

How Does Google Use Machine Learning?

- Difficulty Level : \n[Easy](#)
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In modern times, Google is everywhere!!! So much so that you are most probably reading this article using Google Search. And while Machine Learning has long been a part of Google, now it seems that ML is everywhere! From **Google Search** to **Google Photos** to even **Google Translate**, everything uses [Machine Learning](#).

And these are only the more common items! In fact, Google and its parent company Alphabet are heavily invested in [Machine Learning Research](#) in almost all imaginable fields like **Ethical Principles**, **Quantum Computing**, **Healthcare**, **Robotics**, **Perception**, etc. Sundar Pichai, the CEO of Google commented that Machine learning is a core, transformative way by which we're rethinking how we're doing everything. We are thoughtfully applying it across all our products, be it search, ads, YouTube, or Play. And we're in early days, but you will see us apply machine learning in all these areas.



So it is obvious that Google eventually plans on fully integrating Machine Learning in all its operations. But that futuristic world is still a little far away! For now, let's see some of the ways in which **Google currently uses Machine Learning** so that we can understand the full scope of its applications in the future.

1. Google Translate

Want to translate a text from English to Hindi but don't know Hindi? Well, [Google Translate](#) is the tool for you! While it's not exactly 100% accurate, it is still a great tool to convert text, images, or even real-time video from one language to another. And in case you wonder how it translates more or less accurately, well Google Translate uses Machine Learning of course!

It uses **Statistical machine translation (SMT)** which is a fancy way of saying that it analyses millions of documents that are already translated from one language to another (English to Hindi in this case) and then looks for the common patterns and basic vocabulary of the language. After that, it picks the most accurate translation possible based on educated guesses that mostly turn out to be correct. For Example: Let's see how Google Translate translates Machine Learning is cool into Hindi!!!

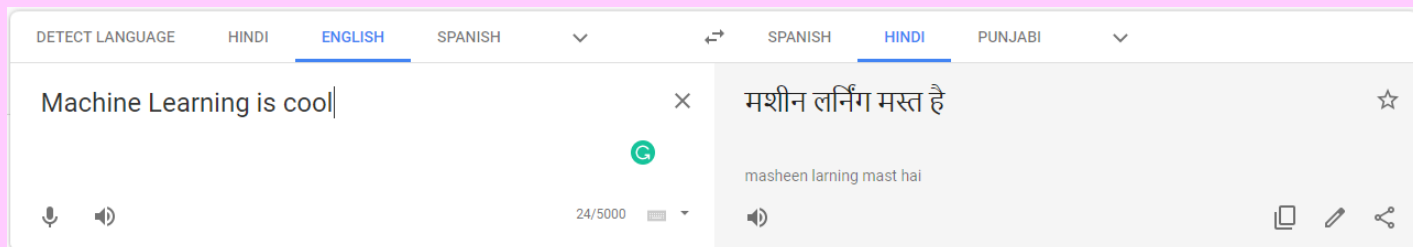


Image Source: Google

2. Google Photos

In case you are a millennial, I am sure you are a selfie addict! And of course, you use [Google Photos](#) a lot if you are an Android user as well. And it's no shock that you do! Google Photos allows you to back up all your photos in a single location even if they were shot from multiple devices and it also offers lots of other cool effects using Machine Learning.

For Example, Google Photos also automatically creates albums of photos taken during a specific period without any input from you. And that's not all, it can also select the **best photos**. And in case you haven't sorted all your pictures into albums, you can also search for them by typing in names. Suppose you want to find a picture with your dog, type in Dog and you will get all the dog pictures! This is done using **Image Recognition**, wherein Deep Learning is used to sort

millions of images on the internet in order to classify them more accurately. So using Deep Learning, the images that are classified as \xe2\x80\x9cDog\xe2\x80\x9d in your Google Photos are displayed.

3. RankBrain

Suppose you want to know who is the CEO of Google? And then you want to know who is his wife? But how do you search this on Google? You cannot exactly write the name of Sundar Pichai or his wife since you don\xe2\x80\x99t know it! In this case, you can simply search \xe2\x80\x9cCEO of google wife\xe2\x80\x9d on Google and you will get the required results. This is achieved using **RankBrain** in Google Search.



Image Source: Google

RankBrain is basically a **deep neural network** that is helpful in providing the required search results. It is one of the factors in the Google Search algorithm that determines which search pages are displayed. In case there are any unique words or phrases on Google Search (like \xe2\x80\x9cCEO of google wife\xe2\x80\x9d in our case!) then RankBrain makes intelligent guesses to find which search results fit the situation and filter them accordingly. In fact, RankBrain is currently so important that Google says it is its third most important page ranking factor for the results of a search query.

4. Google Assistant

Want a little help in organizing your calendar? Want to know the best Italian restaurants near your home? Want to book movie tickets on the go? Well, never fear!!! [Google Assistant](#) is here to make your life easier! It is basically a personal assistant that is enabled using a combination of **Google Knowledge Graph**, **Image Recognition**, and **Natural Language Processing**.

The Google Assistant is envisioned as a chatbot by Google which can be connected to your phones, TVs, speakers, etc. with the ability to actually have a conversation with you. Here the **Google Knowledge Graph** provides information gathered from various sources while **Natural Language Processing** allows the Google Assistant to interact with you and formulate its answers according to your questions.

5. DeepDream

We all know that humans dream? Well, what if computers dream as well?!! This is the premise of Google [DeepDream](#) that used convolutional neural networks to find random patterns in various images and amplifies them in different ways. These images can be tweaked in any possible manner using the input data and various parameters so that the results obtained can be funny, weird or even trippy!!!



Image Source: Google

There are **multiple layers in the neural networks** in DeepDream wherein each layer extracts more and more high-level features from the input image until the final output is produced by the end layer. To demonstrate this, we have an image from Google DeepDream that is a weird hybrid of a woman and lots of gears. All in all, it\xe2\x80\x99s very difficult to just explain the complicated effects of DeepDream so its best that you just try it yourself by uploading any image you want and then just watching the show!

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