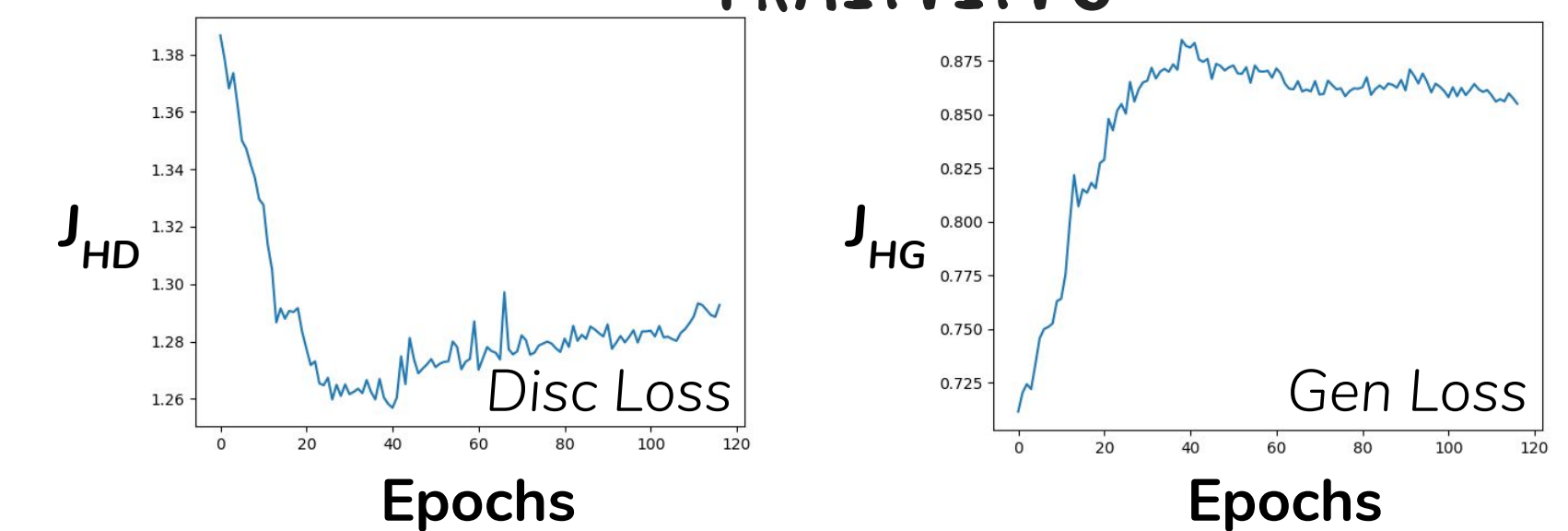


- **Source:** Sketchy, <http://sketchy.eye.gatech.edu>
- **Details**
  - 125 object categories (e.g. cat, guitar, airplane)
  - Average 100 photos per object category
  - 5-7 human drawn doodles per photo
  - Sketches labeled for wrong context, errors, wrong pose or other ambiguity
- **Overall:** 125 categories, 12,500 photos, ~75,000 doodles (sketches)

## GAN ARCHITECTURE



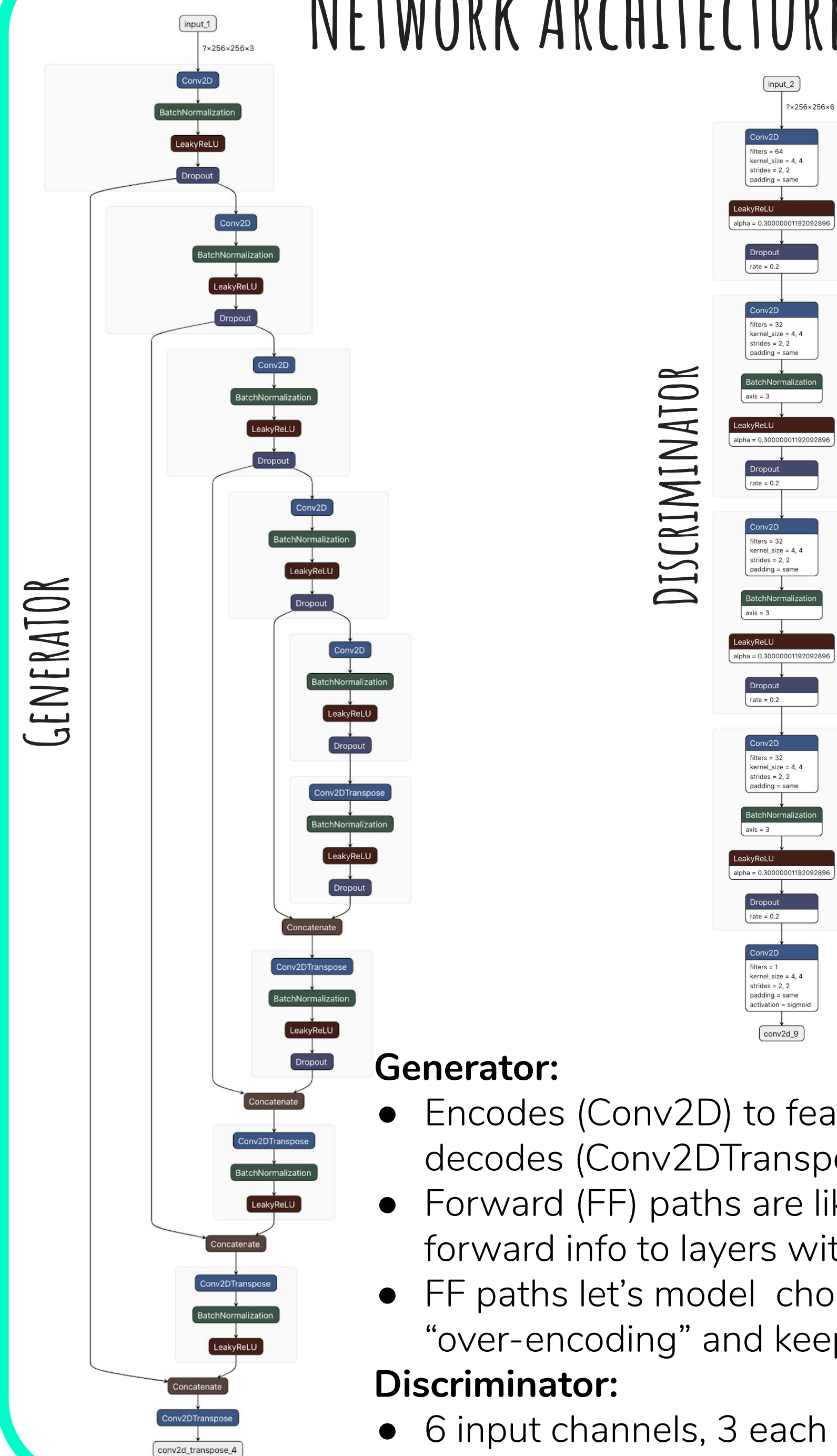
## TRAINING



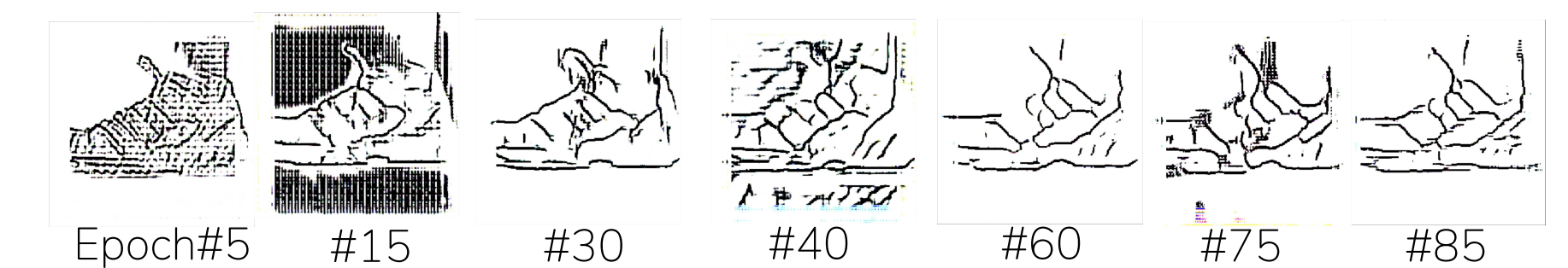
**Training Ratio:** 2:1 for Generator:Discriminator

**Note:** Only 1/3 of sketchy data used for due to time/compute constraints

## NETWORK ARCHITECTURE



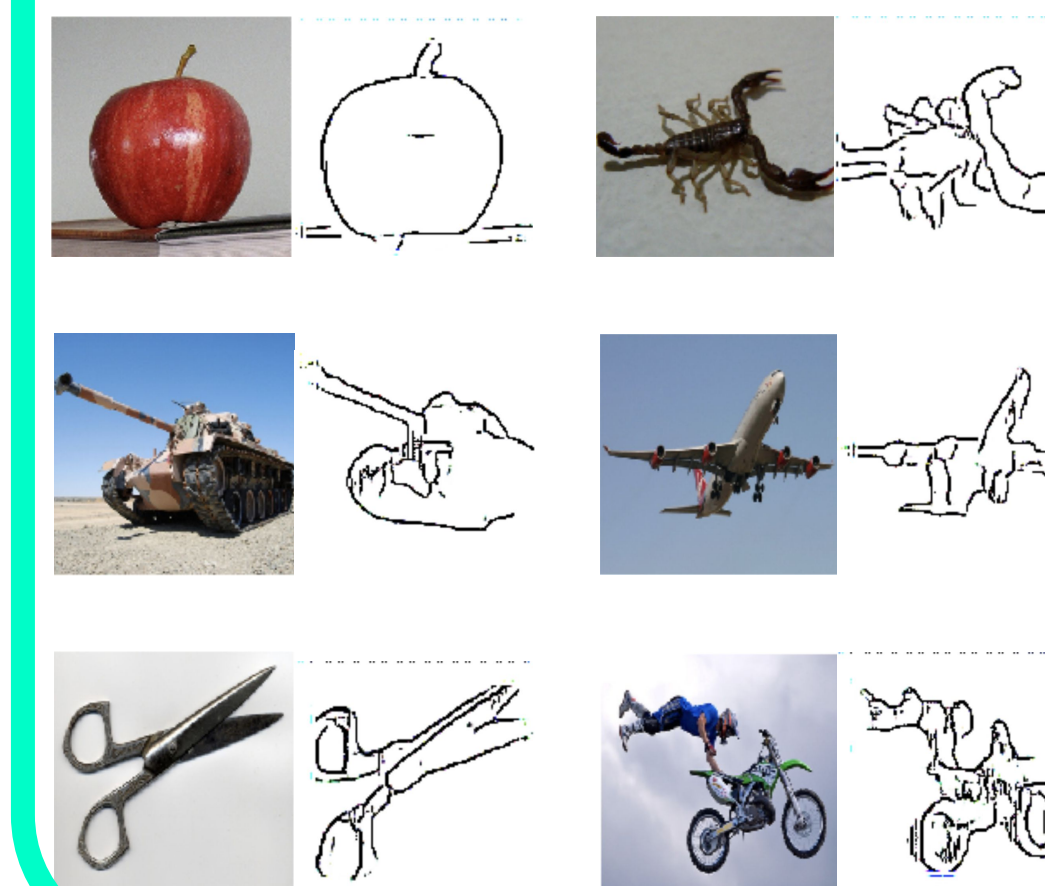
## GENERATED DOODLES



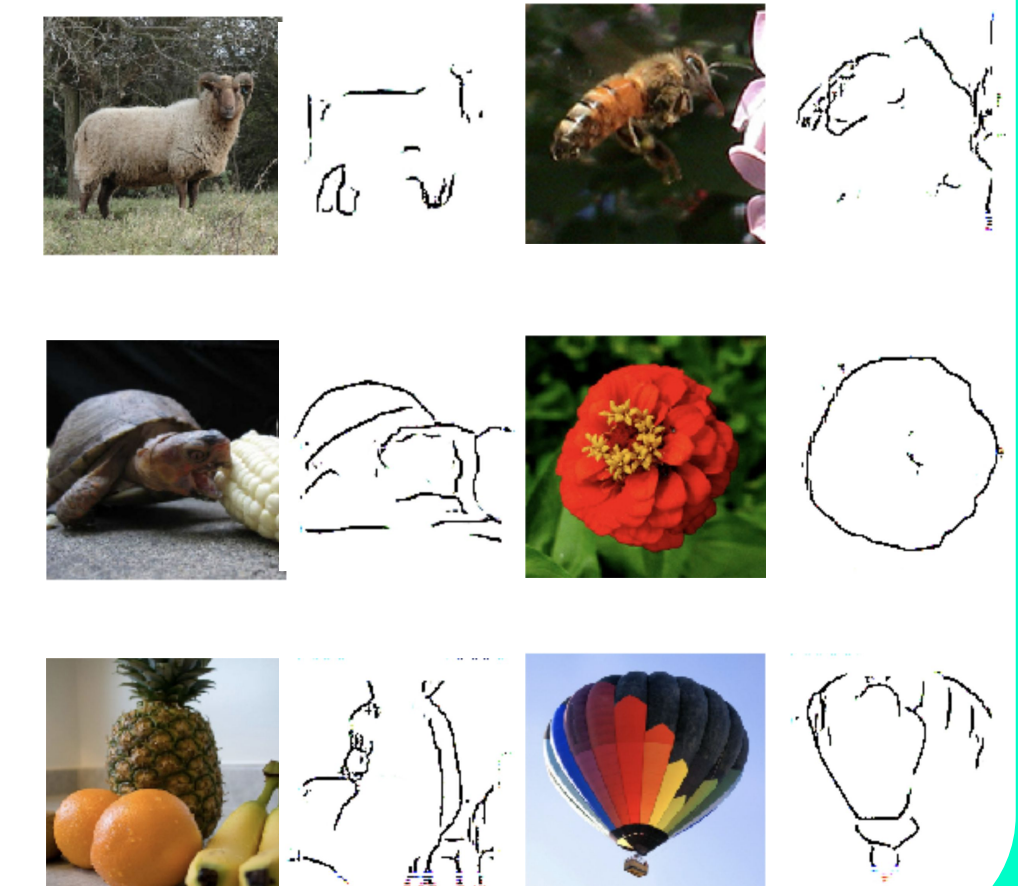
**Over Epochs:** Oscillating between eroded edges and smudges

**NOTE:** Results below are after epoch 74

### Decent Outputs



### Poor Outputs



## DISCUSSION & FUTURE WORK

- **Model Performance:**
  - Model confused by input detail (background and subject)
  - Over iterations, it didn't hit the right tradeoff between capturing edges and filtering extraneous detail.
- **Future work**
  - More compute and training!
  - Architect a separate block to separate subject & background
  - Increase generator model complexity to identify and render key edges in subject and filtering out detail