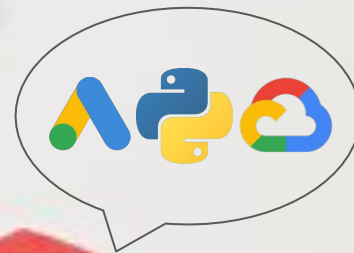


MACHINE LEARNING IN PPC

How To Get Started Today

Christopher Gutknecht | norisk Group | #FOS19



#FOS19

Our Agenda: Intro & 3 PPC Use Cases

INTRO

Machine Learning Essentials

ML Toolkit For PPC

Platforms & Tools

Query Understanding

1. Classifying Near-Exact

Prediction

2. Analysing Query n-Grams

Text Summarization

3. Finding Key Phrases

Note: I'm not a Data Scientist - I'm a PPC



Christopher Gutknecht

Head of Online Marketing @ norisk

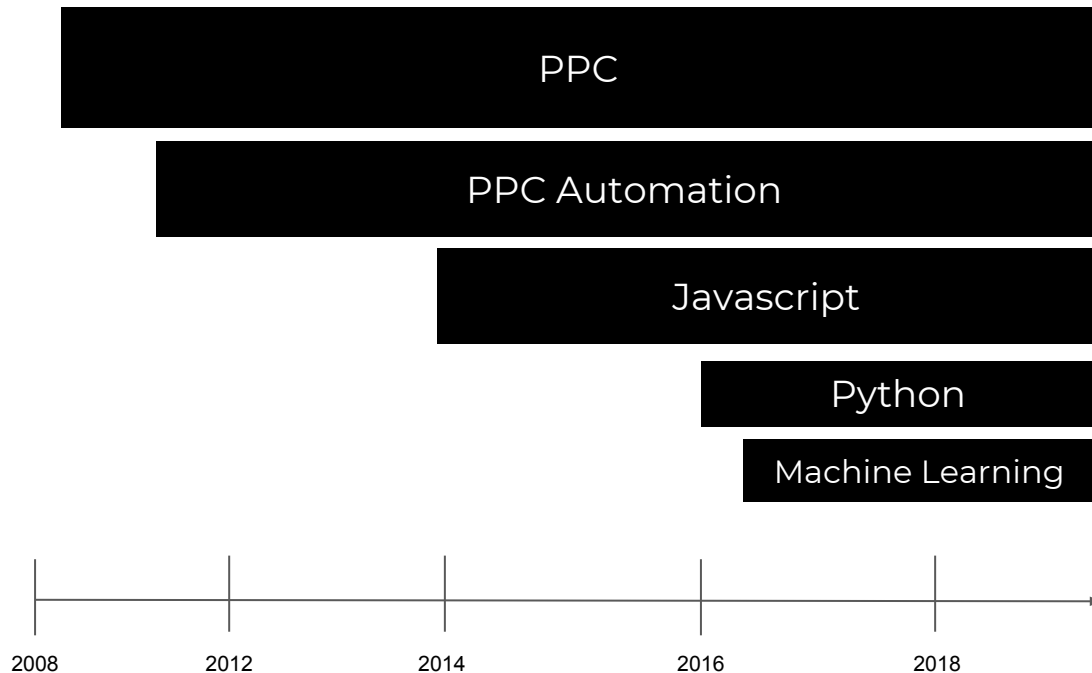


Munich-based

Focus Ecom & Retail

Self Taught Dev

Dad of 2,5 yr old



Think of Me As a Knowledgeable Tourist



Let's Get Started with ML Essentials

INTRO

Machine Learning Essentials



#FOS19

What Do We All Have in Common?

A still from the movie Toy Story showing Woody and Buzz Lightyear. Woody is on the left, looking concerned. Buzz is on the right, in his green space suit, looking excited and gesturing with his right hand. The word "DATA" is overlaid in large white letters on the right side of the image.

DATA

DATA EVERYWHERE

Data-Driven Nature Makes ML Relevant



Why do you need tons of people at your agency/company to manage your **Paid Search** or Display Campaigns, when you can replace almost all of them today with a system that leverages ML?



“ML-Worthy” PPC Automation Tasks



Query Understanding

- Typo Detection
- Entity recognition
- ...



Monitoring

- Anomaly detection
- Semantic inventory match
- ...



Text Generation

- Keyphrase extraction
- Text summarization
- ...



Start with the problem, **not** the solution. Make sure you aren't treating ML as a hammer for your problems.

Let's Get To Know our ML Starter Toolkit

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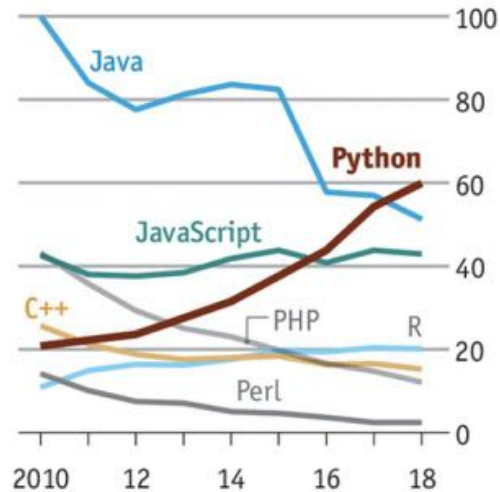


#FOS19

Python: Most Popular in 2018 and Dutch!



US, Google searches for coding languages



Guido van Rossum

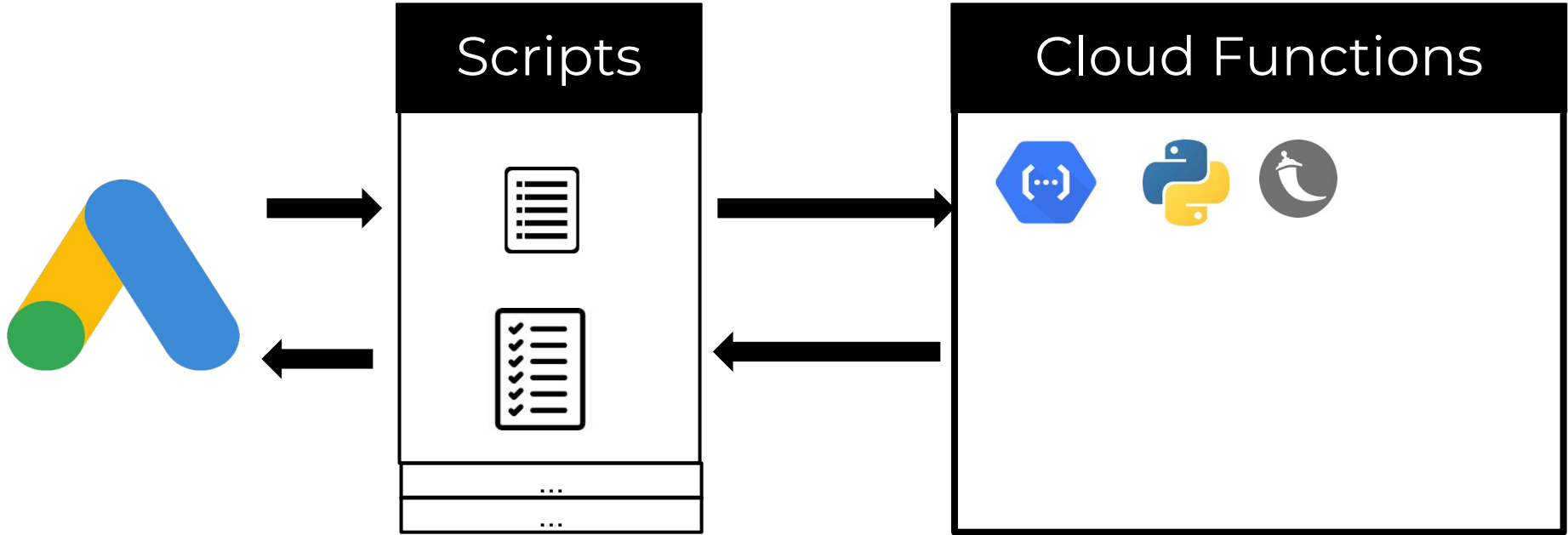


Ads Scripts vs Python vs R?



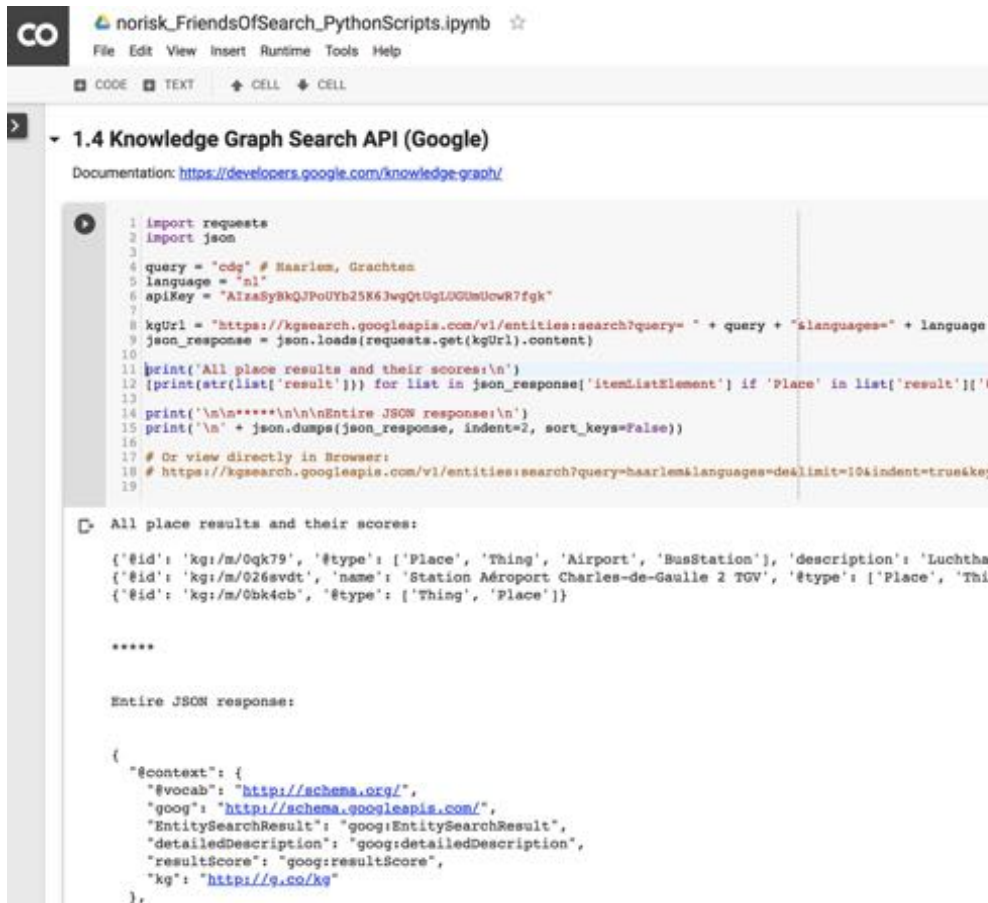
	Ads Scripts	Python	R
Serverless	✓	(✓)	
Direct Ads API	✓		
Many Packages		✓	✓
General Purpose		✓	
Machine Learning		✓	✓

No Either-Or: Run Python From Scripts



Demo: bit.ly/norisk_python

Colaboratory: Google-Sheets for Python



The image shows a Colaboratory notebook titled "norisk_FriendsOfSearch_PythonScripts.ipynb". The notebook is in "CODE" view. The current cell is titled "1.4 Knowledge Graph Search API (Google)". The code in the cell is as follows:

```
1 import requests
2 import json
3
4 query = "cdg" # Haarlem, Grachten
5 language = "nl"
6 apiKey = "AlzaSyRkQJPoUYb25K6JwgQtUg1OGUmUowR7fgk"
7
8 kgUrl = "https://kgsearch.googleapis.com/v1/entities:search?query=" + query + "&languages=" + language
9 json_response = json.loads(requests.get(kgUrl).content)
10
11 print('All place results and their scores:\n')
12 [print(str(list['result'])) for list in json_response['itemListElement'] if 'Place' in list['result']]
13
14 print('\n\n*****\n\nEntire JSON response:\n')
15 print('\n' + json.dumps(json_response, indent=2, sort_keys=False))
16
17 # Or view directly in Browser:
18 # https://kgsearch.googleapis.com/v1/entities:search?query=haarlem&languages=de&limit=10&indent=true&key
19
```

Below the code, the output of the first print statement is shown:

```
☐ All place results and their scores:

{'id': 'kg:/m/0qk79', 'type': ['Place', 'Thing', 'Airport', 'BusStation'], 'description': 'Luchthaven Amsterdam Schiphol', 'score': 0.95}
{'id': 'kg:/m/026s8vdt', 'name': 'Station Aéroport Charles-de-Gaulle 2 TGV', 'type': ['Place', 'Thing', 'TrainStation'], 'score': 0.85}
{'id': 'kg:/m/0b4k4cb', 'type': ['Thing', 'Place']}
```

Below the output, the output of the second print statement is shown:

```
*****

Entire JSON response:

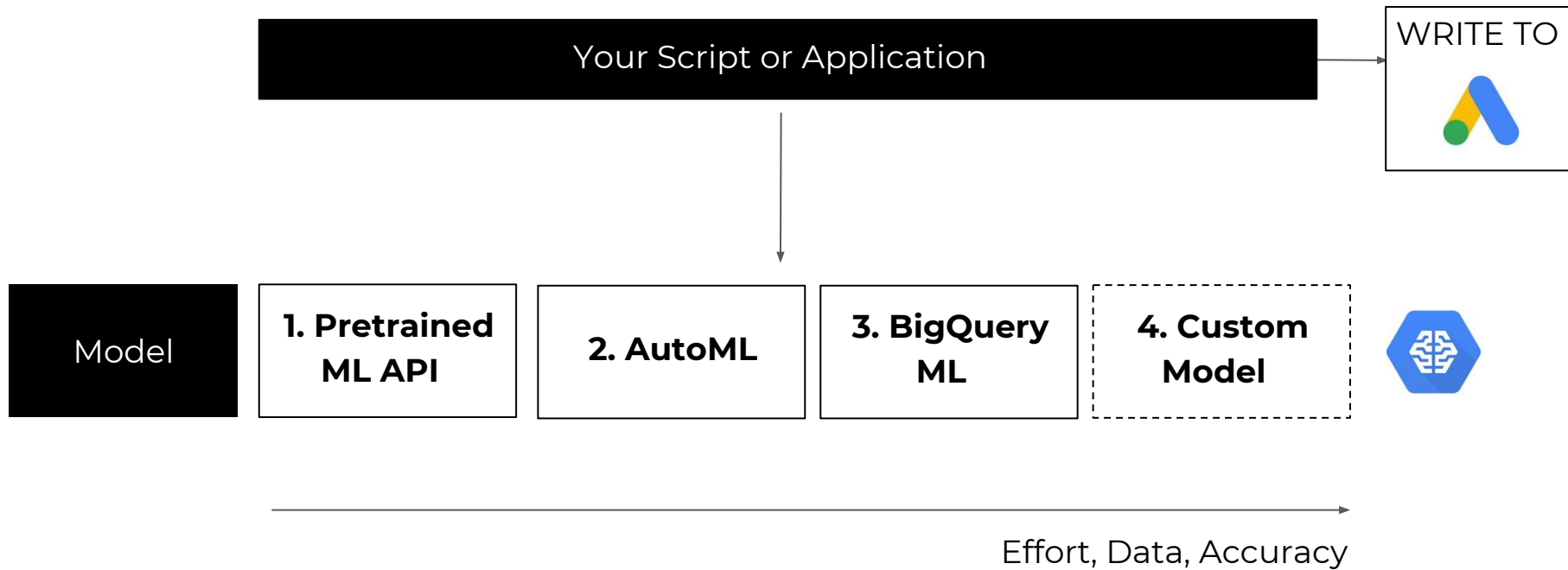
{
  "@context": {
    "vocab": "http://schema.org/",
    "goog": "http://schema.googleapis.com/",
    "EntitySearchResult": "goog:EntitySearchResult",
    "detailedDescription": "goog:detailedDescription",
    "resultScore": "goog:resultScore",
    "kg": "https://g.co/kg"
  },
  "itemListElement": [
    {
      "result": {
        "id": "kg:/m/0qk79",
        "type": "Airport",
        "description": "Luchthaven Amsterdam Schiphol",
        "score": 0.95
      }
    },
    {
      "result": {
        "id": "kg:/m/026s8vdt",
        "name": "Station Aéroport Charles-de-Gaulle 2 TGV",
        "type": "TrainStation",
        "score": 0.85
      }
    },
    {
      "result": {
        "id": "kg:/m/0b4k4cb",
        "type": "Place",
        "score": 0.75
      }
    }
  ]
}
```



DEMO:

bit.ly/norisk_python

Three Simpler Options To Tie in ML



Use Case #1: Classifying Near-Exact

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Query Understanding

1. Classifying Near-Exact

Case #1: Classifying Near-Exact



Match the intent of a search with close variants



Search Engine Land

When exact match isn't exact anymore: A script to regain control

Contributor Daniel Gilbert



ONLY BLOCKING.

> What about **EXPANSION**?

Classify Near Exact? Ask Google!

1. Suggest

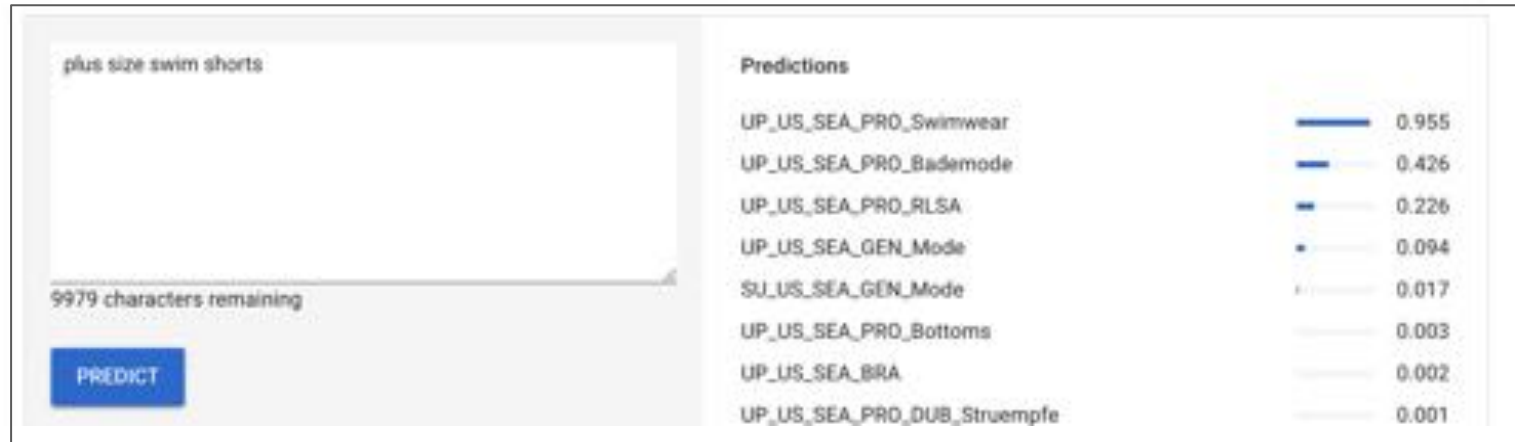


2. Custom Search



Demo: bit.ly/norisk_python

Auto ML I: Model scores & Prediction



norisk
GROUP

This table shows how often the model classified each label correctly (in blue), and which labels were most often confused for that label (in orange).

[illegible]

Use Case #2: Ngram Analysis & BigQuery

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Query Understanding

1. Classifying Near-Exact

Prediction

2. Analysing Query n-Grams

Remember This? BigQuery Is Faster!

Search Engine Land

Ads Script: Find Your Best And Worst Search Queries Using N-Grams

Former Googler Daniel Gilbert of Brainlabs shares a script to help you identify wasted Ads spend using n-grams.

Daniel Gilbert on August 26, 2015



The Basis: Google Ads Data Transfer

The screenshot shows the Google BigQuery interface for creating a new data transfer. On the left, there is a sidebar with navigation links: 'COMPOSE QUERY' (highlighted in red), 'Query History', 'Job History', 'Scheduled Queries', and 'Transfers'. The main area is titled 'New Transfer' and includes a link to learn more about configuring Google Ads (formerly AdWords). The configuration fields are as follows:

Field	Value
Source	Google Ads (formerly AdWords)
Display name	NL
Refresh window	30
Schedule	every 24 hours
Destination dataset	crawler_test
Customer ID	123-4567-890
Exclude removed/disabled items	<input type="checkbox"/>

At the bottom, there is an 'Advanced' section (collapsed) and two buttons: 'Add' (blue) and 'Cancel' (grey).

The screenshot shows a list of datasets under the 'SPOR_Transfer' prefix. Each dataset is preceded by a small icon representing a table structure. The datasets listed are:

Dataset Name
AccountBasicStats_2131444427
AccountConversionStats_21314444...
AccountNonClickStats_2131444427
AccountStats_2131444427
Ad_2131444427
AdBasicStats_2131444427
AdConversionStats_2131444427
AdCrossDeviceConversionStats_21...
AdCrossDeviceStats_2131444427
AdGroup_2131444427
AdGroupBasicStats_2131444427
AdGroupConversionStats_2131444...
AdGroupCrossDeviceConversionSta...
AdGroupCrossDeviceStats_213144...
AdGroupStats_2131444427
AdStats_2131444427
AgeRange_2131444427

BigQueryML: Train Models with SQL

Demo: bit.ly/norisk_python

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Text Summarization

3. Finding Key Phrases

Text Summarization > see Demo

▾ PART 3. TEXT SUMMARIZATION

▸ 3.1 Text Summarization with Sumy (Dan Shapiro)

↳ 2 cells hidden

▸ 3.2 KeyPhrase Detection API (Microsoft Azure)

↳ 2 cells hidden

Demo: bit.ly/norisk_python

Takeaways: Start Experimenting!

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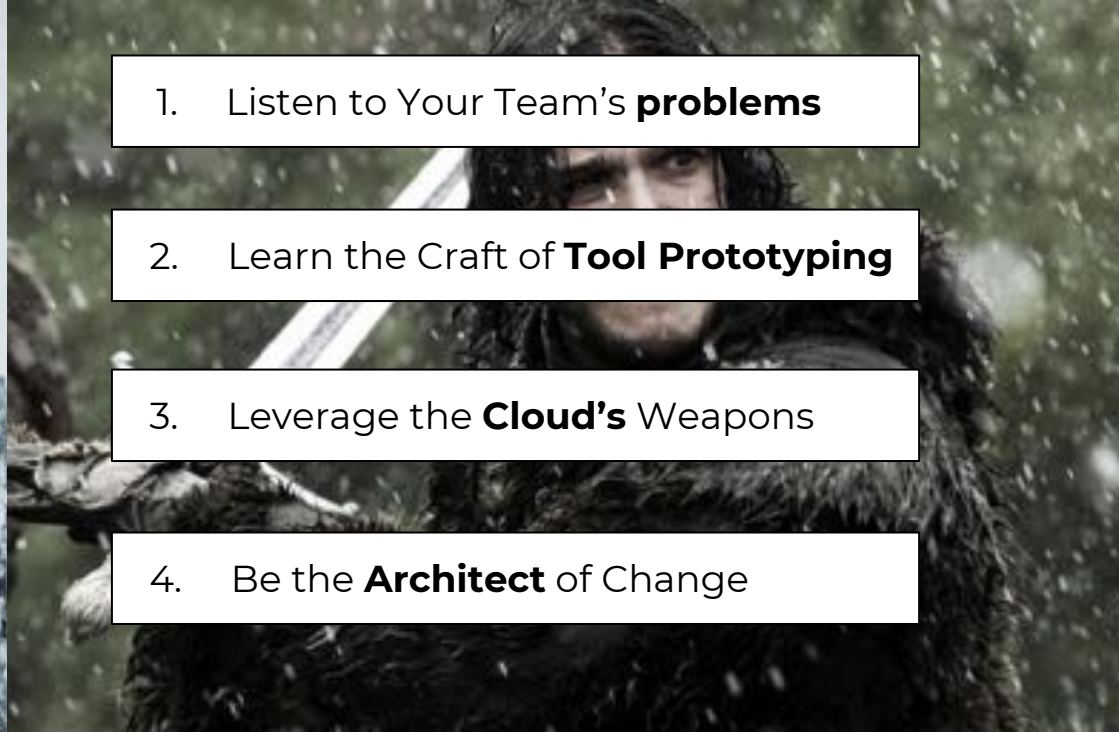
USE CASES

Typos, NGrams, Summaries

TAKEAWAYS

Start Experimenting!

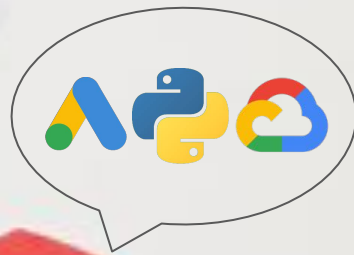
AI Is Coming ? Let's be Jon Snow!



1. Listen to Your Team's **problems**
2. Learn the Craft of **Tool Prototyping**
3. Leverage the **Cloud's** Weapons
4. Be the **Architect** of Change

THANK YOU. Your Questions Please!

#FOS19



MACHINE LEARNING IN PPC

How To Get Started Today

Christopher Gutknecht | norisk Group | #FOS19



Bonus: GA Anomaly Detection for Slack

#om_ga_alarmduck

☆ | 6 | ✖ | ➦ Thema hinzufügen

Freitag, 4. Januar



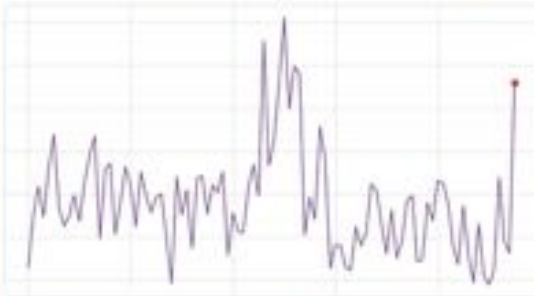
Alarmduck APP 07:23 Uhr

Anomalies in |

Page: /

Bounce Rate: 10.5879650896%

▲ 56% UP compared to expected value (46 kB) +



07:23 Uhr Anomalies in |

Page: /Wintersport/Skitouren/

Pageviews: 321

▲ 78% UP compared to expected value (31 kB) +



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Typos, NGrams, Summaries

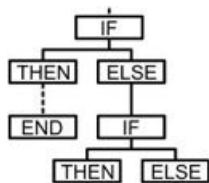
APPENDIX I

Additional Content

Rule #1: Not Every Problem Needs ML

RULE BASED

- Designed rule-flow
- **Outliers not included**
- Won't improve on data



MACHINE LEARNING

- Algorithmic model
- **Model learns from errors**
- Model constantly retrained

$$E = \sum_{i=1}^N (y_i - \hat{y}_i)^2$$

Rule-Based vs Machine Learning Code

Write a computer program
with **explicit rules** to follow

```
if email contains V!agra  
    then mark is-spam;  
if email contains ...  
if email contains ...
```

Traditional Programming

Write a computer program
to **learn from examples**

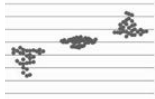
```
try to classify some emails;  
change self to reduce errors;  
repeat;
```

Machine Learning Programs

Five Main Types of ML Algorithms

Unsupervised

Clustering



Dimension Reduction



Supervised

Classification



Regression

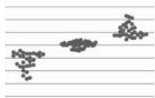


+ Reinforcement Learning

Natural Language Processing Is Its Own Game

Supervised \leftrightarrow Unsupervised

Sentiment Analysis



Topic Modelling



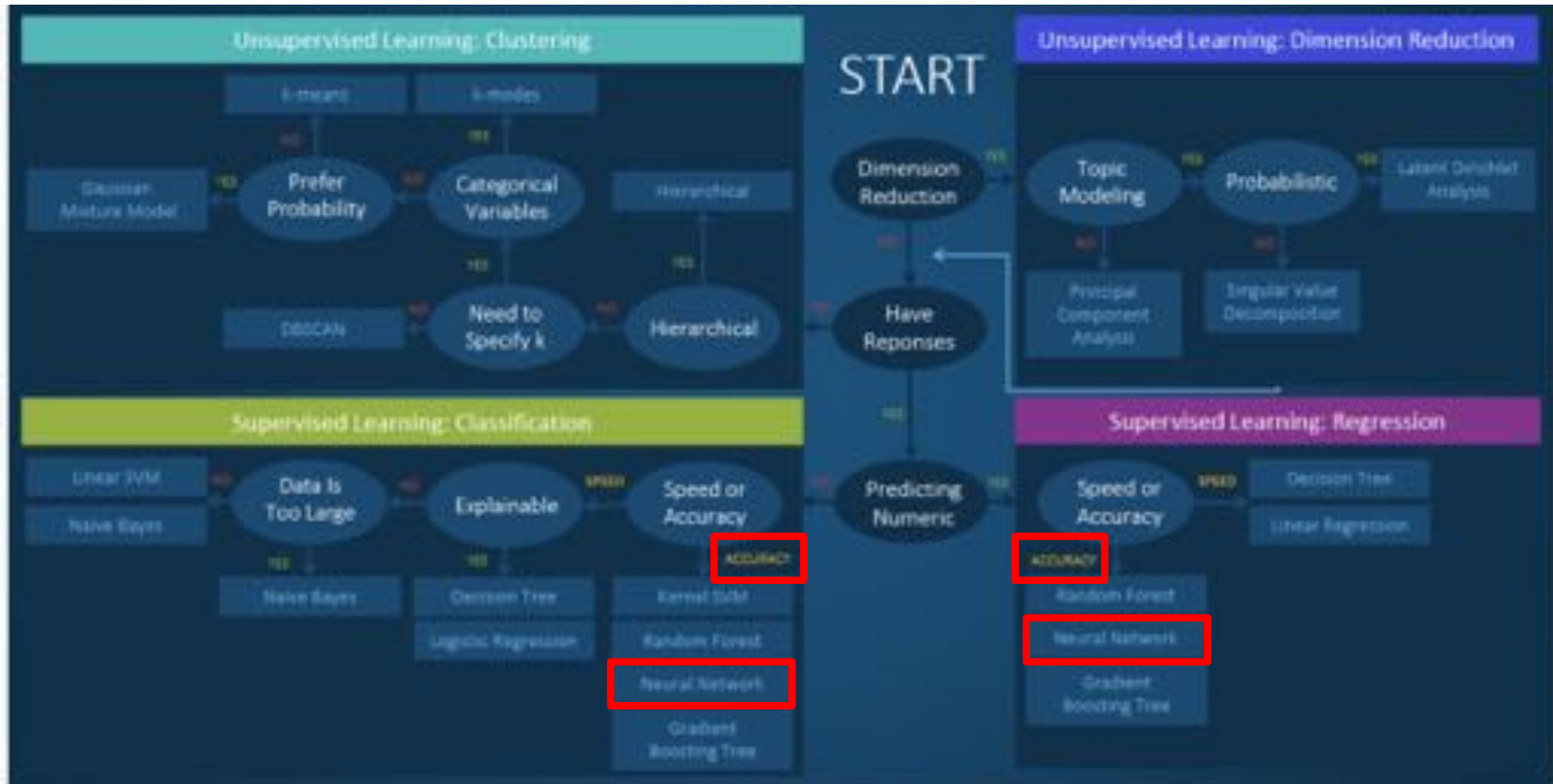
Entity Recognition



Sequence Prediction



And Deep Learning? Higher Accuracy!



Main Challenges for ML Approaches

Good Problem Framing

- Finding value drivers
- Defining relevant outputs



Access To Data

- Depth and Breadth
- Cleanliness



Knowledge of Solutions

- Choice of framework
- References projects







The 3 Cloud Platforms & their ML Tools



Google Cloud Platform

+ Google Integrations

- Managed **Storage** 
- Serverless **Execution** 
- Pretrained ML **APIs** 
- **AutoML** Service 

Amazon Web Services

+ Best DevOps Workflow

- “
- “
- “
- “

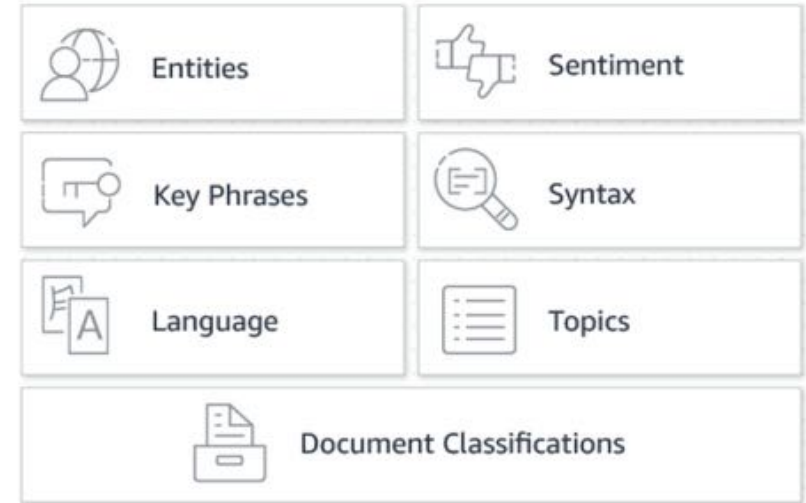
Microsoft Azure

+ Windows & Bing maybe

- “
- “
- “
- -

→ All similar. But Google has its benefits!

Pretrained APIs: Amazon Comprehend



Extracts data, topics, and document classifications with confidence scores

Look out for Colab: Example TensorFlow



Text classification with movie reviews

 [Run in Google Colab](#)

This notebook classifies movie reviews as *positive* or *negative* using the text of or two-class-classification, an important and widely applicable kind of machine

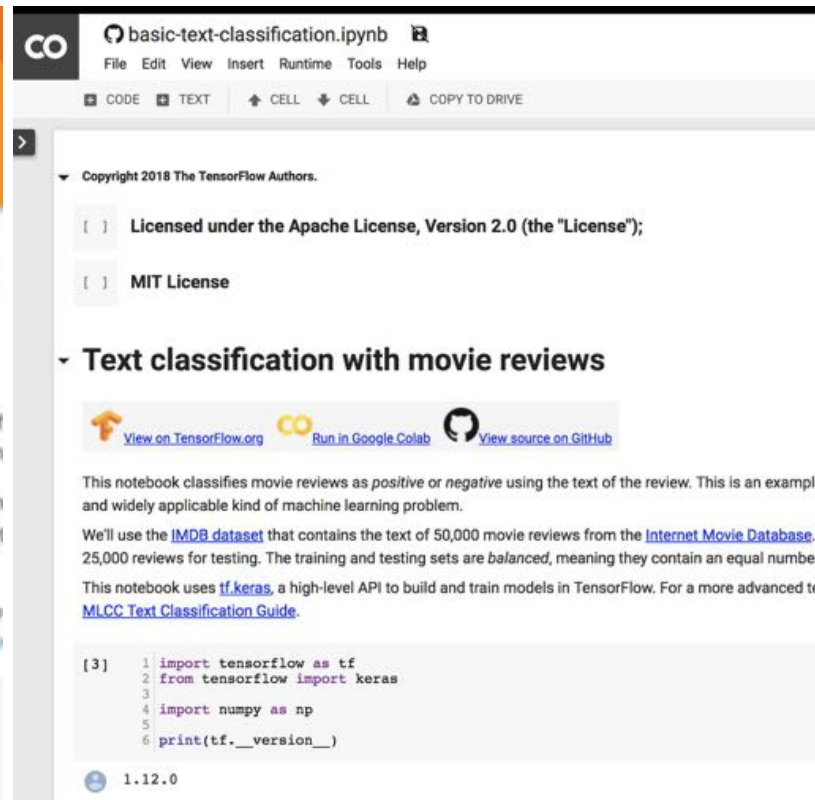
We'll use the [IMDB dataset](#) that contains the text of 50,000 movie reviews from split into 25,000 reviews for training and 25,000 reviews for testing. The training they contain an equal number of positive and negative reviews.

This notebook uses [tf.keras](#), a high-level API to build and train models in TensorFlow classification tutorial using [tf.keras](#), see the [MLCC Text Classification Guide](#)

```
import tensorflow as tf
from tensorflow import keras

import numpy as np

print(tf.__version__)
```




Popular Python NLP Packages

fuzzyWuzzy

spaCy

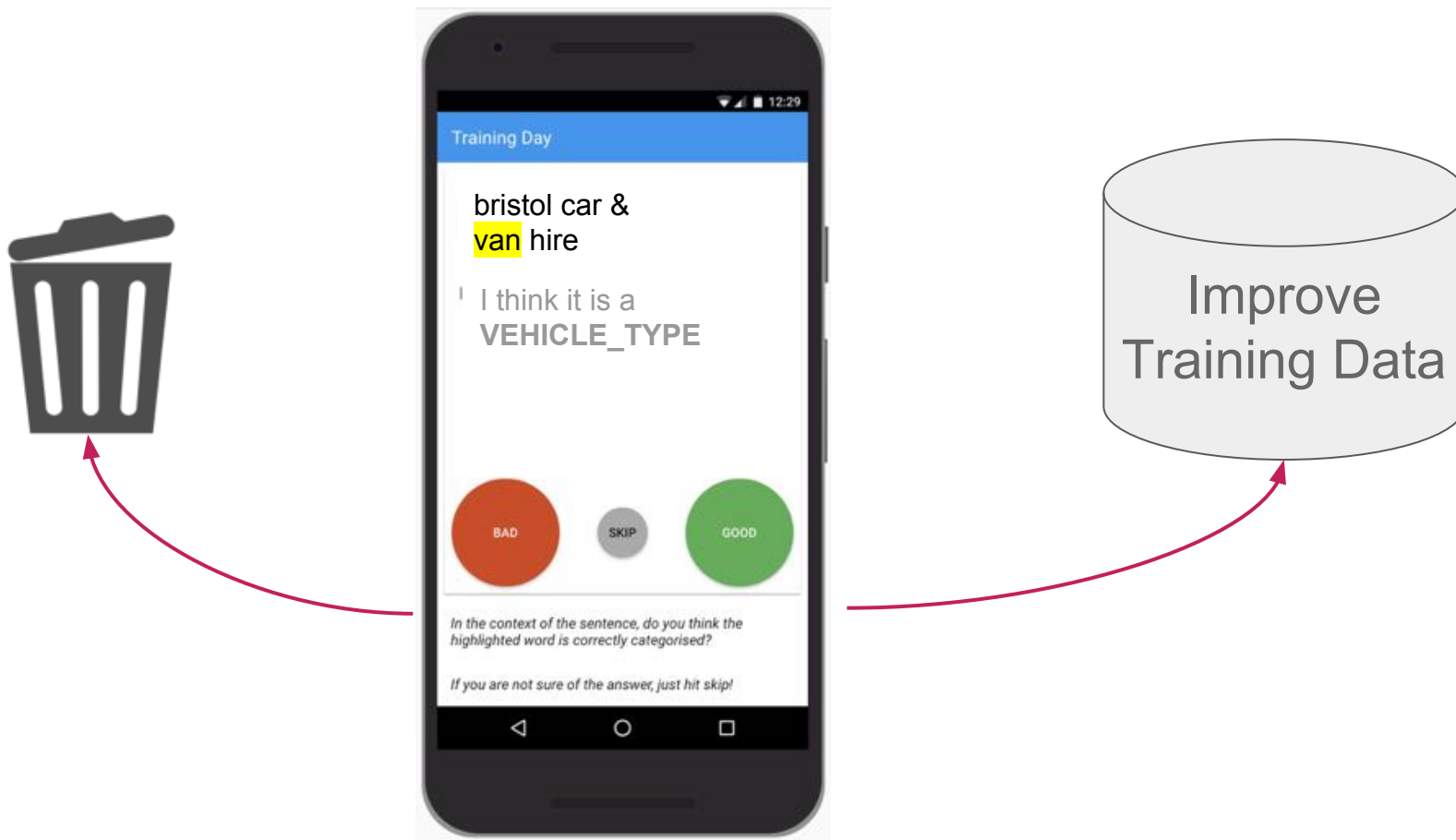
gensim

String Similarity \approx	Language Model 	Context Modeling $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$
✓		
✓	✓	
✓		✓

Fuzzy Wuzzy Cloud Function Example:

<https://colab.research.google.com/drive/1W6guxVZJqp-duQT6jSlmsqxkrCgt95Cl#scrollTo=a60zDUMiOEXD>

Sixt: Query Disambiguation via App & Spacy



Don't want write code? Try KNIME



KNIME Analytics Platform

Open, intuitive, integrative data science.



Querying Google Analytics in KNIME

Mon, 10/06/2014 - 00:00 — winter

The KNIME Google API extension (since [version 2.10](#)) allows for the connection and interaction of KNIME with Google APIs. For now nodes are provided to request and load data from [Google Analytics](#).



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USE CASES

Typos, NGrams, Auto-Sitelinks

APPENDIX II

Resources

Resources: Google ML Crash Course



developers.google.com/machine-learning/crash-course/

Resources: ai.google/education

Google AI

About

Stories

Research

Education

Tools

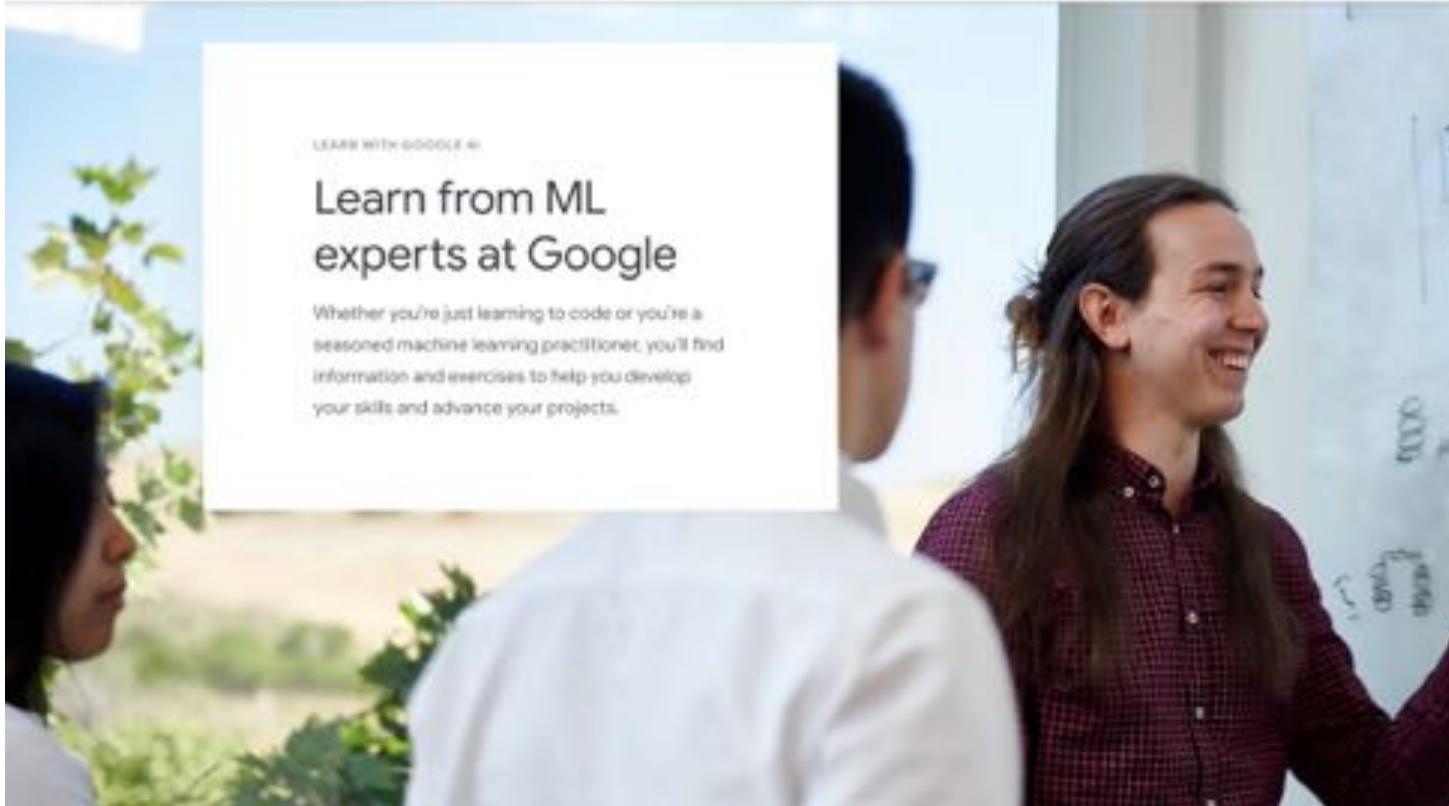
Principles

Blog

LEARN WITH GOOGLE AI

Learn from ML experts at Google

Whether you're just learning to code or you're a seasoned machine learning practitioner, you'll find information and exercises to help you develop your skills and advance your projects.



Resources: cloud.google.training

The screenshot displays the Google Cloud Training portal. The top navigation bar includes the Google Cloud logo, links for 'Why Google', 'Solutions', 'Products', 'Pricing', 'Getting started', and 'CONTACT SALES', along with a search icon and 'Docs'. A left sidebar lists various training categories: 'Training Tools', 'Training Programs', 'Learning Tracks', 'Cloud Infrastructure', 'Data & Machine Learning' (highlighted in blue), 'Application Development', 'G Suite Administration', 'Your Gateway to GCP', 'Course Catalog', 'First & Class', 'Self-Paced Training', 'Quizzes', and 'Courses'. The main content area is titled 'Data and Machine Learning' and includes a descriptive paragraph. Below this, the 'Data Analyst Track' is featured with two steps: 'STEP 1: From Data to Insights with Google Cloud Platform' and 'STEP 2: Building Conversational Experiences with Dialogflow'. Each step card contains a brief description and links for 'ON DEMAND' and 'MORE INFO'.

Google Cloud Why Google Solutions Products Pricing Getting started CONTACT SALES Search Docs

Training Tools

Training Programs

Learning Tracks

Cloud Infrastructure

Data & Machine Learning

Application Development

G Suite Administration

Your Gateway to GCP

Course Catalog

First & Class

Self-Paced Training

Quizzes

Courses

Data and Machine Learning

This learning path is designed for data professionals who are responsible for designing, building, analyzing, and optimizing big data solutions. To get up to speed quickly, choose a course track suited for your role or interests.

Data Analyst Track

STEP 1

From Data to Insights with Google Cloud Platform

This course teaches participants how to derive insights through data analysis and visualization using the Google Cloud Platform.

ON DEMAND MORE INFO

STEP 2

Building Conversational Experiences with Dialogflow













This course provides a deep dive into how to create a chatbot using Dialogflow, augment it with Cloud Natural Language API, and operationalize it using Google Cloud tools.

ON DEMAND MORE INFO

Resources: codelabs.google.com

https://codelabs.developers.google.com/?cat=cloud

Google Developers Search

Building a Serverless Data Pipeline: IoT to Analytics 44 min Updated Nov 8, 2018  Start	Building a gRPC service with C# 30 min Updated Nov 20, 2018  Start	Building a gRPC service with Java 22 min Updated Nov 14, 2018  Start
Building a gRPC service with Node.js 44 min Updated Jan 26, 2017  Start	Classify Text into Categories with the Natural Language API 22 min Updated Nov 29, 2018  Start	Classify images of clouds in the cloud with AutoML Vision 56 min Updated Nov 24, 2018  Start
Compute the Cosmos with Google Compute Engine 54 min Updated Nov 13, 2018  Start	Configure an Uptime Check and Alerting Policy 20 min Updated Nov 13, 2018  Start	Connect and visualize all your data in Data Studio 20 min Updated Dec 5, 2018  Start
Connecting to Cloud SQL Updated Dec 26, 2018  Start	Continuous Delivery to Kubernetes Using Spinnaker 50 min Updated Nov 29, 2018  Start	Continuous Deployment with Cloud Build Updated Nov 8, 2018  Start

Resources: aws.training (Courses)

The Elements of Data Science - Introduction to The Elements of Data Science

https://contentaws.training/volumedata/jwptm/1.0.5/index.html?endpoint=https%3a%2f%2firs.aws.training%2fTCAPIK2I&auth=BasicN2Q0eDcwYVYyYSltZnRlbnRvbmVzLmMdrjYy

The Elements of Data Science

EN COMPLETE

▶ AWS MACHINE LEARNING: THE ELEMENTS OF DATA SCIENCE

Introduction to The Elements of Data Science

What Is Data Science?

Knowledge Check 1

Problem Formulation and Exploratory Data Analysis

Knowledge Check 2

Data Processing and Feature Engineering

Lesson 1 of 11

Introduction to The Elements of Data Science

In this course, we'll explore the machine learning process from end-to-end. It's important to know how data influences and impacts this process, because your machine learning solution is only as good as the data that drives it.

Resources: aws.training

The screenshot displays the AWS Training and Certification portal. The top navigation bar includes the AWS logo, 'training and certification', and links for 'Dashboard', 'Learning Library', 'Certification', and 'Support'. On the right, there are links for 'English' and 'My Account'. A search bar is located on the left side of the main content area. Below the search bar, a sidebar lists various domains: Analytics, Application Integration, Architecting, Big Data, Business Applications, Compute, Database, Desktop & App Learning, DevOps, Developer Tools, Game Tech, Internet of Things (IoT), **Machine Learning** (highlighted with a green checkmark), Management & Governance, Media Services, Migration & Transfer, Mobile Services, Networking & Content Delivery, and Security, Identity & Compliance. The main content area shows a grid of training resources under the 'Machine Learning' domain. The resources are categorized by type (Video or Curriculum) and level (Advanced, Fundamental, Intermediate). Each resource card includes a title, level, duration, and a brief description.

Domain	Resource Type	Resource Title	Level	Duration	Description
Machine Learning	VIDEO	Amazon Transcribe Deep Dive: Using Feedback Loops to Improve	ADVANCED	40 MINUTES	This demonstration shows you how to use a feedback loop to process custom vocabulary to improve transcription generated by the...
	VIDEO	What is Deep Learning?	FUNDAMENTAL	20 MINUTES	This introductory course provides an overview of Deep Learning (DL) concepts. In the course, we discuss the AWS services available for DL...
	VIDEO	What is Machine Learning?	FUNDAMENTAL	10 MINUTES	This course introduces you to machine learning concepts and the role data plays. We explore use cases, discuss an innovative way to build...
	VIDEO	What is Artificial Intelligence?	FUNDAMENTAL	10 MINUTES	this is an introductory course on artificial intelligence (AI). In the course, we discuss what AI is and why it is important, and take a brief...
	CURRICULUM	Machine Learning Security	INTERMEDIATE		At AWS, security is the highest priority. Controlling and managing permissions, as well as authorizing traffic is all part of building...
	CURRICULUM	Machine Learning Exam Basics	CERTIFICATION		Throughout this curriculum we'll explore the AWS machine learning services that enable everything from building, training, and...
Machine Learning	CURRICULUM	Conversation Primer: Machine Learning Terminology	FUNDAMENTAL		Learn about the AWS machine learning services that can help you build, train, and deploy models at scale, analyze images and...
	CURRICULUM	Developing Machine Learning Applications	ADVANCED		In this curriculum, we'll explore Amazon's fully managed ML platform, Amazon SageMaker. Specifically, we'll discuss how to train and tune...
	CURRICULUM	ML Building Blocks: Services and Terminology	FUNDAMENTAL		These two courses clarify both the machine learning stack and the terms and processes that will help you build a good foundation in...

Resources: Machine Learning 101



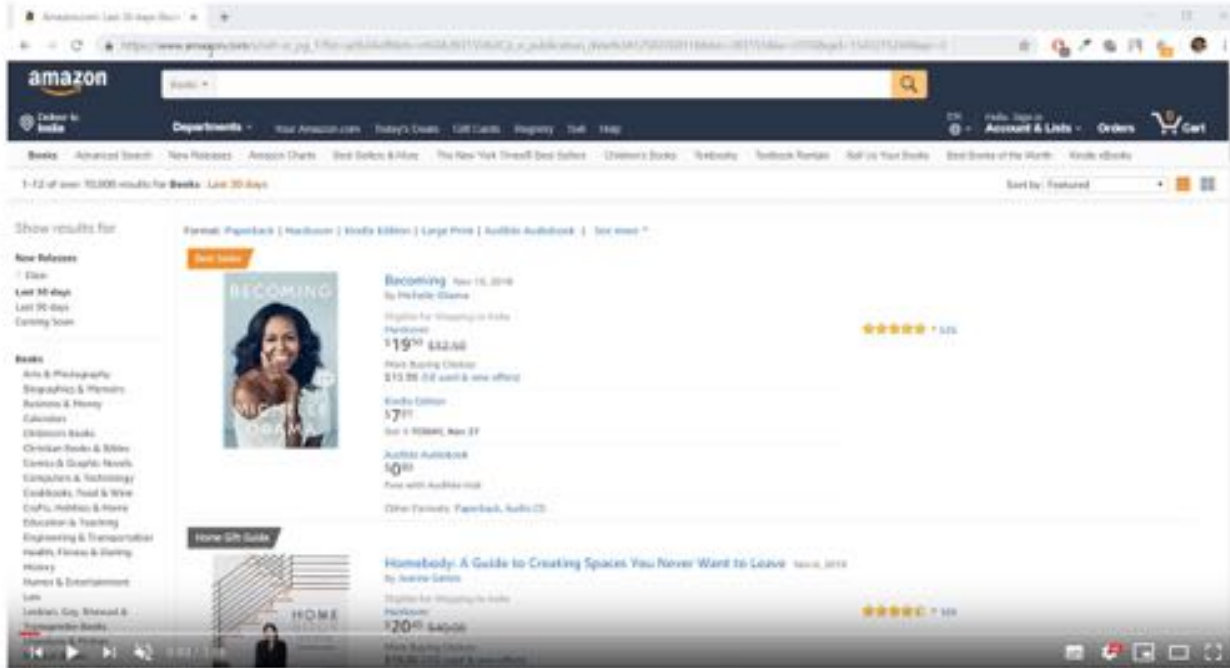
docs.google.com/presentation/d/1kSuQyW5DTnkVaZEjGYCkfOxvzCqGEFzWBy4e9Uedd9k/

Resources: TechSEO Boost (Python/ML)



Python & SEO Talks @ TechSEOBoost: https://youtu.be/N0uJp_JXfOg

Resources: Scraping with Python



Python
Python Scrapy Tutorial- 1 - Web Scraping Spiders and Crawling

Python Scrapy Tutorial: https://youtu.be/ve_Oh4Y8nuI