DEEP LEARNING WITH
TENSORFLOW

FEB 20 - MAR 29

Mondays and Wednesdays

6:30pm - 9:30pm

Sam Abrahams

Link to slides:

https://tinyurl.com/z3cx82c

For the presentation today:

- Ask questions in the chat box
- Link to slides: https://tinyurl.com/z3cx82c
- This will be recorded
- Presentation itinerary:
  1. Slides: Deep learning context and course outline
  2. Q/A
  3. Light demo: using a pre-trained network with TensorFlow
  4. Q/A
- Admissions: amy@thisismetis.com

ABOUT THE INSTRUCTOR

- Creator, Deep Learning with TensorFlow
- Co-author, *TensorFlow for Machine Intelligence*
- Consultant, Memdump
- Maintainer, TensorFlow on Raspberry Pi
- Long time contributor, TensorFlow

GitHub: samjabrahams Twitter: @Sabraha

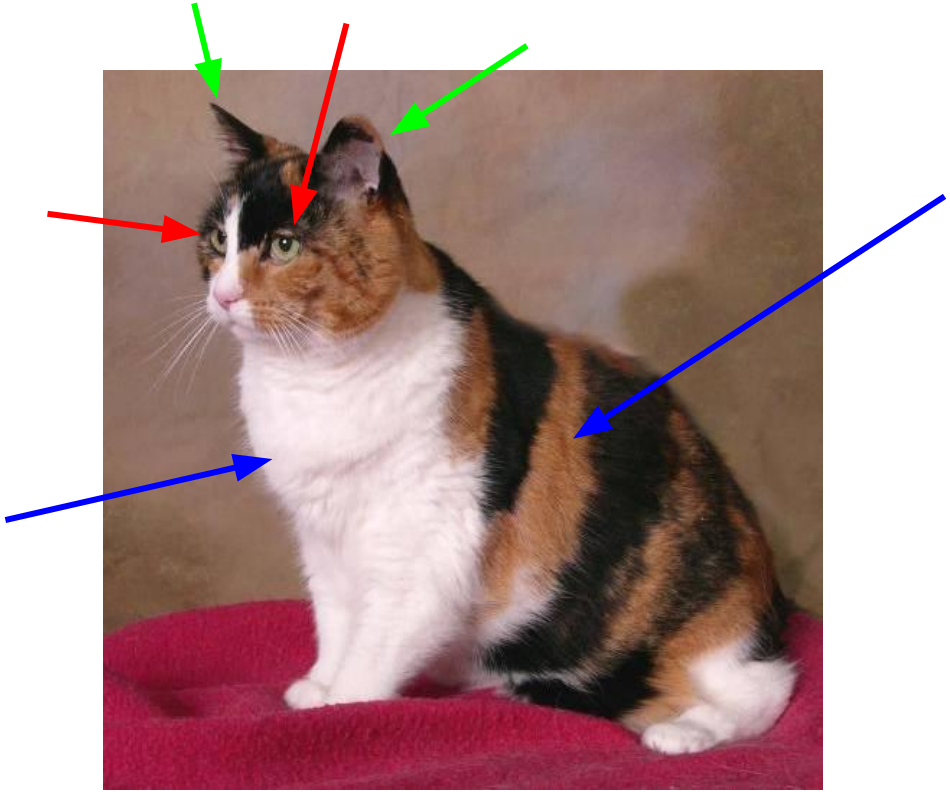
Deep Learning

A Question:

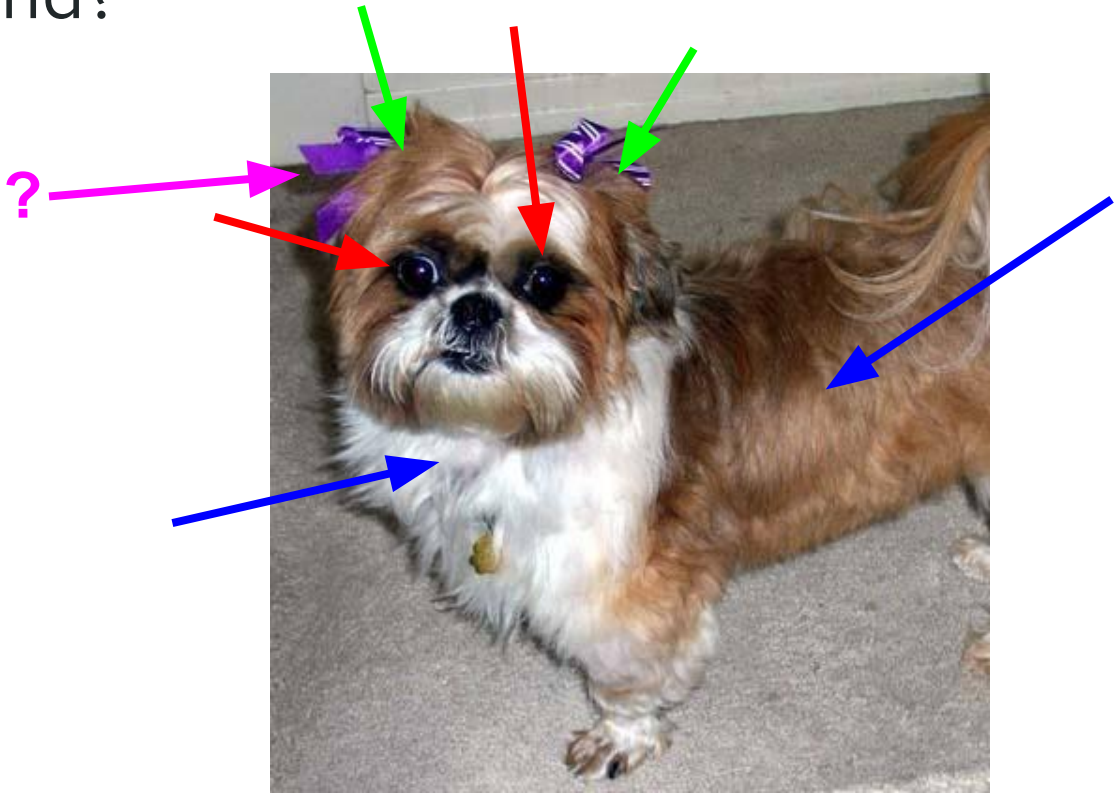
OR

?

By hand?



By hand?

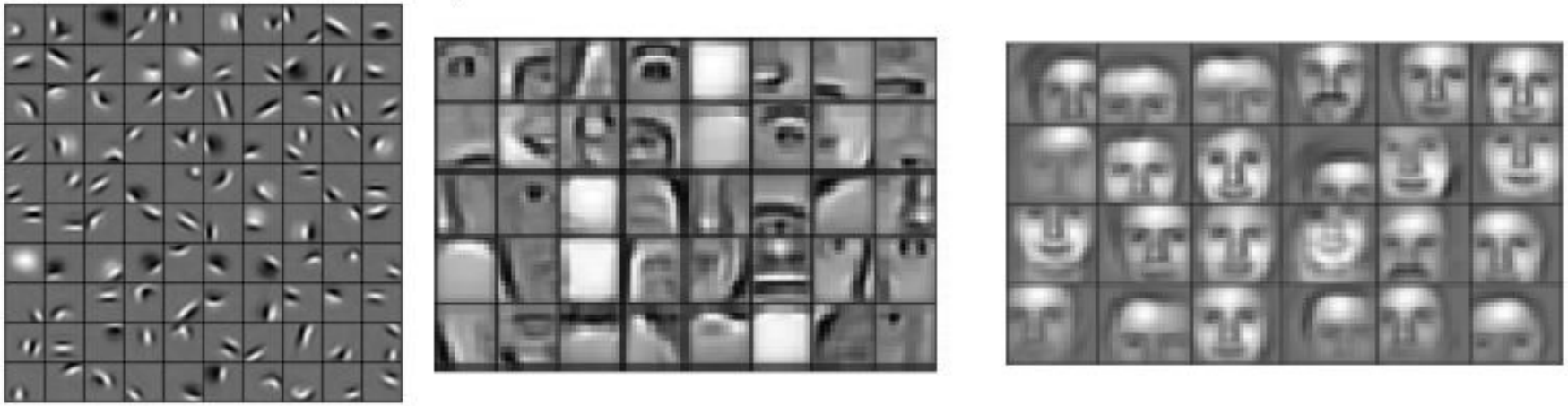


Making good, complex features by hand isn’t practical

What if:

A computer could do it for us?

Example: recognizing faces

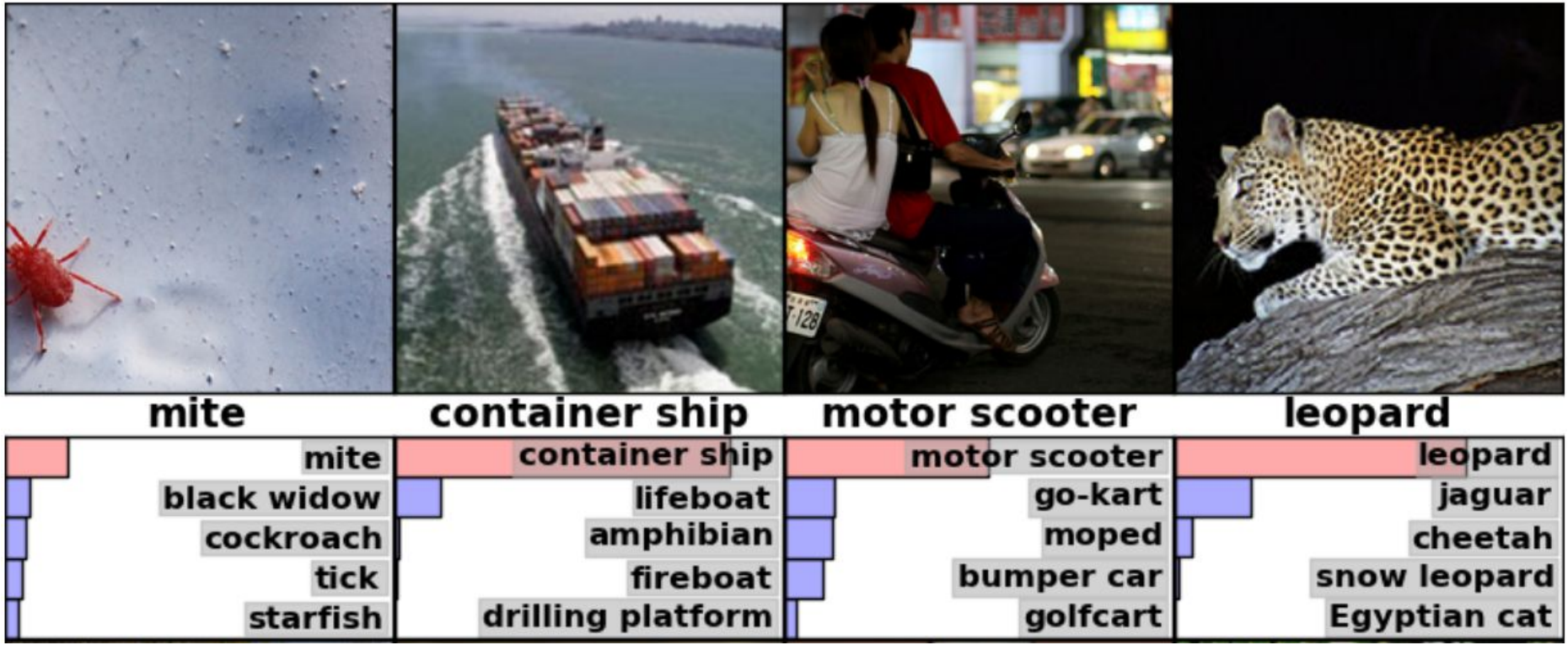


from NVIDIA's devblog

Deep Learning

- Computer uses complex combinations of inputs
- Incredibly powerful with unstructured data, e.g. :
  - Images
  - Audio
  - Text

Image Classification



Object detection

Airplane

Car

Person

Style Transfer

Natural Language Processing

Machine translation

Grammatical parsing

Text-to-speech audio generation

Question answering

You provide the ***what.***
Deep learning finds the ***how.***

TensorFlow

What is TensorFlow?

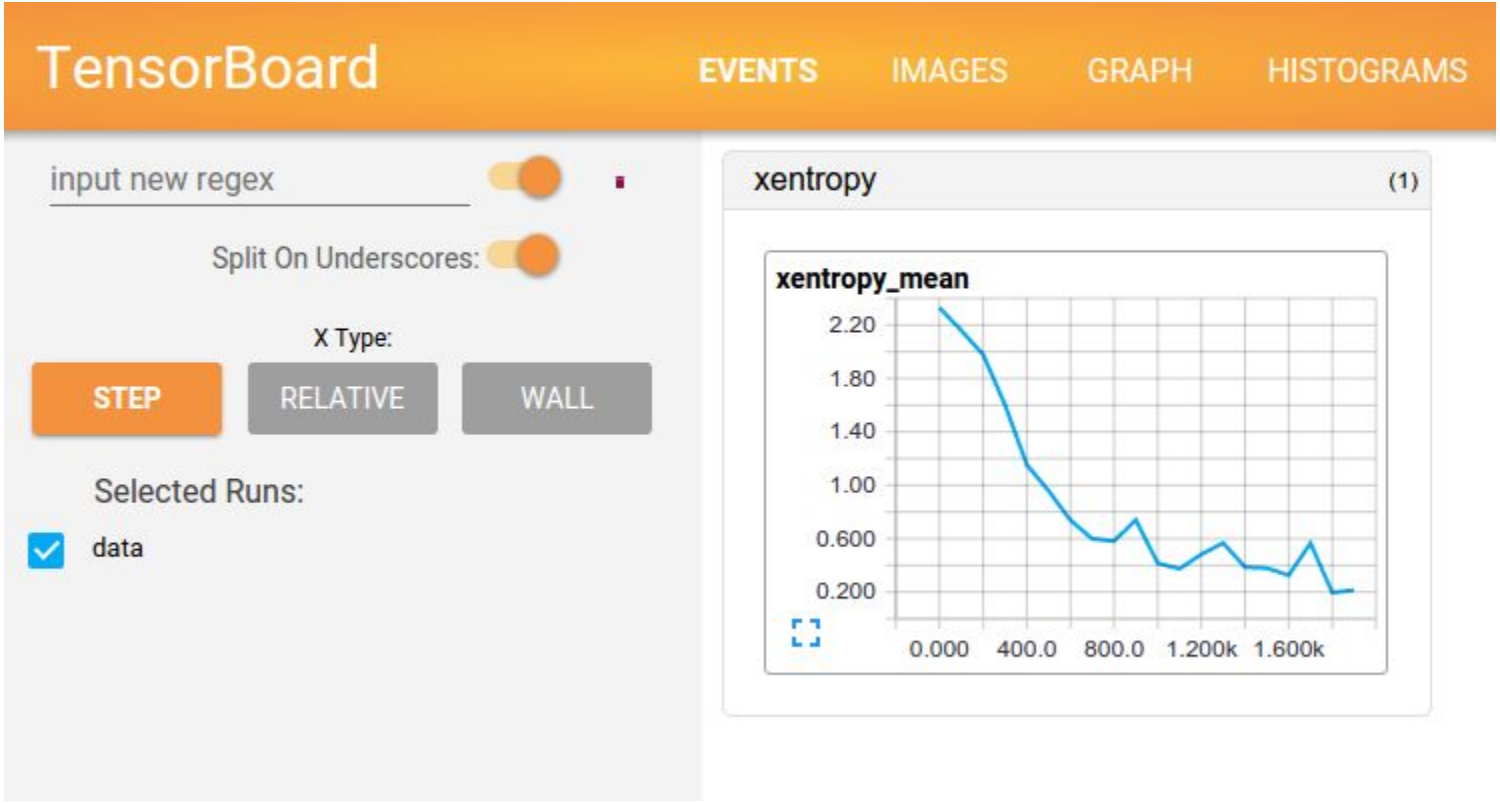
- Open source math library
- Designed especially for machine learning
- Single machines, clusters, and mobile/low power devices

Why TensorFlow?

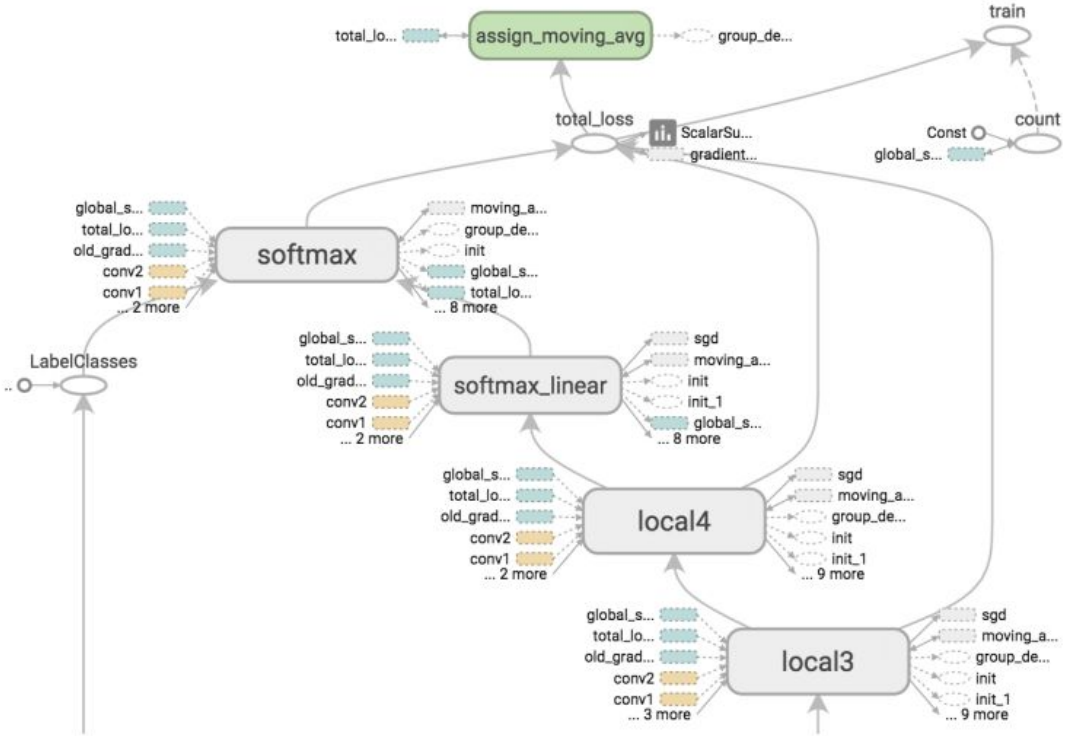
Key benefits

- Flexible
- Scalable
- Compatible
- Deployable

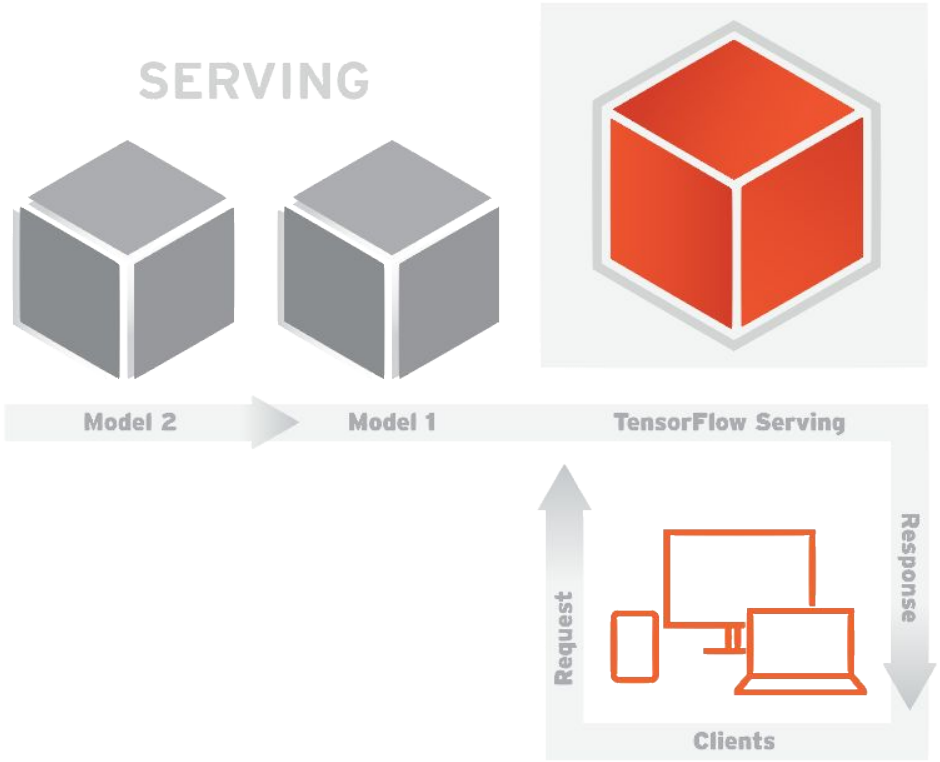
TensorBoard



TensorBoard



TensorFlow Serving



Companies using TensorFlow

Source: tensorflow.org

Course Outline

Structure

- 6 weeks, two nights a week
- Class is one part lecture, one part lab
- Pair programming in lab
- Reading, quizzes, project

0 - Math Refresher

- Linear algebra
- Derivative calculus
- Probability

1 - TensorFlow & Machine Learning

- Introduction to TensorFlow
- Elements of ML
- Training first models

2 - Feedforward Neural Networks

- Activation functions
- Backpropagation
- Optimization algorithms

3 - Convolutional Networks

- Convolutional kernels
- Residual connections
- Inception modules
- Classification and detection
- Transfer learning

4 - Recurrent Networks

- Recurrent connections
- LSTMs and GRUs
- Word vector encodings
- Image descriptions

5 - Deployment

- Finalizing, exporting, and bundling models
- Prototyping with Flask
- TensorFlow Serving and gRPC

Outcomes

Gain intuition for deep learning methods

Implement modern architectures in TF

Learn to read papers to build new models

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Thank you!

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