



Intro to TensorFlow

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

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Presented by Jason Klein 09/12/2018





"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





Welcome

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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.



ENIAC was completed until 1946.











2009

Netflix

The Netflix Prize competition is launched. The aim was to beat Netflix's recommendation accuracy in predicting a user's rating for a film. The prize was won in 2009.





2018

Language

Alibaba language processing Al outscores top humans at a Stanford reading and comprehension test, scoring 82.44 against 82.304 on a set of 100,000 questions.

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

Google Duplex

Announcement of Google Duplex, a service to allow an AI assistant to book appointments over the phone using a "nearly flawless" imitation of human-sounding speech.

2018





2024+

Outperform Humans

Experts believe AI will outperform humans in many activities, such as translating languages (2024), writing a high-school essay (2026), driving a truck (2027), working in retail (2031), writing a bestselling book (2049), and working as a surgeon (2053). ^[1]



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 it's predecessor (Theanos) and it's 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



Concept

Identify a specific problem to be addressed



Ongoing Training

Model should be trained using updated data.



Plan Model Determine which model(s) will be appropriate for problem



Develop Model

Build the model that will process your data. Reserve part of your data for testing.



Deploy

Model can be deployed to large distributed system, or to web and mobile clients.

Train and Evaluate

Train and evaluate your model. Refine until desired accuracy.



Use Cases of TensorFlow

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









Basic Classification with TensorFlow

Train your first Neural Network

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CO Dasic_classification.ipynb	Help
CODE TEXT 🛧 CELL 🕈 CELL	COPY TO DRIVE CONNECT
Table of contents $Code$ snippets $Files$ X	
Copyright 2018 The TensorFlow Authors.	Copyright 2018 The TensorFlow Authors.
Licensed under the Apache License, Version 2.0 (the "License");	Licensed under the Apache License, Version 2.0 (the "License");
MIT License	[] MIT License
Train your first neural network: basic classification	 Train your first neural network: basic classification
Import the Fashion MNIST dataset	
Explore the data	Image: Construction of the second
Preprocess the data	This guide trains a neural network model to classify images of clothing, like sneakers and shirts. It's okay if yo
Build the model	understand all the details, this is a fast-paced overview of a complete TensorFlow program with the details ex This quide uses tf kerge, a high-level API to build and train models in TensorFlow
Setup the layers	
Compile the model	<pre>[] # TensorFlow and tf.keras import tensorflow as tf from tensorflow import keras</pre>
Train the model	# Helper libraries
Evaluate accuracy	import numpy as np import metplotlib.pyplot as plt mrint(tf. mercion)
Make predictions	princ(crvereion_)
SECTION	✓ Import the Fashion MNIST dataset
	This guide uses the <u>Fashion MNIST</u> dataset which contains 70,000 grayscale images in 10 categories. The in individual articles of clothing at low resolution (28 by 28 pixels), as seen here:



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



Jupyter Notebook

Web app to create and share documents that contain live code, equations, visualizations and narrative text. Learn more @ 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







Text Classification with TensorFlow

Text classification with movie reviews from IMDB

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Table of contents Code snippets Files X Convright 2018 The TensorFlow Authors	
Licensed under the Apache License, Version 2.0 (the "License");	Licensed under the Apache License, Version 2.0 (the "License");
MIT License	[] MIT License
Text classification with movie reviews	 Text classification with movie reviews
Download the IMDB dataset	
Explore the data	Image: Contract of the second state of the second
Convert the integers back to words	This notebook classifies movie reviews as positive or negative using the text of the review. This is an ex
Prepare the data	—or two-class—classification, an important and widely applicable kind of machine learning problem. Well use the IMDR detect that contains the text of E0.000 metric reviews from the laterast Metric Detection.
Build the model	split into 25,000 reviews for training and 25,000 reviews for testing. The training and testing sets are be meaning they contain an equal number of positive and pegative reviews
Hidden units	This notebook uses tf.keras, a high-level API to build and train models in TensorFlow. For a more advar
Loss function and optimizer	classification tutorial using tf.kcras, see the <u>MLCC Text Classification Guide</u> .
Create a validation set	<pre>[] import tensorflow as tf from tensorflow import keras</pre>
Train the model	import numpy as np
Evaluate the model	<pre>print(tfversion)</pre>
Create a graph of accuracy and loss over time	 Download the IMDB dataset



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Thank you for Attending

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