doodle-bot-learn

Original Images Drawn with GANs

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Overview

Doodle Bot

- Platform for request driven image generation
- Also used for hierarchical classification
- AI integration throughout all parts

The Problem

- Can hierarchical classification be used to improve image classifiers, and avoid the *pixel change* problem?

The Problem

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- ConvNets only rely on pixel information, which leaves valuable information on the table
- Don't take into account hierarchical concepts

Hierarchical Concepts

Animals

- Exist within a taxonomy
- Related animals share similar characteristics

ImageNet

- Searchable source of images
- How do we sample this?

WordNet

- Conceptual backend for ImageNet
- Graph of semantic relations among words
- Common measure of difference between all words

Generative Adversarial Networks

- Networks networking together
- Two parts:
  - Generator
  - Discriminator

Generator Network

- Outputs a vector of noise, to forms an image

Discriminator Network

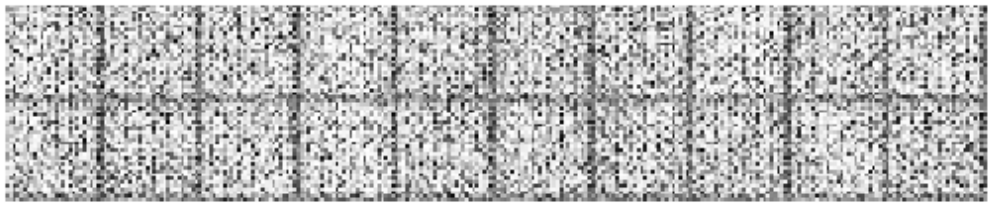
- Trained as an image classifier
- Evaluates the output of the generator

MNIST Results

- Proof of concept using the *MNIST* dataset
- Trained for 500,000 observations

MNIST Results

MNIST Results



MNIST Results

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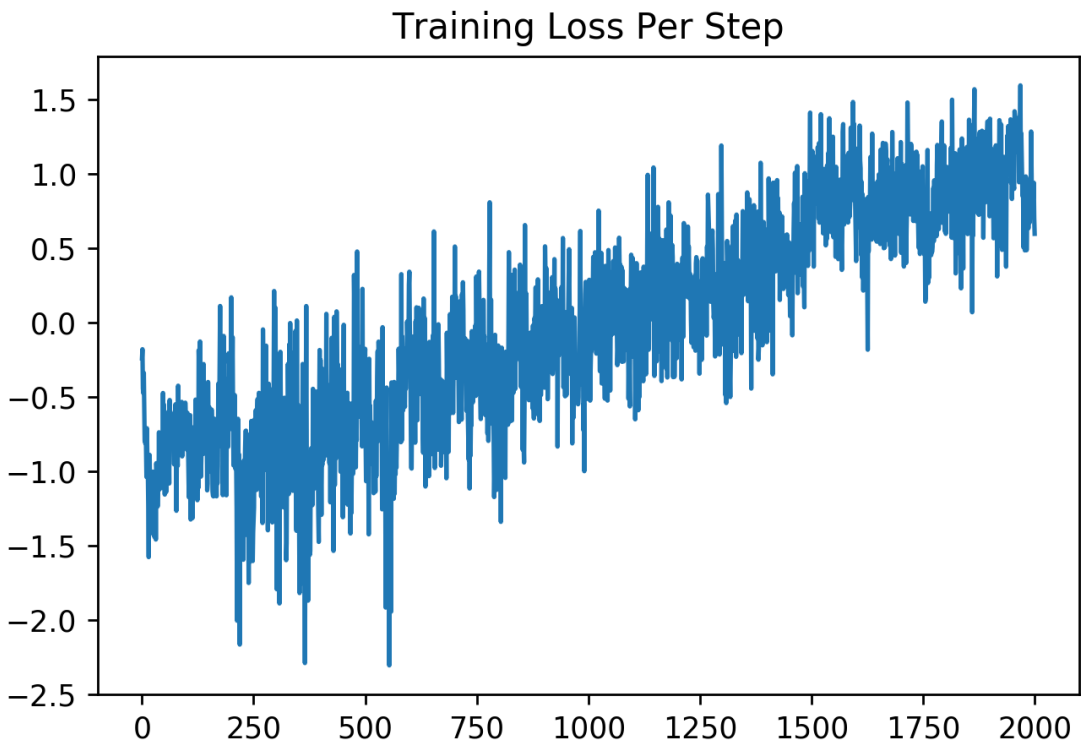
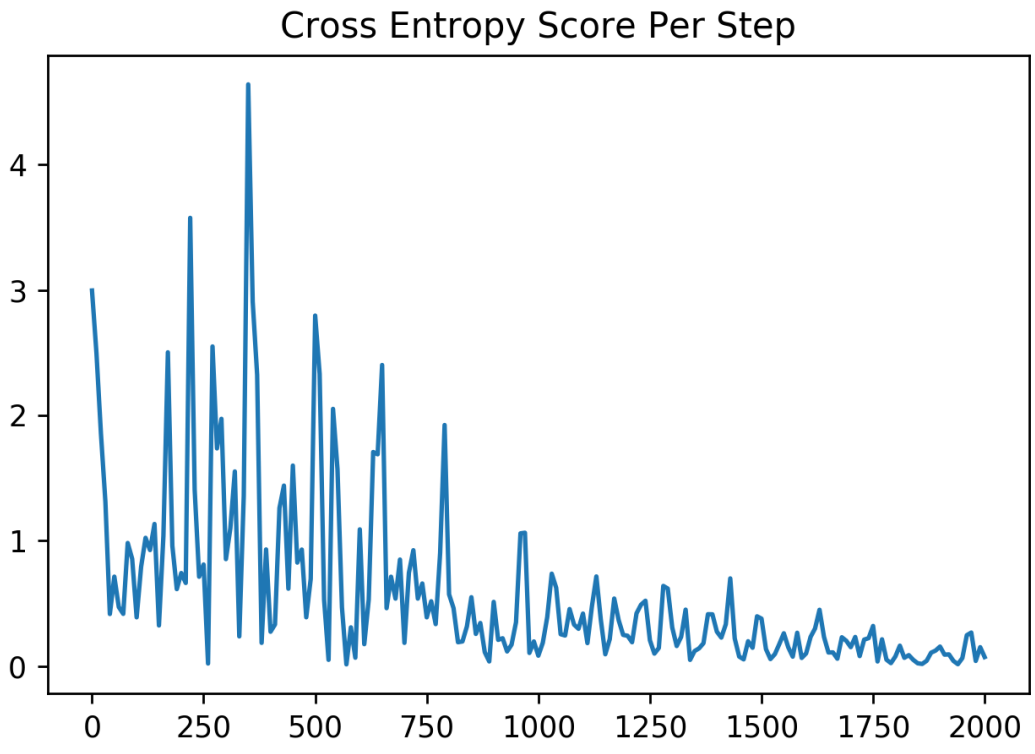


MNIST Results



GANs ¿ ConvNets

- How do GANs help us more than ConvNets?
- *Semantic Vectors*

Zebra - Horse = Stripes

Tech

Two components

- doodle-bot
  - Front end application and data handling
- doodle-bot-learn
  - Warehouse for AI model building

Amazon Web Services

- EC2
  - p2.xlarge instances used for training
  - Nvidia Tesla KS80 gpus
- S3
  - Storage for harvested images, as well as trained models
- Neptune
  - Graph database for mapping image libraries, and models

Project Roadmap

- Q4 2017
  - Run on CIFAR10 and extended CIFAR10
  - Connect doodle-bot and doodle-bot-learn
- Q1 2018
  - Run on CIFAR100
  - Run on ImageNet
  - Public hosting with limited library

Future Research

- Classifiers trained with GANs
- Hierarchical GANs
- Handwriting Learner

Future Research

Thank you.