



Intro to TensorFlow

Google Developer Group (GDG) Springfield Missouri
Cloud Next Extended '18

Presented by Jason Klein

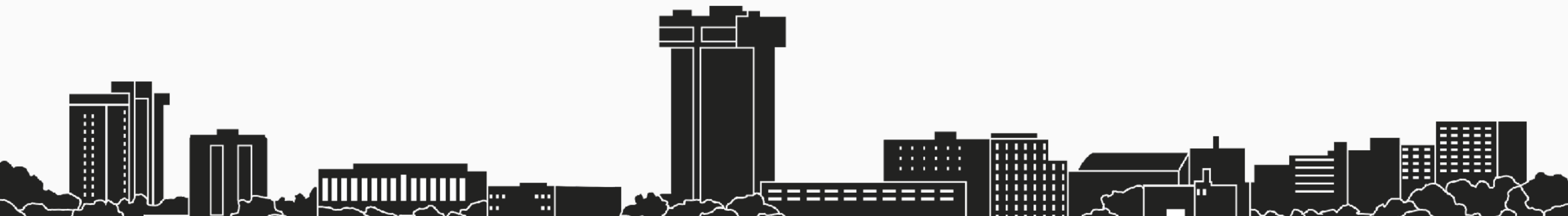
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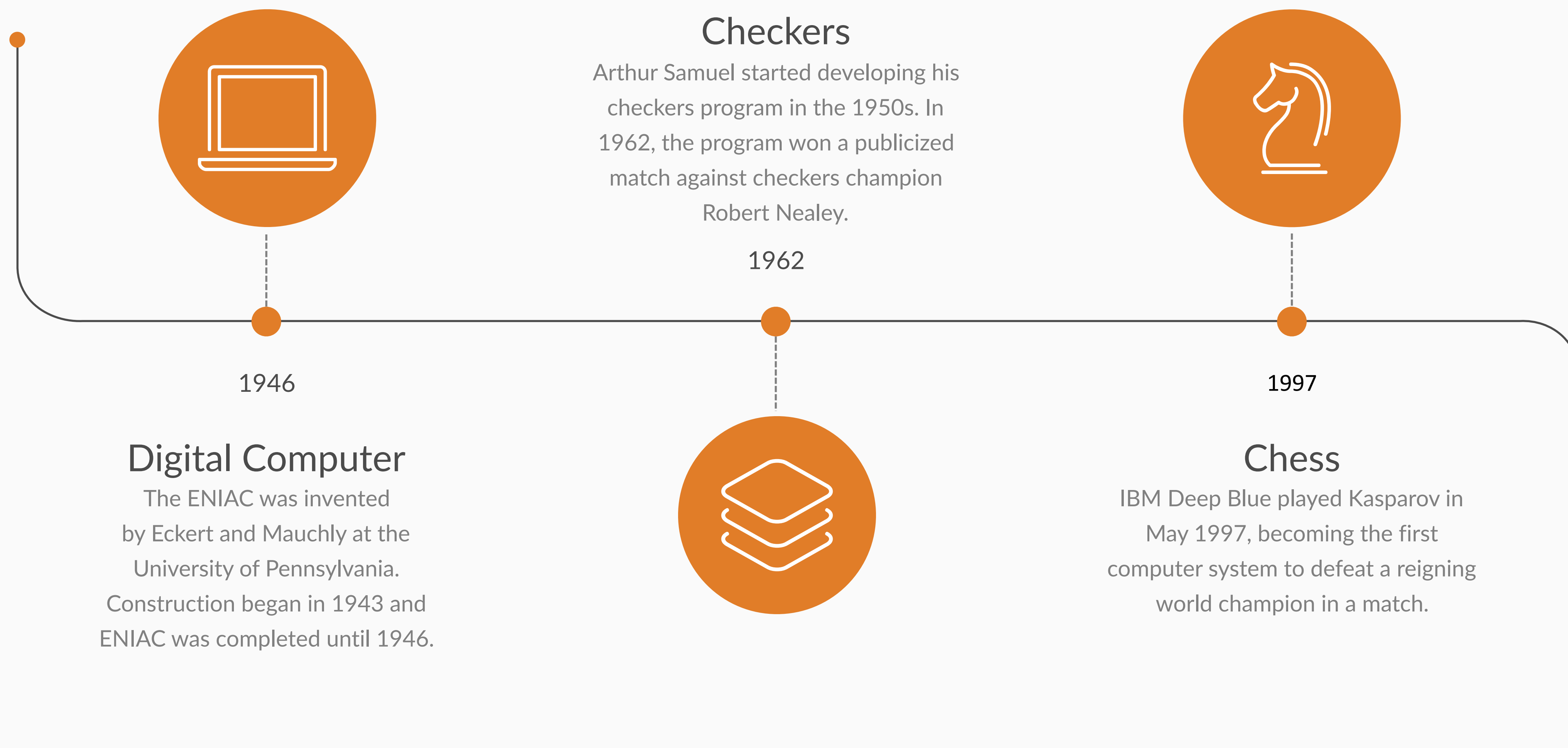
Welcome

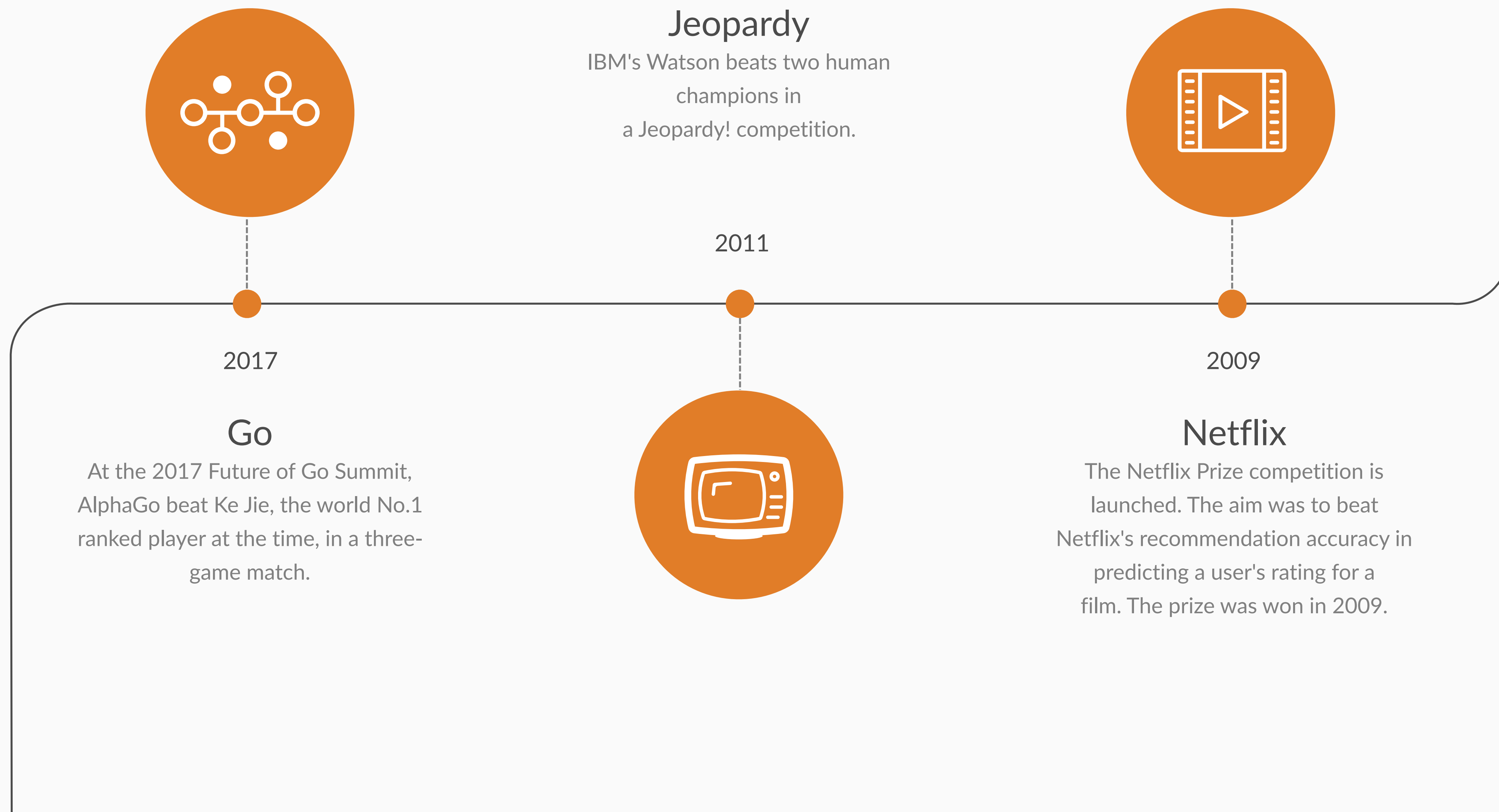
“Artificial intelligence would be the ultimate version of Google. The ultimate search engine that would understand everything on the web. It would understand exactly what you wanted, and it would give you the right thing. We're nowhere near doing that now. However, we can get incrementally closer to that, and that is basically what we work on.” —Larry Page, Co-Founder, Google

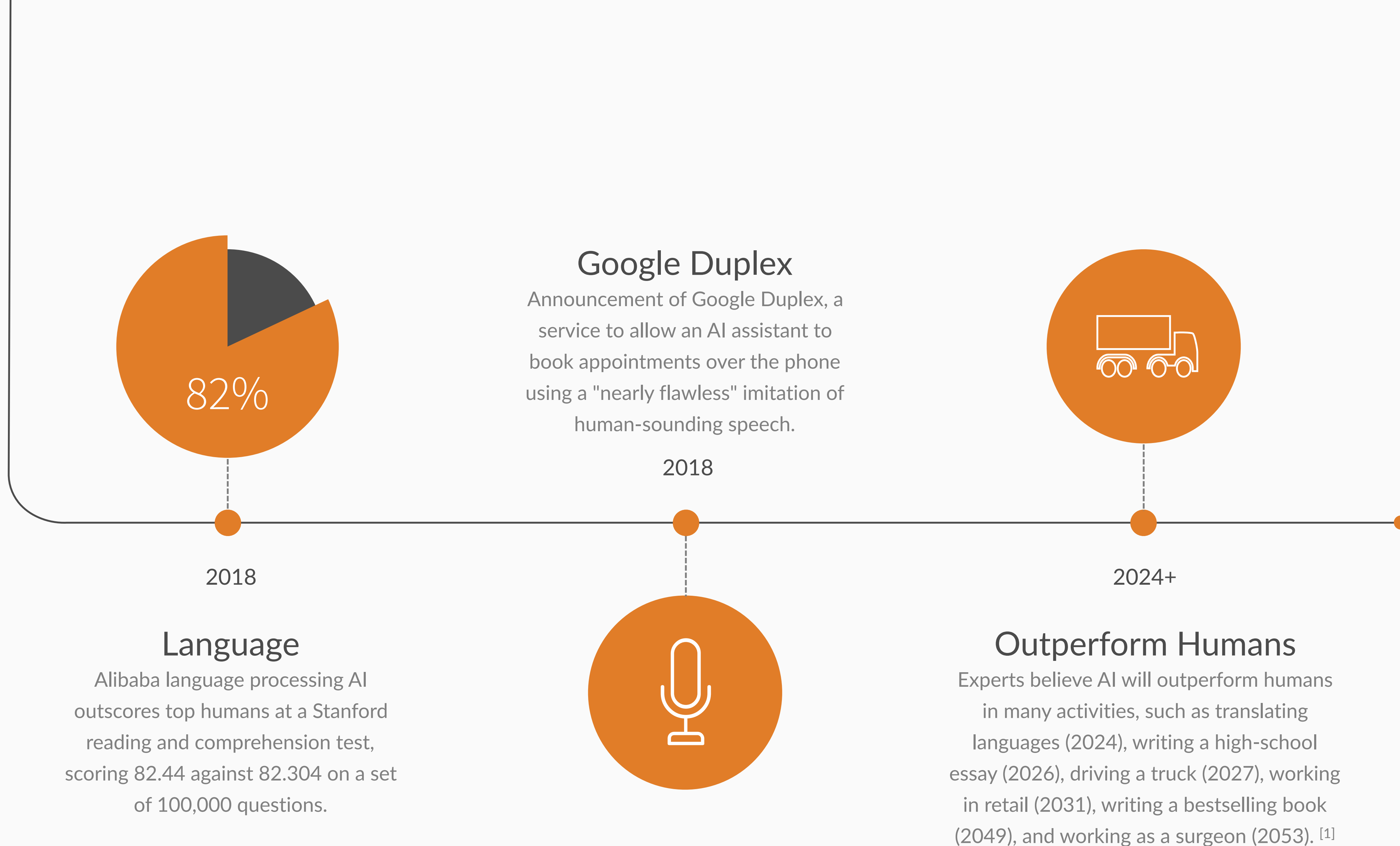


Artificial Intelligence Timeline

The field of AI research was born shortly after the first Digital Computer was invented. Advances in machine learning and data-hungry deep learning methods can be attributed to faster computers, algorithmic improvements, and access to large amounts of data enabled advances in machine learning and perception.



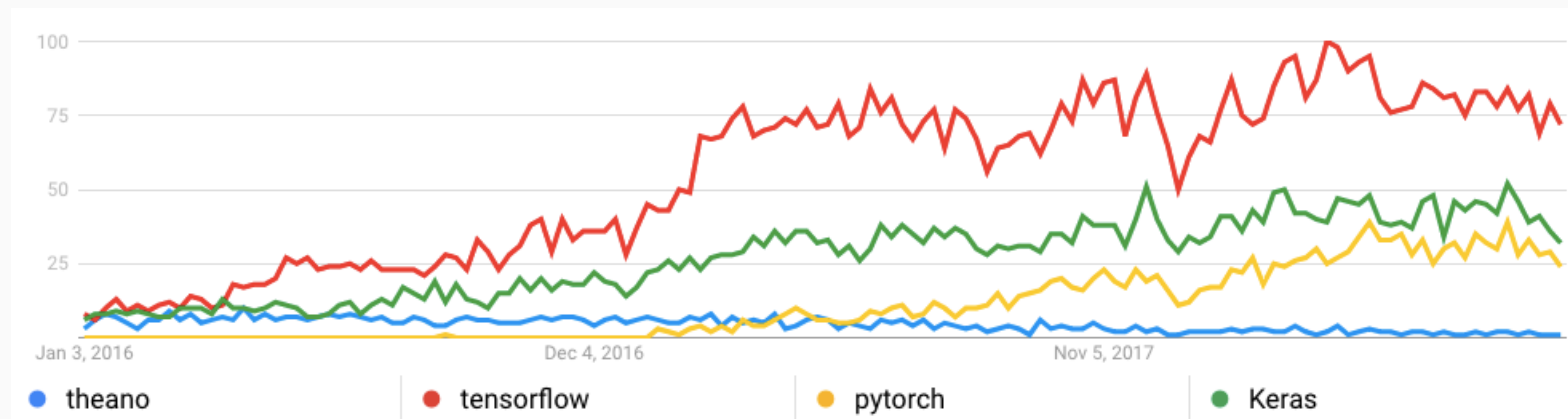




^[1] Future milestones in AI predicted by experts (<https://www.futuretimeline.net/blog/2017/06/13.htm>)

Machine Learning Frameworks

TensorFlow is currently the most searched Machine Learning framework on Google Search



Google Search Trends: 2016-2018

TensorFlow is currently the most searched Machine Learning framework, compared to its predecessor (Theanos) and its largest rival (PyTorch). Other frameworks include: Alexnet, Caffe, Caffe 2, Chainer, CNTK (Microsoft), Decaf, DL4J, DSSTNE (Amazon), DyNet (CMU), and MxNet (Amazon).

Deep Learning with TensorFlow

Several current uses of TensorFlow. Google Open Sourced the platform in 2015.



Deep Speech (Mozilla)

Open Source Speech-To-Text engine, using a model trained by machine learning techniques, based on Baidu's Deep Speech research paper. DeepSpeech uses Google's TensorFlow project to make the implementation easier.



RankBrain (Google)

RankBrain is an algorithm learning artificial intelligence system that helps Google to process search results and provide more relevant search results for users. It is the third most important factor in the ranking algorithm along with links and content.



Inception Image Classification (Google)

Google's deep convolutional neural network architecture named "Inception", which was responsible for setting the new state of the art for classification and detection in the ImageNet Large-Scale Visual Recognition Challenge 2014



SmartReply (Google)

Deep LSTM model to automatically generate email responses. Automatically determine if an email is answerable with a short reply, then compose a few suitable responses that users can edit or send with just a tap.



Networks for Drug Discovery (Google)

These massively multitask networks for Drug Discovery are deep neural network models for identifying promising drug candidates.

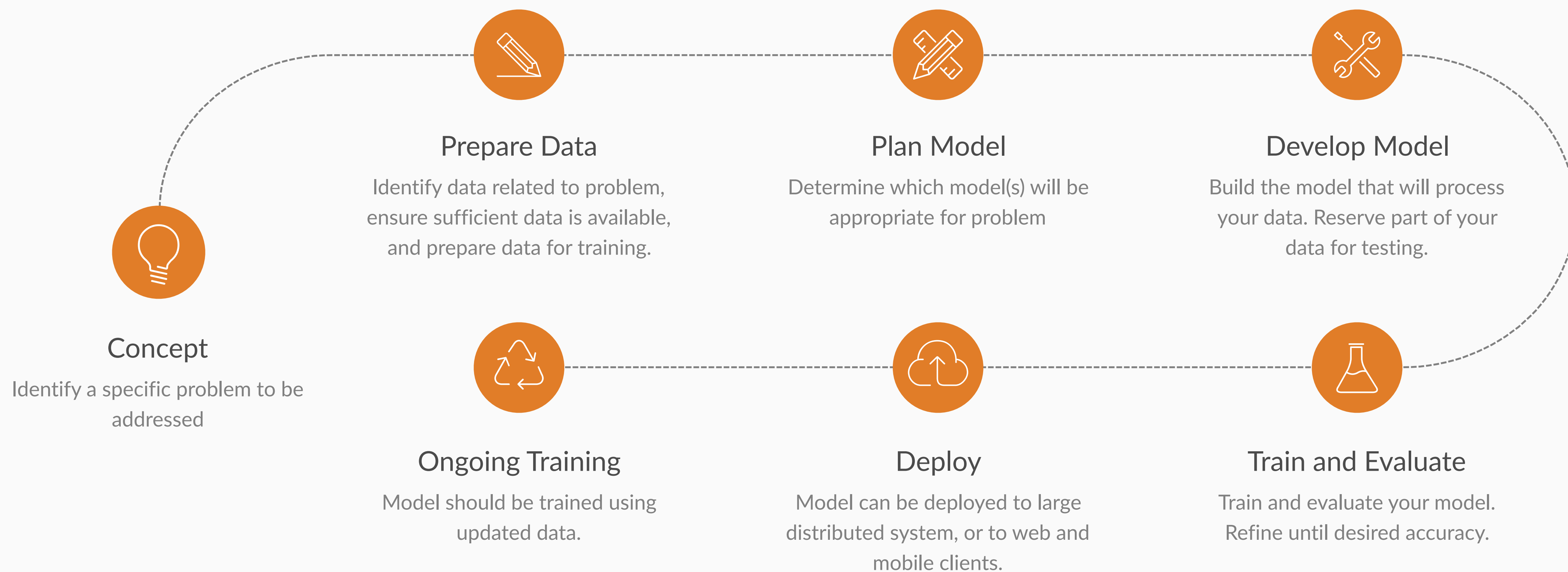


On-Device Vision for OCR (Google)

On-device computer vision model to do optical character recognition (OCR) to enable real-time language translation.

Machine Learning Design Process

Plan to invest a significant amount of time preparing your data and planning your model



Use Cases of TensorFlow

TensorFlow can train and run deep neural networks for the following uses cases

1

Handwritten digit classification

2

Image recognition

3

Word embeddings

4

Recurrent neural networks

5

Sequence-to-sequence models for machine translation

6

Natural language processing

7

PDE (partial differential equation) based simulations

8

Production prediction at scale, with the same models used for training

Basic Classification with TensorFlow

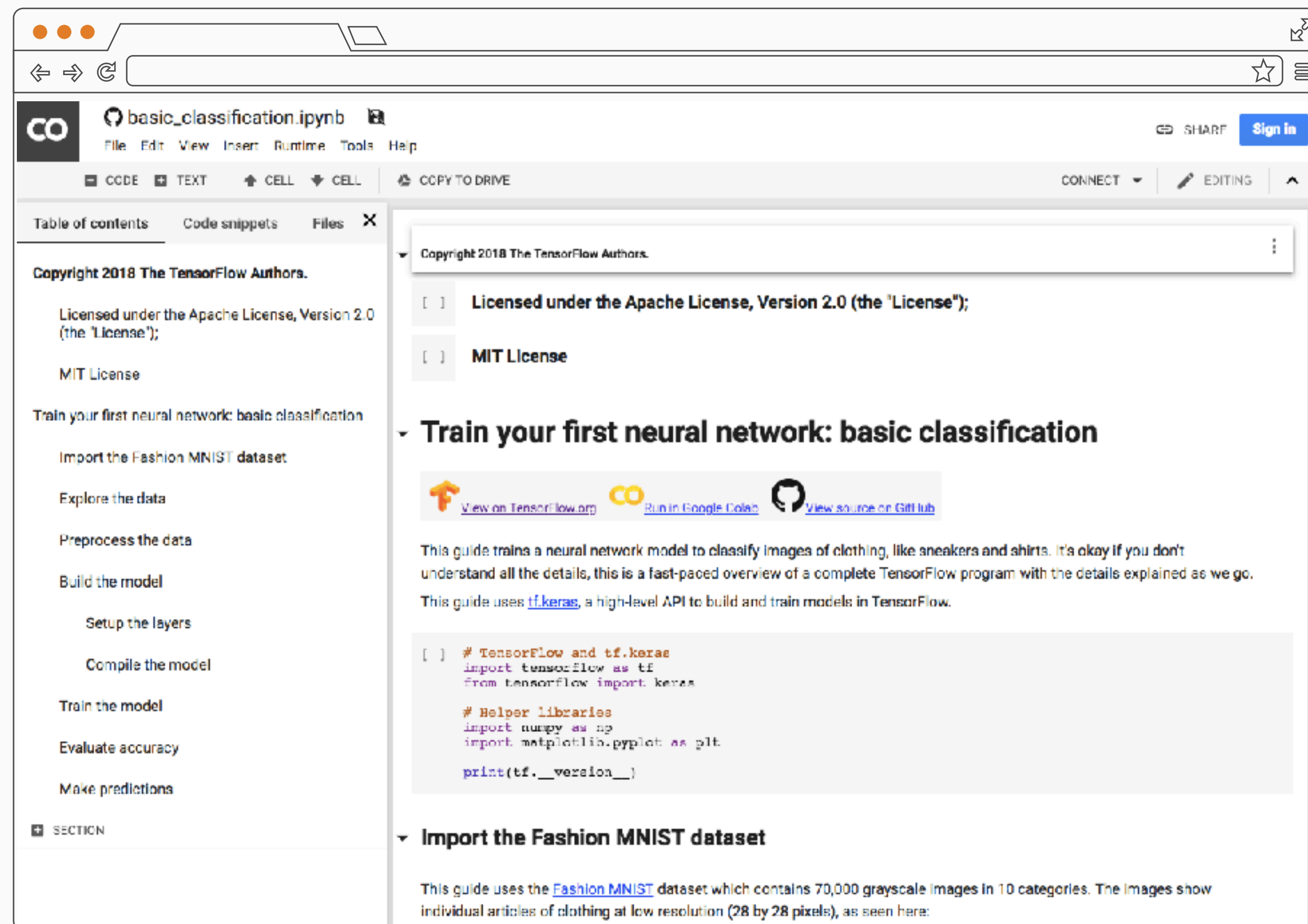
Fashion MNIST is intended as a drop-in replacement for the classic MNIST dataset—often used as the "Hello, World" of machine learning programs for computer vision.

The MNIST dataset contains images of handwritten digits (0, 1, 2, etc) in an identical format to the articles of clothing we'll use.



Basic Classification with TensorFlow

Train your first Neural Network



Google Colaboratory

Colaboratory is a research tool for machine learning education and research. It's a Jupyter notebook environment that requires no setup to use. [Learn more @ colab.research.google.com](https://colab.research.google.com)



Jupyter Notebook

Web app to create and share documents that contain live code, equations, visualizations and narrative text. [Learn more @ jupyter.org](https://jupyter.org)



Keras

High-level API to build and train deep learning models. Used for fast prototyping, advanced research, and production.

Follow along @

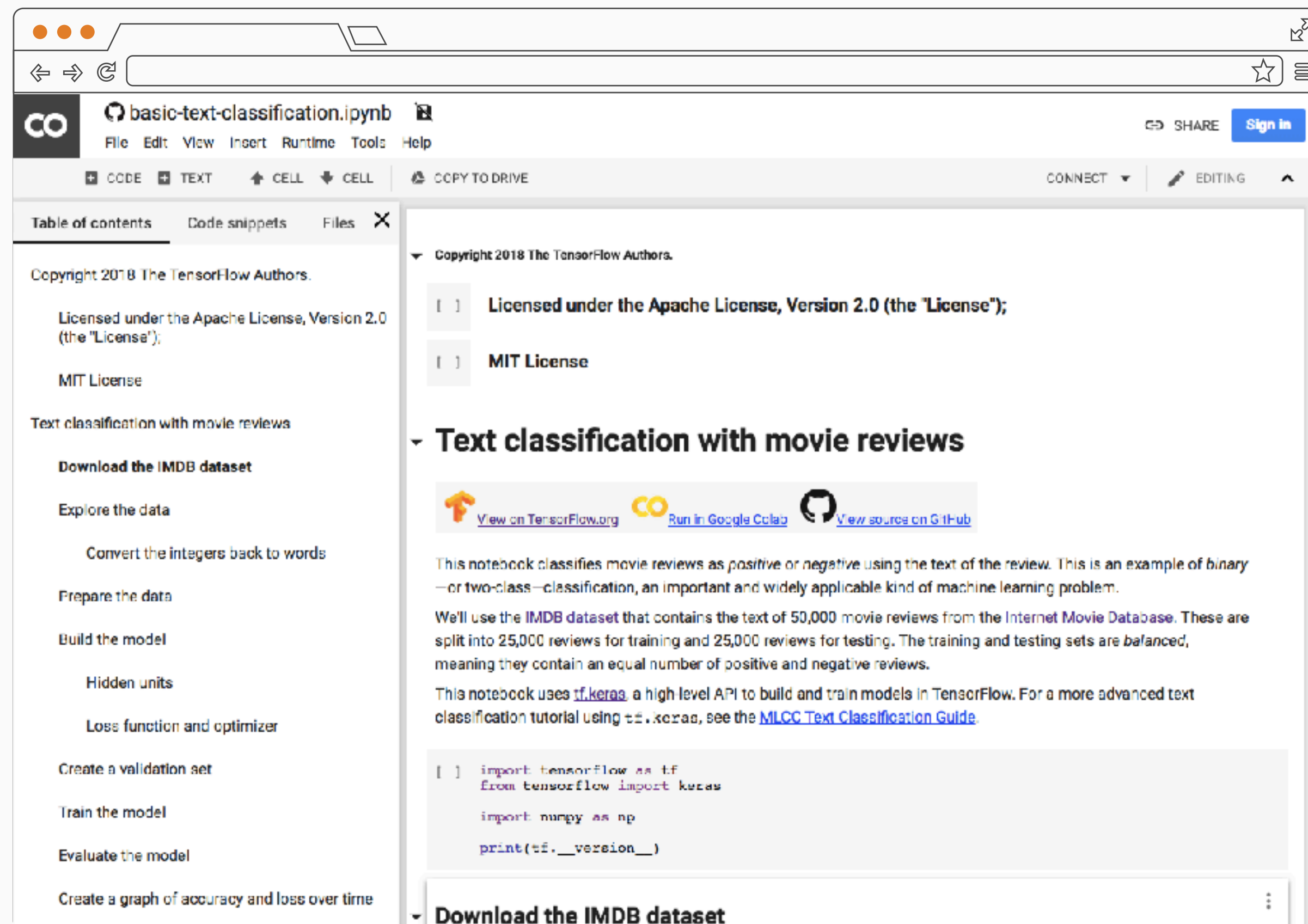
tensorflow.org/tutorials/keras/basic_classification

We'll use the IMDB dataset that contains the text of 50,000 movie reviews from the Internet Movie Database.

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Text Classification with TensorFlow

Text classification with movie reviews from IMDB



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Follow along @

tensorflow.org/tutorials/keras/basic_text_classification



Thank you for Attending

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Questions about TensorFlow? Contact Jason Klein



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