E6893 Big Data Analytics

NICE DRAWING

- *A tool that reproduces similar looking line drawings from sketches or photos*

Project ID: 201812-22
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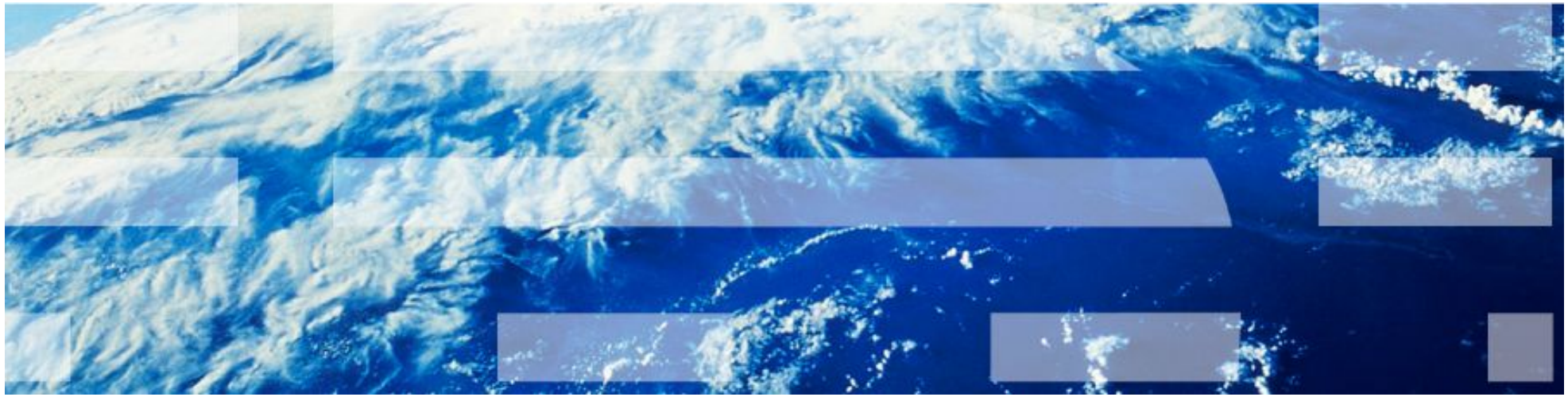
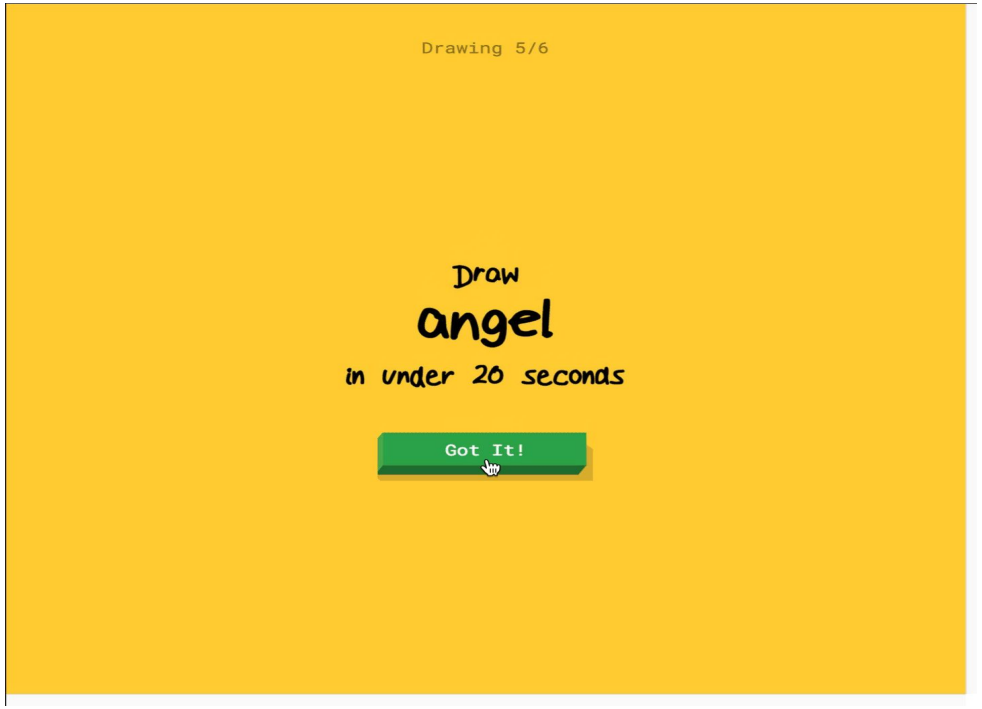


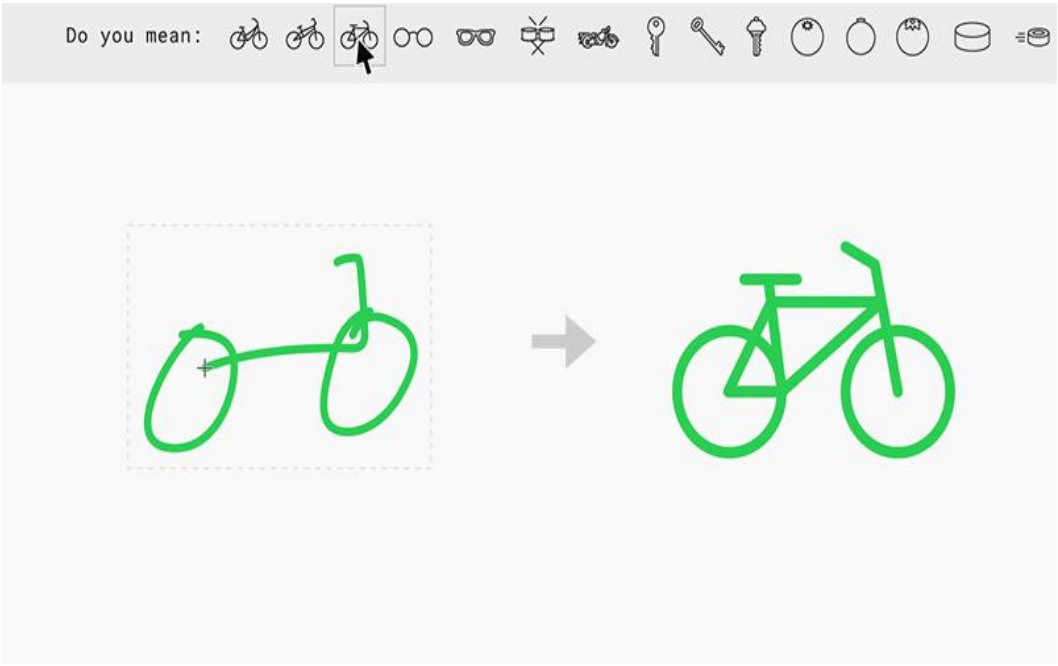
Agenda

- Introduction & Motivation
- Dataset
- Algorithms & Tools
- Demo
- Contributions & References

Introduction & Motivation

- Inspired by Quick, Draw! and AutoDraw developed by Google
- Explore the application of the state-of-the-art technologies toward visual art
- Make the drawing experiences easier, faster, and more fun to the general public
- Assist the creative process of professional artists and designers and help them expand imagination





Dataset

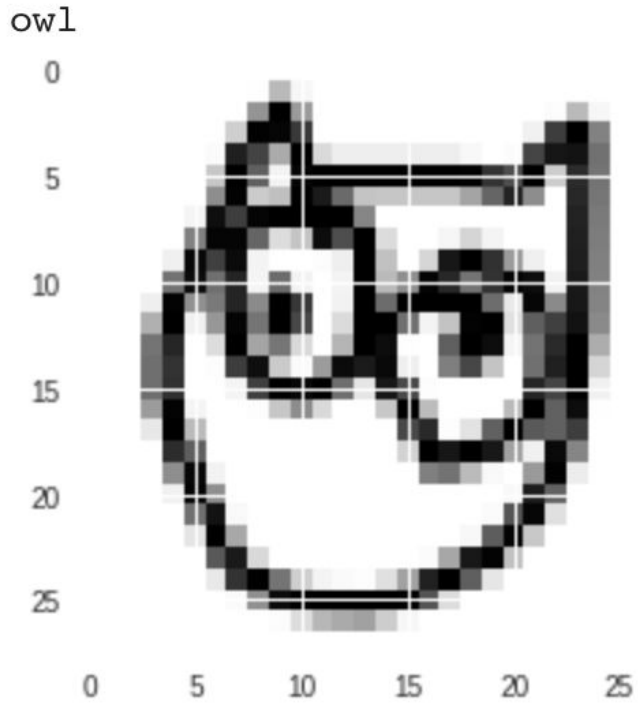
The Quick, Draw! Dataset: 50 millions of drawings across 345 categories

- **Categories: 15 animal categories**

ant	124,612	dog	152,159	owl	169,632
bear	120,890	duck	135,480	penguin	253,791
bee	134,762	flamingo	124,569	pig	186,770
bird	133,572	frog	159,047	snail	133,757
cat	123,202	octopus	150,152	tiger	121,067

- **Data Size: 1.85G**
  Classification: 100K samples (80K training & 20K test) per category

- **Data Format: Numpy Bitmaps (.npy)**
  The drawings have been rendered into a 28x28 grayscale bitmap in numpy .npy format.



Algorithms & Tools

Algorithms:

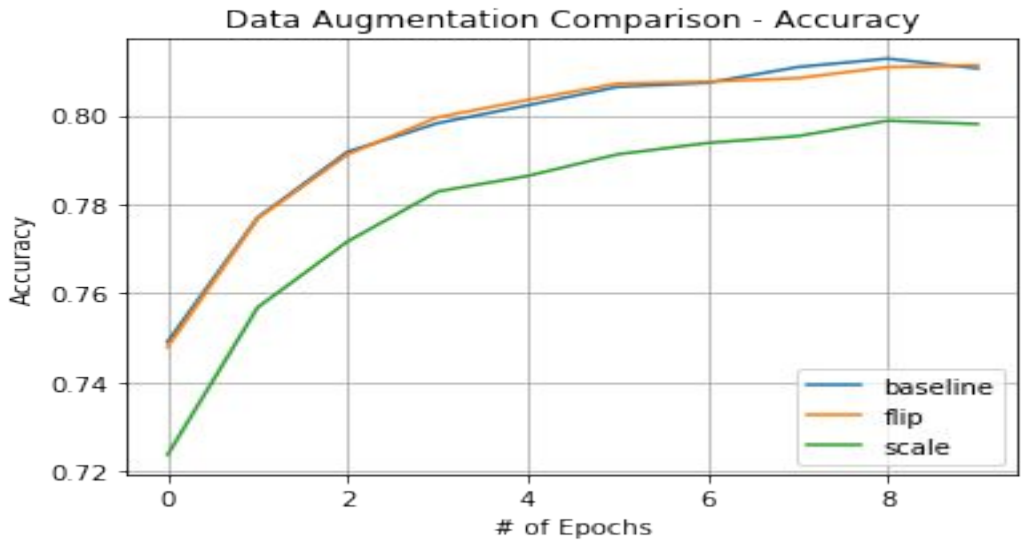
- **Classification:**
  - **Drawings**: Logistic Regression, CNN
  - **Photographs**: TensorFlow Image Recognition and Object Detection API
- **Visualization**: Use t-SNE to visualize similarities between drawings.

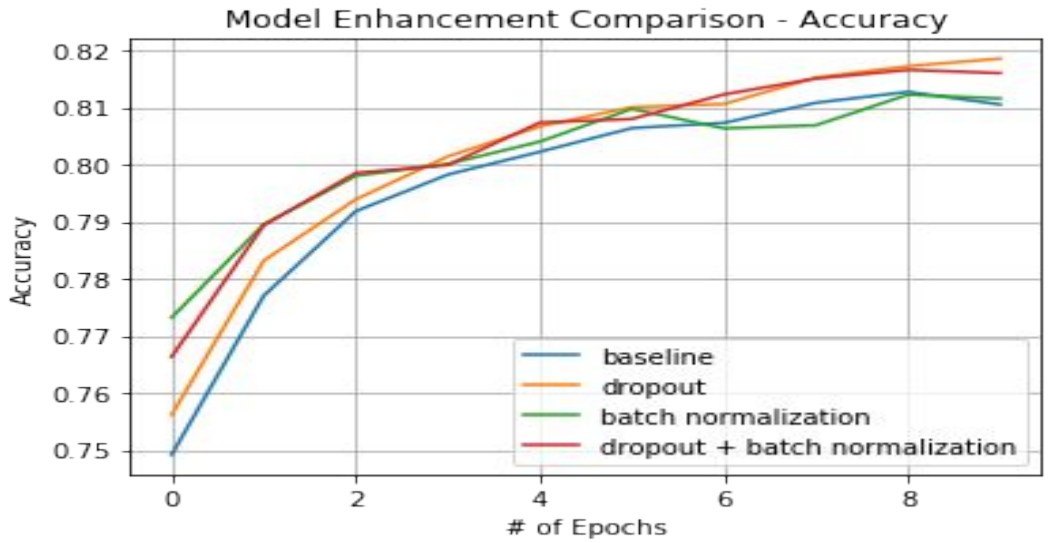
Tools:

Google Cloud Platform, Google Cloud Dataproc, Spark
TensorFlow, TensorFlow.js,
Jupyter Notebook, Google Colab, Observable Notebook, GitHub Pages

Pipeline

01	Train model	• Logistic Regression: accuracy 43% • CNN: accuracy 82%
02	Prepare Model for Web	• Save • Convert • Download
03	Deploy Model on the Browser	• Observable Notebook • Github Pages

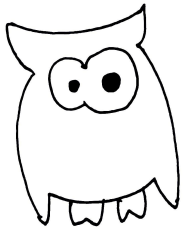
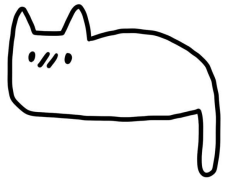
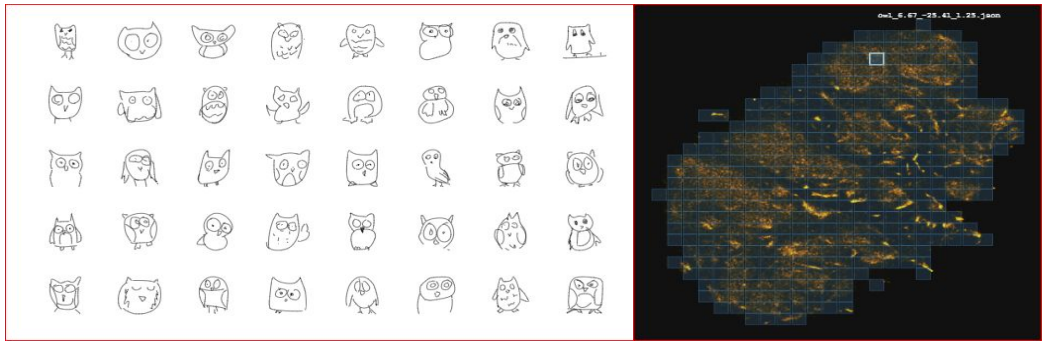
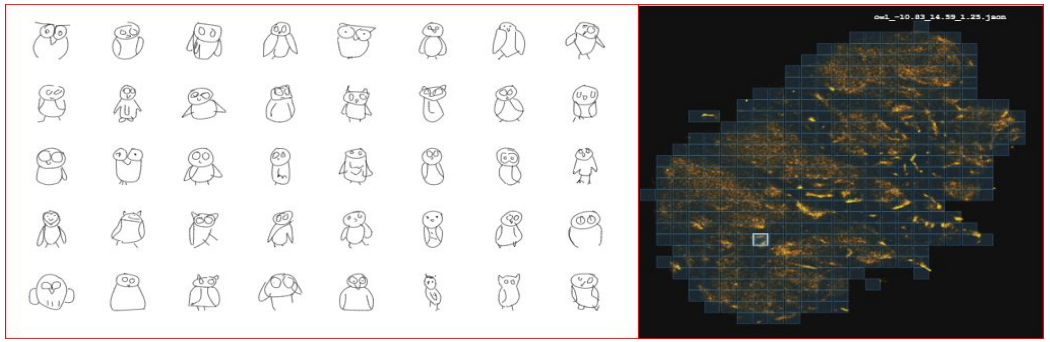




Demo

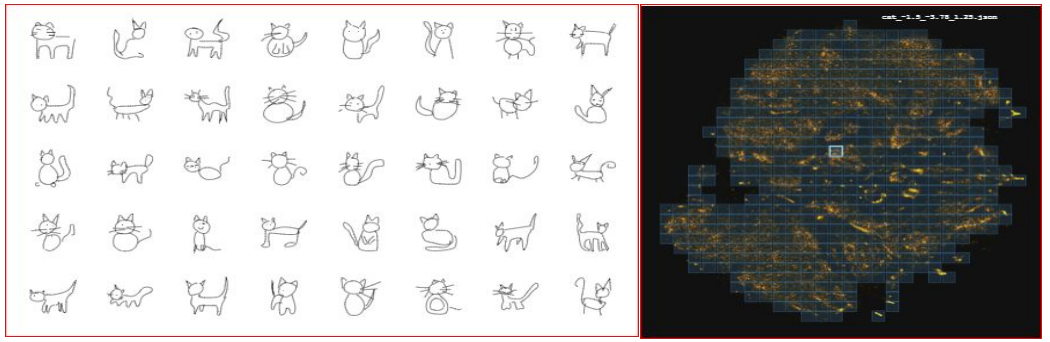
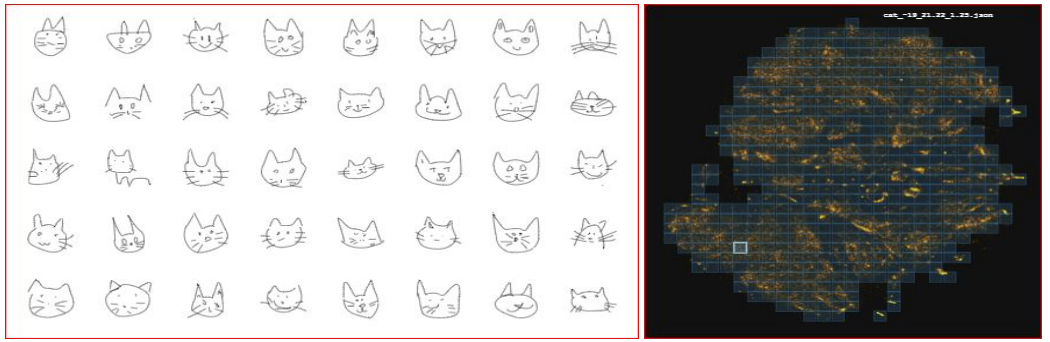
YouTube Observable

- Turn a (poorly) sketched digital drawing into (more aesthetically) similar looking reproductions

- Convert an uploaded photograph of an object into an unrealistic but similar looking line drawing



Contributions & References

Contributions:

- **Xueyao Li**: Classification (Drawings), Big Data Frameworks, Website (Github Pages)
- **Yiyi Zhang**: Classification (Photographs), t-SNE Visualization, Website (Observable Notebook), Demo

References:

- The Quick, Draw! Dataset https://github.com/googlecreativelab/quickdraw-dataset
- TensorFlow Image Recognition and Object Detection API https://github.com/tensorflow/tfjs-models
- Machine Learning for Visualization https://medium.com/@enjalot/machine-learning-for-visualization-927a9dff1cab
- Deploy model on the browser using TensorFlow.js https://github.com/zaidalyafeai/zaidalyafeai.github.io/tree/master/sketcher

Thank You!