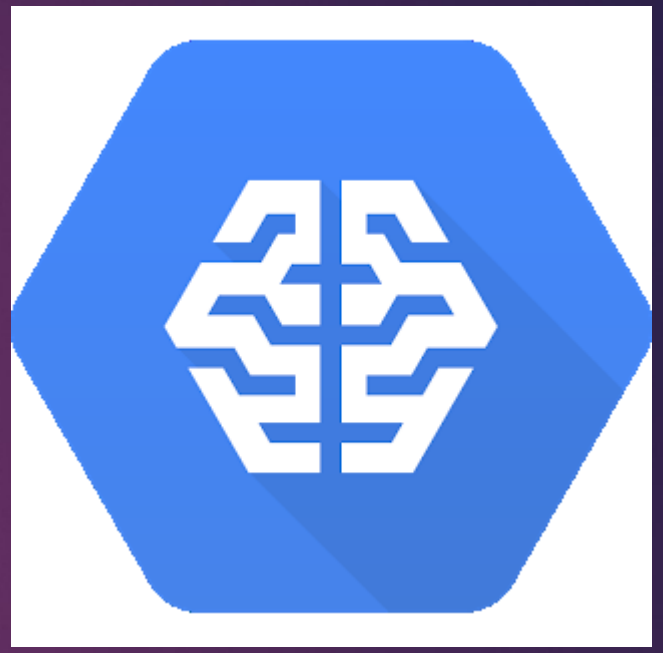
A brief Introduction to Google Cloud AI Products

Dr. MOHAMMED TAHA EL ASTAL



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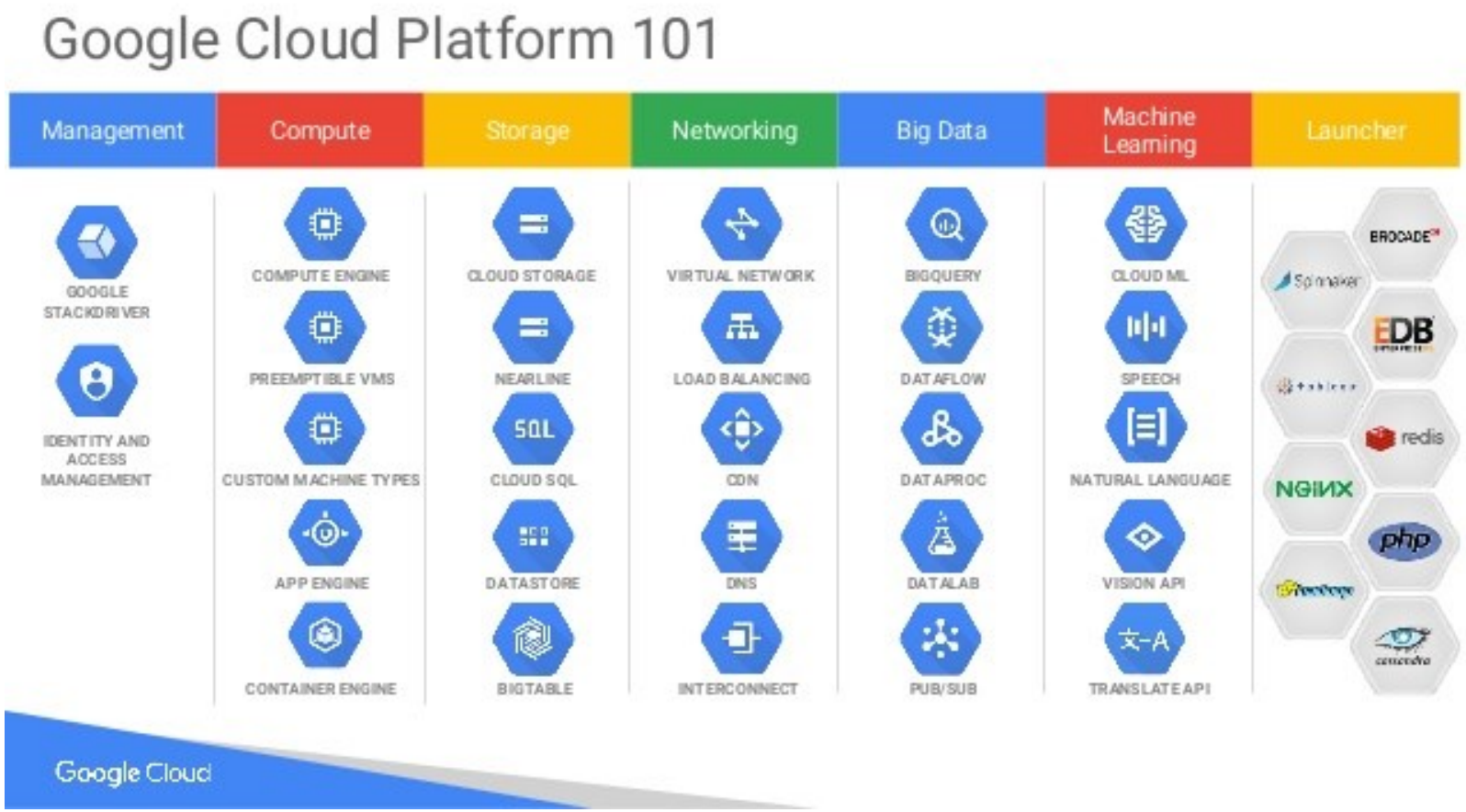
Intro to Google Cloud



Google Cloud AI Products:

Use your own data to train models

TensorFlow

Cloud Machine Learning Engine

Ready to use Machine Learning models

Cloud Vision API

Cloud Speech API

Cloud Jobs API

Cloud Translation API

Cloud Natural Language API

Cloud Video Intelligence API

Coming soon

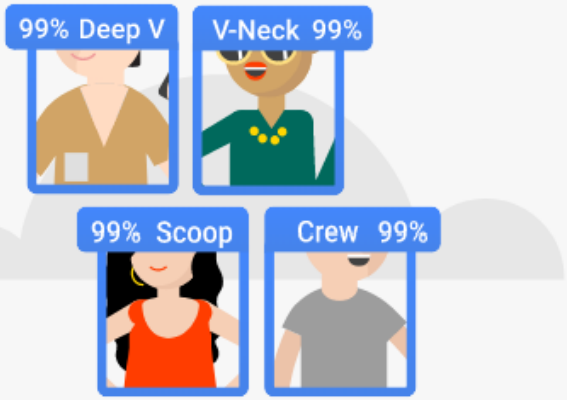
Cloud AutoML

Train Custom Machine Learning Models

Cloud AutoML is a suite of Machine Learning products that enables developers with limited machine learning expertise to train high quality models by leveraging Google's state of the art transfer learning, and Neural Architecture Search technology.

AutoML Vision is the first product to be released. It is a simple, secure and flexible ML service that lets you train custom vision models for your own use cases. Soon, Cloud AutoML will release other services for all other major fields of AI.

Cloud AutoML



Easily train custom vision models

With Cloud AutoML, you can bring your training data to create your own custom vision model with minimum Machine Learning skills required. Start with as little as a few dozen photographic samples and Cloud AutoML will do the rest.

State-of-the-art performance

Use Cloud AutoML to leverage Google's proprietary image recognition technology. The AutoML technology achieved the state of the art performance on popular public datasets (CIFAR and ImageNet). This research is now available to you.

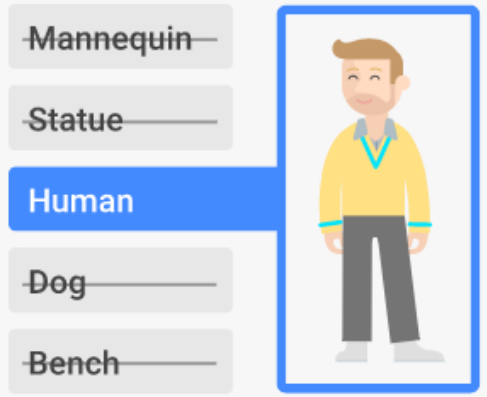
Cloud AutoML

Get up and running fast

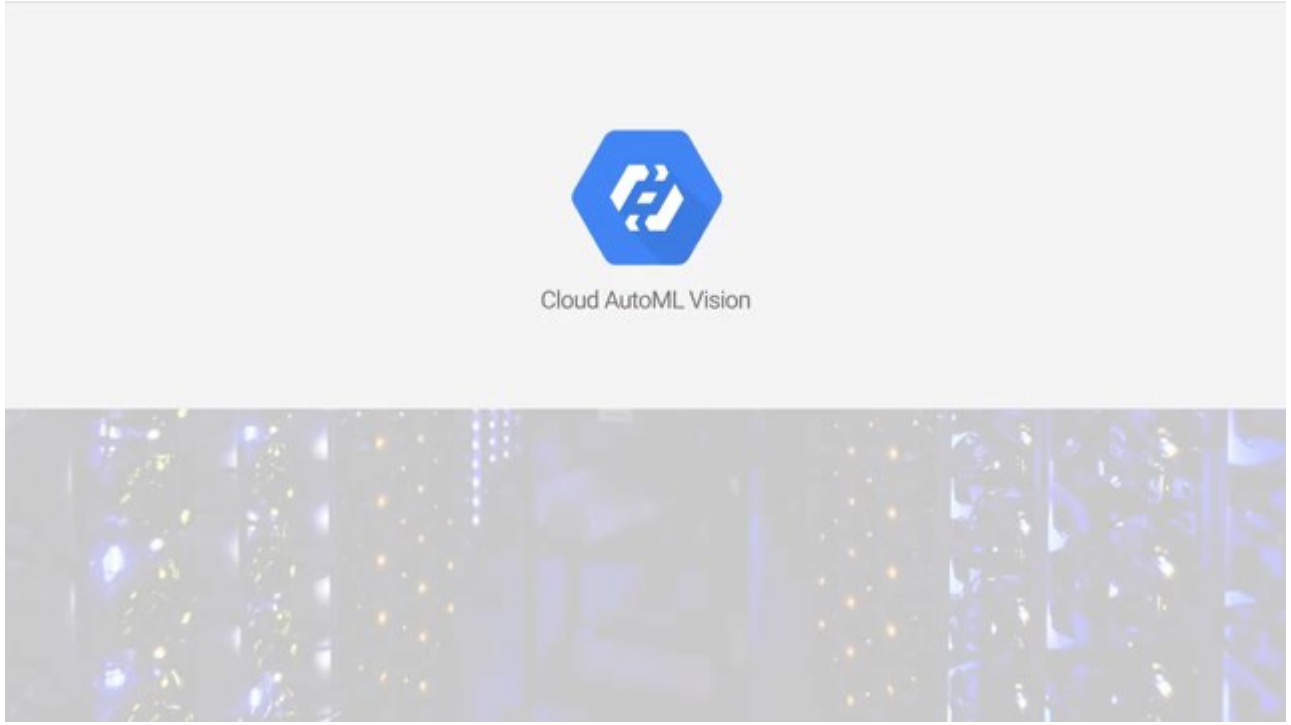
Cloud AutoML provides a simple graphical user interface (GUI) for you to train, evaluate, improve, and deploy models based on your own data. You're only a few minutes away from your own custom machine learning model.

Generate high quality training data

You can use Google's human labeling service to annotate or clean your image labels to make sure your models are being trained on high-quality data.



Cloud AutoML: Sample



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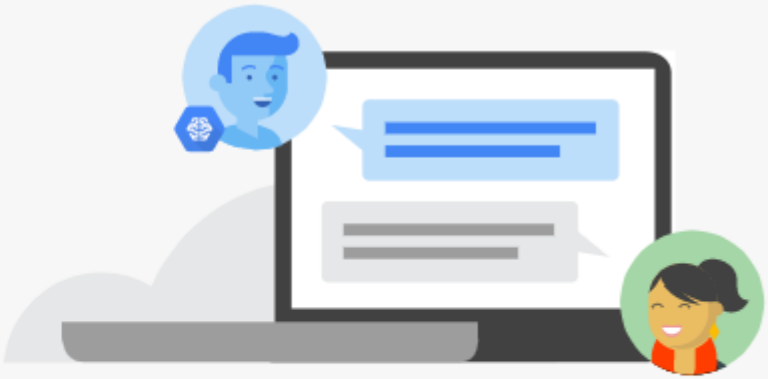
https://www.youtube.com/watch?v=GbLQE2C181U

Dialogflow

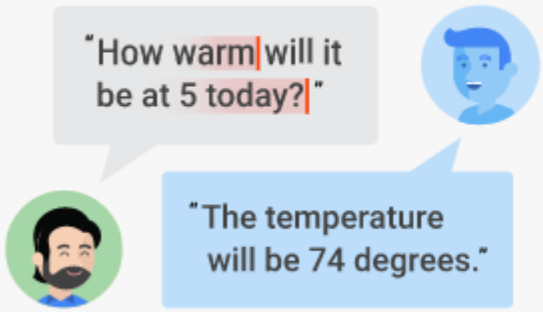
Natural Conversational Experiences

Dialogflow is an end-to-end development suite for building conversational interfaces for websites, mobile applications, popular messaging platforms, and IoT devices. You can use it to build interfaces (e.g., chatbots) that are capable of **natural and rich interactions** between your users and your business. It is powered by machine learning to **recognize the intent and context of what a user says**, allowing your conversational interface to provide highly efficient and accurate responses.

Dialogflow Enterprise Edition is the enterprise tier of Dialogflow and is part of Google Cloud Platform.



Dialogflow



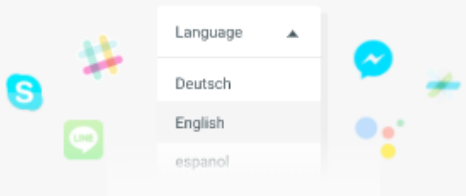
Powered by Google's Machine Learning

Natural language understanding recognizes a user's intent and extracts pre-built entities such as time, date, and numbers. You can train your agent to identify custom entity types by providing a small dataset of examples. You can also use 30+ pre-built agents as a template.

Build Quickly with Integrated Code Editor

Dialogflow provides an integrated code editor that allows you to natively build serverless applications linked to your conversational interface through Cloud Functions for Firebase. Or provide your own custom webhook that can be hosted in the cloud or on-premise.

Dialogflow



Cross-Platform and Multi-Language Support

Dialogflow supports 20+ languages and integration with over 14 different platforms. Reach more audiences by building a multilingual agent that works across multiple languages.

Powered by Google Cloud Speech

You can expand your conversational interface to recognize voice interactions with a single API call. Powered by Google Cloud Speech, it supports real-time streaming and synchronous modes.

Built-in Analytics for Better User Experiences

The integrated Analytics dashboard gives you insight into conversational interactions so that you can optimize your bot to better recognize and respond to user intents.

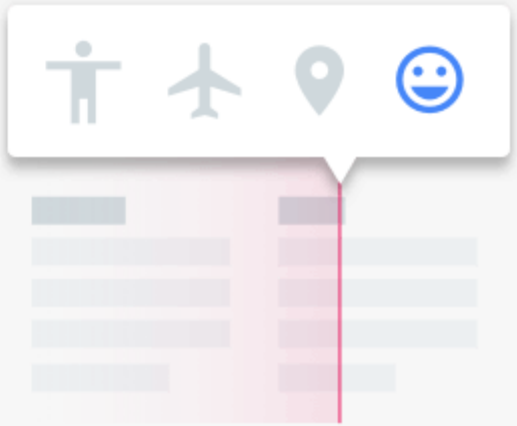
Dialogflow: Sample

https://www.youtube.com/watch?v=Om7tyGGemXI

CLOUD NATURAL LANGUAGE

Powerful Text Analysis

Google Cloud Natural Language reveals the structure and meaning of text by offering powerful machine learning models in an easy to use REST API. You can use it to **extract information** about people, places, events and much more, mentioned in text documents, news articles or blog posts. You can use it to **understand sentiment** about your product on social media or **parse intent** from customer conversations happening in a call center or a messaging app. You can **analyze text uploaded in your request** or integrate with your document storage on Google Cloud Storage.



CLOUD NATURAL LANGUAGE

Insights from your customers

Extract actionable insights on product reception or user experience from customer conversations in email, chat or social media by using entity detection and sentiment analysis.

Multimedia, Multi-lingual Support

Combine the API with our Google Cloud Speech API and extract insights from audio conversations. Use with Vision API OCR to understand scanned documents. Extract entities and understand sentiments in multiple languages by translating text first with Translation API.

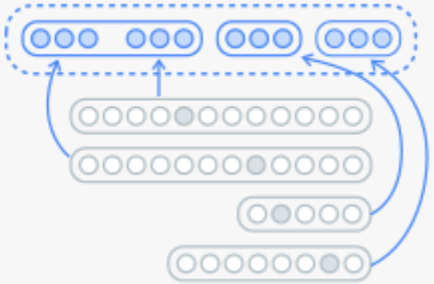
CLOUD NATURAL LANGUAGE

Content Classification Relationship Graphs

Classify documents by common entities or 700+ general categories such as News, Technology and Entertainment. Build relationship graphs of entities extracted from news or wikipedia articles, by using signals from the state of the art syntax analysis.

Best of Google Deep Learning models

This API brings to you the same Machine Learning technology that both powers Google's ability to find specific answers to user questions in Google search and is the language understanding system behind the Google Assistant.



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CLOUD NATURAL LANGUAGE

Live-demo:

https://cloud.google.com/natural-language/

CLOUD SPEECH-TO-TEXT

Powerful Speech Recognition

Google Cloud Speech-to-Text enables developers to **convert audio to text** by applying powerful **neural network models** in an easy to use API. The API **recognizes 120 languages and variants,** to support your global user base. You can enable voice command-and-control, transcribe audio from call centers, and more. It can process **real-time streaming or pre-recorded audio,** using Google's **machine learning technology.**

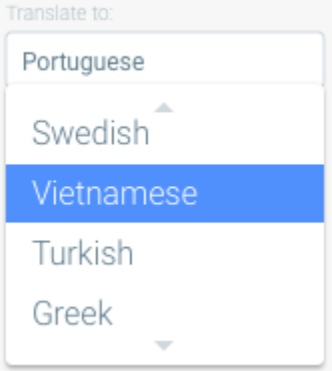
CLOUD SPEECH-TO-TEXT

Powered by Machine Learning

Apply the most advanced deep learning neural network algorithms to audio for speech recognition with unparalleled accuracy. Cloud Speech-to-Text's **accuracy improves over time** as Google improves the internal speech recognition technology used by Google products.

Recognizes over 120 Languages

Cloud Speech-to-Text **recognizes** 120 languages and variants to support your global user base. You can also **filter inappropriate content** in text results for all languages.



CLOUD SPEECH-TO-TEXT

Returns Text Transcription In Real-Time for Short or Long-form Audio

Cloud Speech-to-Text can **stream text results,** immediately returning text as it's recognized from streaming audio or as the user is speaking. Alternatively, Cloud Speech-to-Text can return recognized text from audio stored in a file. It's capable of analyzing short and long-form audio.

Automatically Transcribes Proper Nouns and Context-Specific Formatting

Cloud Speech-to-Text is tailored to work well with real-life speech and can accurately transcribe proper nouns (i.e. Sundar Pichai) and appropriately format language (e.g., dates, phones numbers). Google supports more than 10x proper nouns compared to the number of words in the entire Oxford English Dictionary.

Offers Selection of Pre-Built Models, Tailored for Your Use-Case

Cloud Speech-to-Text comes with multiple pre-built speech recognition models so you can optimize for your use case (e.g., voice commands). Example: Our pre-built video transcription model is ideal for indexing or subtitling video and/or multispeaker content, and uses machine learning technology that is similar to YouTube captioning.

CLOUD SPEECH-TO-TEXT: SAMPLE

Live-demo:

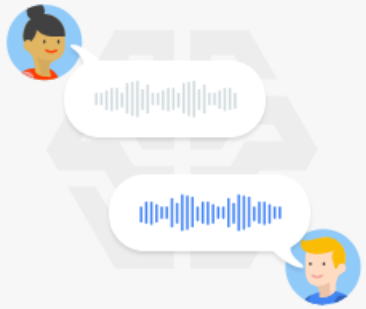
https://cloud.google.com/speech-to-text/

CLOUD TEXT-TO-SPEECH

High-Fidelity Speech Synthesis

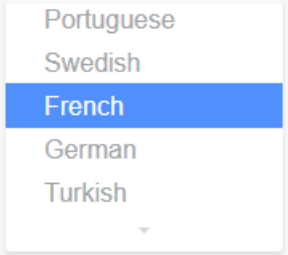
Google Cloud Text-to-Speech enables developers to synthesize natural-sounding speech with 30 voices, available in multiple languages and variants. It applies DeepMind's groundbreaking research in WaveNet and Google's powerful neural networks to deliver the highest fidelity possible. With this easy-to-use API, you can create lifelike interactions with your users, across many applications and devices.

CLOUD TEXT-TO-SPEECH



Powered by Google's Machine Learning

Apply the most advanced deep learning neural network algorithms to synthesize text into a variety of voices and languages. Our neural networks were built based on Google's speech synthesis expertise.



Select from 30+ Voices

Google Cloud Text-to-Speech offers a selection of 30+ voices in multiple languages and variants.

Includes Exclusive Access to WaveNet Voices from DeepMind

DeepMind has made groundbreaking research in machine learning models to generate speech that mimics human voices and sounds more natural, reducing the gap with human performance by over 50%. Cloud Text-to-Speech offers exclusive access to multiple WaveNet voices and will continue to add more over time.

CLOUD TEXT-TO-SPEECH

Supports Many Common Use-Cases

As an easy-to-use API, Google Cloud Text-to-Speech is a flexible solution to creating natural experiences for a variety of use-cases. Common use-cases include call center automation, interactive responses from IoT devices, or transforming text into audio that can be consumed as audio.

Easily Integrates with Existing Applications and Devices

Cloud Text-to-Speech supports any application or device that can send a REST or gRPC request including phones, PCs, tablets and IoT devices (e.g., cars, TVs, speakers)

CLOUD TEXT-TO-SPEECH

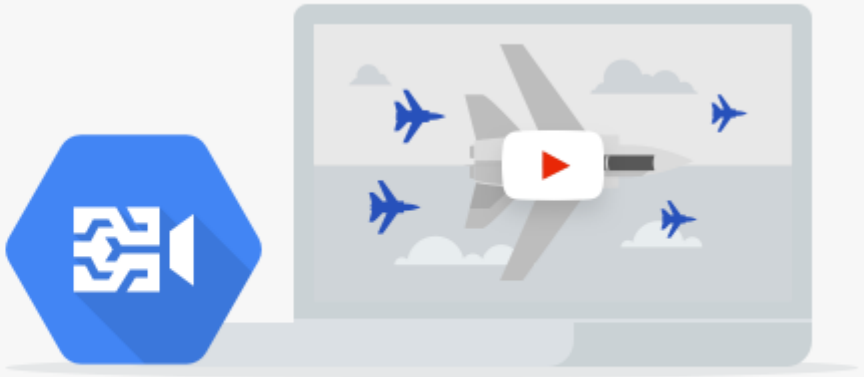
Live-demo:

https://cloud.google.com/text-to-speech/

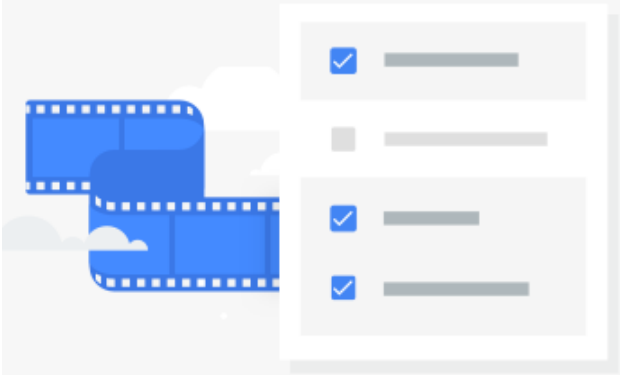
CLOUD VIDEO INTELLIGENCE

Precise Video Analysis

Google Cloud Video Intelligence makes videos searchable, and discoverable, by extracting metadata with an easy to use REST API. You can now search every moment of every video file in your catalog. It quickly annotates videos stored in Google Cloud Storage, and helps you identify key entities (nouns) within your video; and when they occur within the video. Separate signal from noise, by retrieving relevant information within the entire video, shot-by-shot, -or per frame.



CLOUD VIDEO INTELLIGENCE

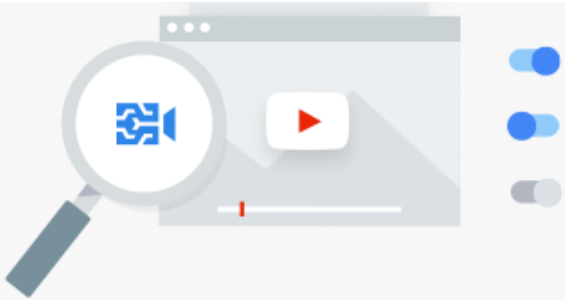


Gather Insight from 20,000 Labels

Cloud Video Intelligence allows developers to **extract actionable insights from video** files without requiring any machine learning or computer vision knowledge. From our massive library of 20,000 labels, it automatically analyzes video content to identify what entities are in your video content and when they appear. Cloud Video Intelligence improves over time as new concepts are introduced and accuracy is improved.

Quickly Search Your Video Catalog

You can now **search your video catalog the same way you search text documents.** Cloud Video Intelligence extracts metadata that can be used to index your video content and make it easy to organize and search your video content. It also returns confidence levels for each entity identified, so you can easily control and filter your content for what's most relevant.



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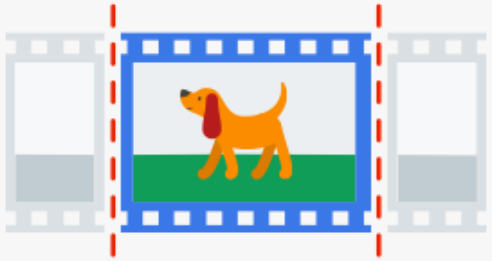
CLOUD VIDEO INTELLIGENCE



Separate Signals from Noise

You can identify the presence of a signal buried in noise, by using **shot detection to distinguish scene changes** within a video and discern only relevant entities at the video, shot or frame level (e.g. Identify “dog” within a new scene).

Process and Store on Google Cloud Platform

You can select the region where **processing will take place, choosing from any region where Google Cloud Platform is available.** You can also store your videos Google Cloud Storage, which features a consistent API, low-latency, and speed across multiple storage classes.

CLOUD VIDEO INTELLIGENCE

Live-demo:

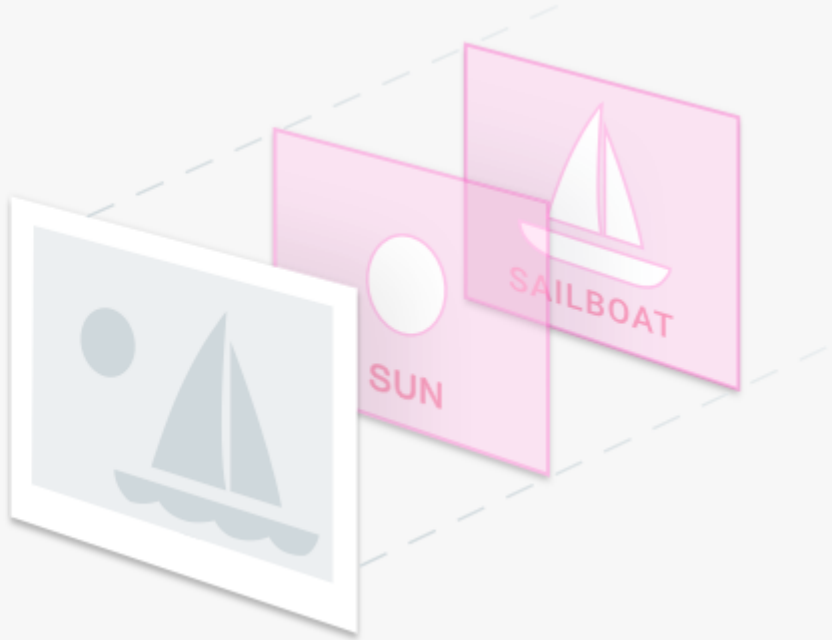
https://cloud.google.com/video-intelligence/

https://www.youtube.com/watch?v=_9ncHt6EOyA

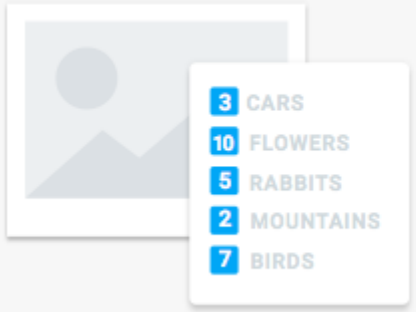
CLOUD VISION API

Powerful Image Analysis

Google Cloud Vision API enables developers to **understand the content of an image** by encapsulating **powerful machine learning models** in an easy to use REST API. It quickly **classifies images** into thousands of categories (e.g., "sailboat", "lion", "Eiffel Tower"), **detects individual objects and faces within images**, and finds and reads printed words contained within images. You can build metadata on your image catalog, moderate offensive content, or enable new marketing scenarios through image sentiment analysis. **Analyze images uploaded in the request** or integrate with your image storage on Google Cloud Storage.



CLOUD VISION API

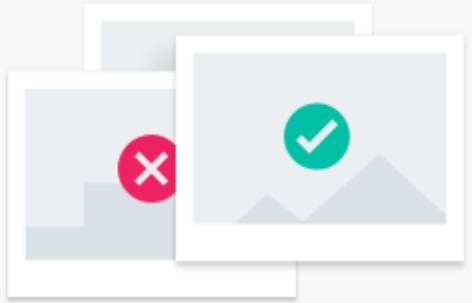


Insight From Your Images

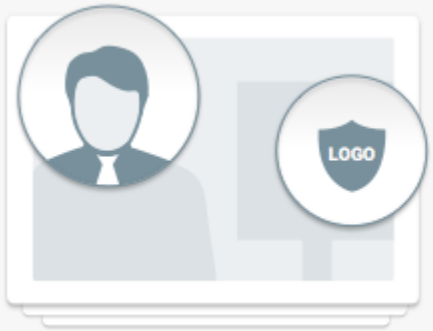
Easily **detect broad sets of objects** in your images, from flowers, animals, or transportation to thousands of other object categories commonly found within images. **Vision API improves over time** as new concepts are introduced and accuracy is improved.

Detect Inappropriate Content

Powered by Google SafeSearch, **easily moderate content** from your crowd sourced images. Vision API enables you to detect different types of inappropriate content from adult to violent content.



CLOUD VISION API



Power of the Web

Vision API uses the power of Google Image Search to find topical entities like **celebrities**, logos, or news events. Combine this with Visually Similar Search to find similar images on the web.

Extract Text

Optical Character Recognition (OCR) enables you to **detect text** within your images, along with **automatic language identification**. Vision API supports a broad set of languages.

CLOUD VISION API: SAMPLE

Live-demo:

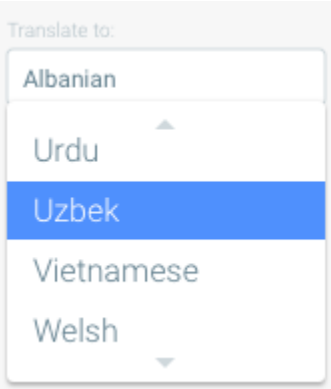
https://cloud.google.com/vision/

CLOUD TRANSLATION API

Fast, Dynamic Translation

Cloud Translation API provides a simple programmatic interface for translating an arbitrary string into any supported language using state-of-the-art Neural Machine Translation. Translation API is highly responsive, so websites and applications can integrate with Translation API for fast, dynamic translation of source text from the source language to a target language (e.g., French to English). Language detection is also available in cases where the source language is unknown. The underlying technology pushes the boundary of Machine Translation and is updated constantly to seamlessly improve translations and introduce new languages and language pairs.

CLOUD TRANSLATION API



Translate Many Languages

Translation API supports more than one hundred different languages, from Afrikaans to Zulu. Used in combination, this enables translation between thousands of language pairs.

Language Detection

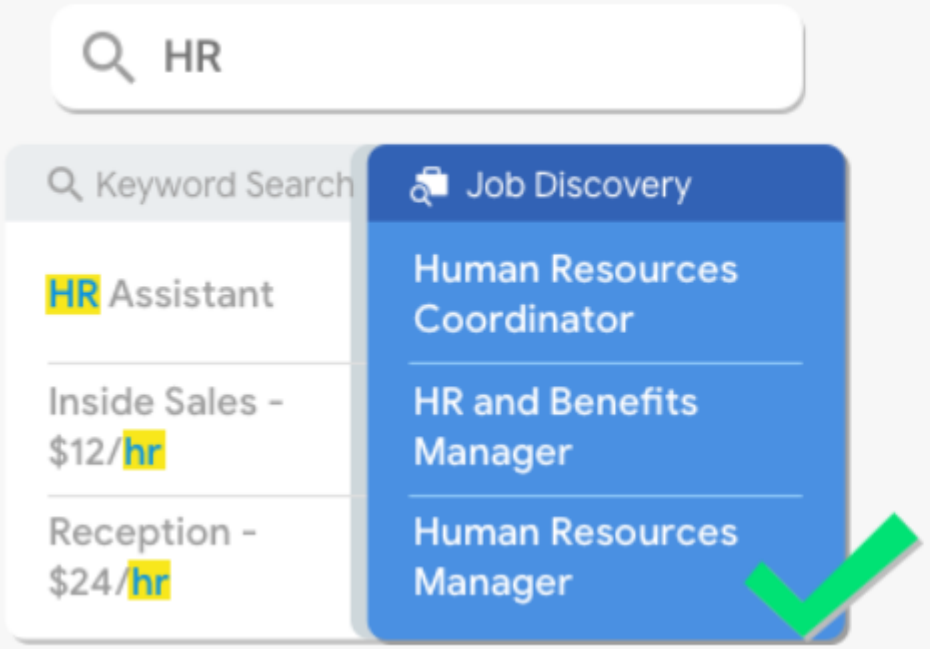
Sometimes you don't know your source text language in advance. For example, user generated content might not contain a language code. Translation API can automatically identify languages with high accuracy.

CLOUD TRANSLATION API

Live-demo:

https://cloud.google.com/translate/

CLOUD JOB DISCOVERY



Cloud Job Discovery uses machine learning to better understand both job content and the intent of job seekers, resulting in:

- better job site engagement
- higher apply rates
- increased candidate conversion
- freed up product and engineering resources

Most job sites rely on keyword search to retrieve content which often omits relevant jobs and overwhelms the job seeker with irrelevant jobs. For example, a keyword search with any **spelling error returns 0 results**, and a keyword search for "**dental assistant**" returns any "assistant" role that offers dental benefits.

CLOUD JOB DISCOVERY

Live-demo:

https://cloud.google.com/job-discovery/

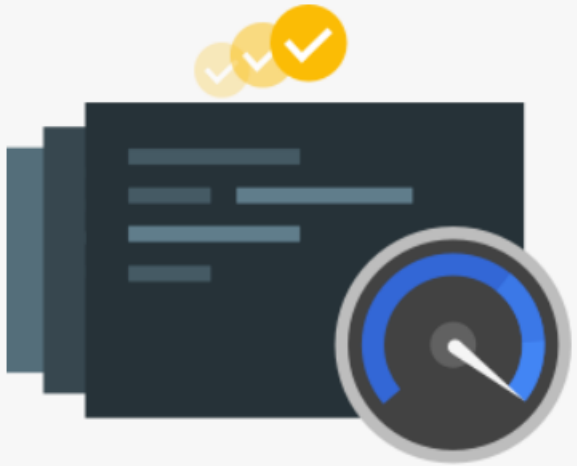
Note: explore the feature in the table shown

CLOUD TPU

Accelerated Machine Learning

Machine learning (ML) has the power to greatly simplify our lives. Improvements in computer vision and natural language processing help all of us interact more naturally with technology. Businesses rely on ML to strengthen network security and reduce fraud. Advances in medical imaging enabled by ML can increase the accuracy of medical diagnoses and expand access to care, ultimately saving lives.

CLOUD TPU

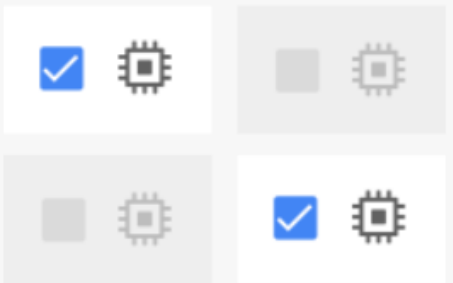


Speed Up Machine Learning Workloads

These revolutionary Cloud TPUs were designed to accelerate machine learning workloads with TensorFlow. Each Cloud TPU provides up to 180 teraflops of performance, providing the computational power to train and run cutting-edge machine learning models. Cloud TPUs can help you transform your business or create the next research breakthrough.

On-Demand ML Supercomputing

Access powerful machine learning accelerators on demand—no up-front capital investment required. Whether your task requires Cloud TPUs for hours or weeks, you can get exactly the machine learning acceleration you need without creating your own datacenter.



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CLOUD TPU

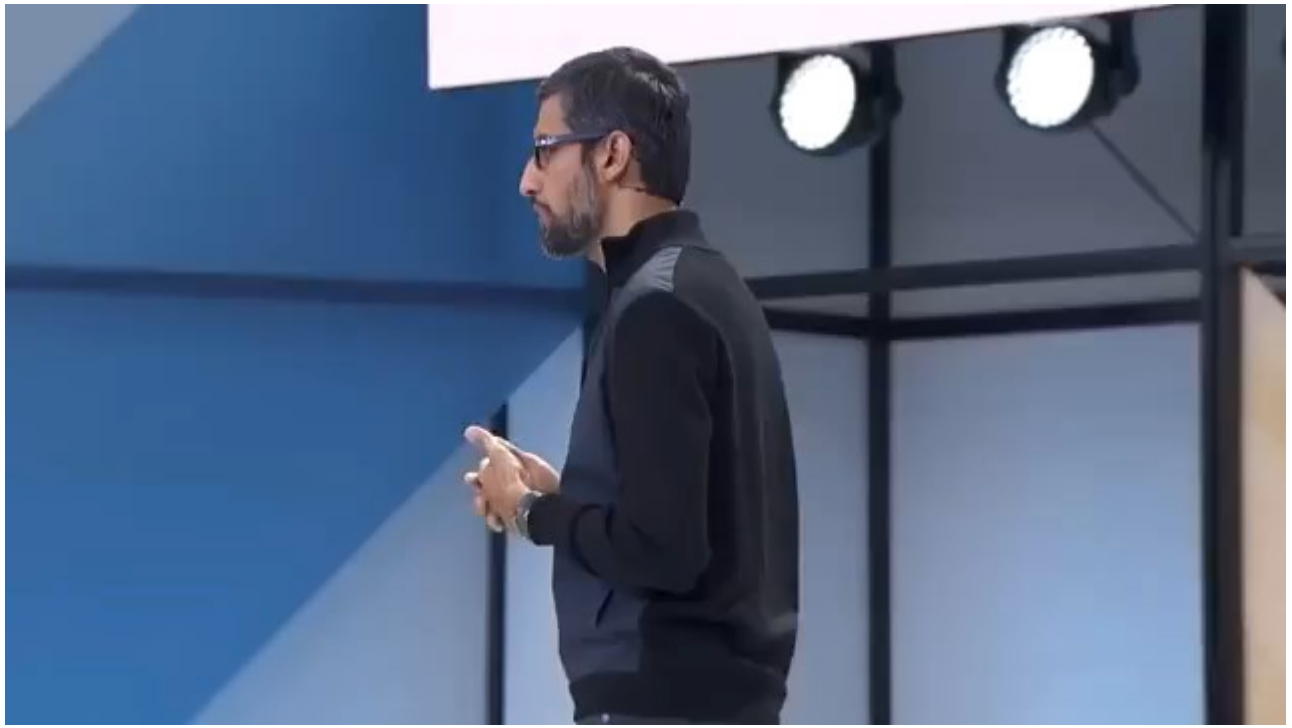
Easy On-Ramp to Cloud

Because TensorFlow is open-source, it's easy to take ML workloads you're already running in TensorFlow and try them on Cloud TPUs. Use TensorFlow's high-level APIs to move models across CPUs, GPUs, and TPUs with minimal code changes. If you have image classification or machine translation needs, we provide a number of models that run well on TPUs - just bring your data, download a reference TensorFlow model and train.

Access Google's AI Innovation

Access the same accelerators used by Google to develop world-class machine learning products. Cloud TPUs are purpose-built specifically to accelerate state-of-the-art machine learning workloads, including both training and prediction.

Cloud TPU: Sample



https://www.youtube.com/watch?v=78P0pBj-i4c

Build and calculate your model's Price:

https://cloud.google.com/products/calculator/

Google Cloud AI: Installation and Setup

- Install Python using https://www.youtube.com/watch?v=dX2-V2BocqQ&t=62s
- Install google cloud using : pip install google-cloud
- Set up google API key (apikey.json)
- activate service key, refer to YouTube in References
- Set envirmental variable of google application credential : Set GOOGLE_APPLICATION_CREDNTIALs=apikey.json
- Example: Google cloud Vision API
  - Writing your python script
  - Test image
- References:
- https://www.youtube.com/watch?v=tqFk8bzv2ys&t=382s

https://www.youtube.com/watch?v=dX2-V2BocqQ

Thank you

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