


**Google Cloud Computing Foundation Course**  
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**Google Cloud**

**Lecture-78**  
**ML and GCP**

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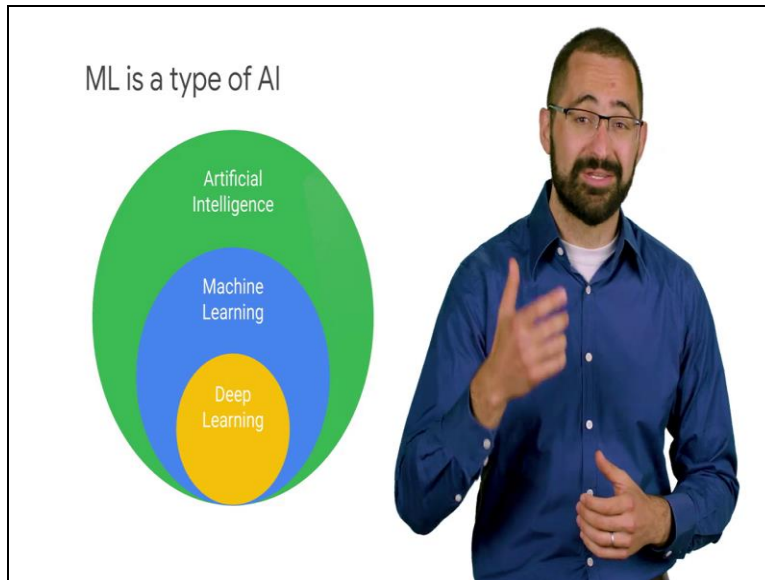
## Agenda

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|---|---|
| Introduction to Machine Learning                          | Lab: Classify Images of Clouds in the Cloud with AutoML Vision  |
| <b>Machine Learning and GCP</b>                           | Google's Pre-trained Machine Learning APIs  |
| Qwik, Draw  | Qwik Start Labs: <ul style="list-style-type: none"><li>• Cloud Natural Language API</li><li>• Cloud Speech API</li><li>• Video Intelligence API</li></ul> |
| Building Bespoke Machine Learning Models with AI Platform | Quiz  |
| Lab: AI Platform Qwik Start                               | Summary   |
| Cloud AutoML  |   |

In this topic you will be introduced to the different options that exist in GCP when it comes to leveraging machine learning. First though you will explore the relationship between machine learning, artificial intelligence and deep learning.

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A very common question asked what is the difference between AI, Artificial Intelligence Machine learning and Deep learning? Well one way to think about it is AI is the discipline like something like physics. AI refers to machines that are capable of acting autonomously. Machines that think AI has to do with the theory and methods to build machines that can solve problems by thinking and acting like humans. Machine learning within there is a tool set like Newton's Laws of Mechanics.

Just as you can use Newton's laws to figure out how long it will take a ball and drop and when it falls off a cliff. You can use machine learning to scale ably solve certain kinds of problems using data examples, but without the need for any custom code. Deep learning is a type of machine learning that works even when the data consists of unstructured data like images, speech, video natural language text and so on.

One kind of deep learning is image classification. A machine can learn how to classify images into categories when it is shown lots of different examples and the really cool thing about deep learning is that often times, in a really complex problem, it can do better than a human error. The basic difference between machine learning and other techniques in AI is that in machine learning machines learn they do not start out intelligent, they become intelligent.

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The impact of ML is scale

Not about saving money

But about doing it at greater scale

Back to our example, let us say we have built a machine on a model to find bad manufactured parts and then we want to remove them. Quality control is now pretty inexpensive, so what? The business factor motivating us is that my business will save money. It is I could add quality control throughout our entire manufacturing process instead of just doing the quality control at the end of the manufacturing line, we can now insert it everywhere and improve overall.

The opportunity is for organizations to take advantage of the ease of creating new models to continue to transform their business. So, now that you know what ML is and I hope that you have started to come up with some of those ideas of your own related to ML.

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Barriers to entry have now fallen

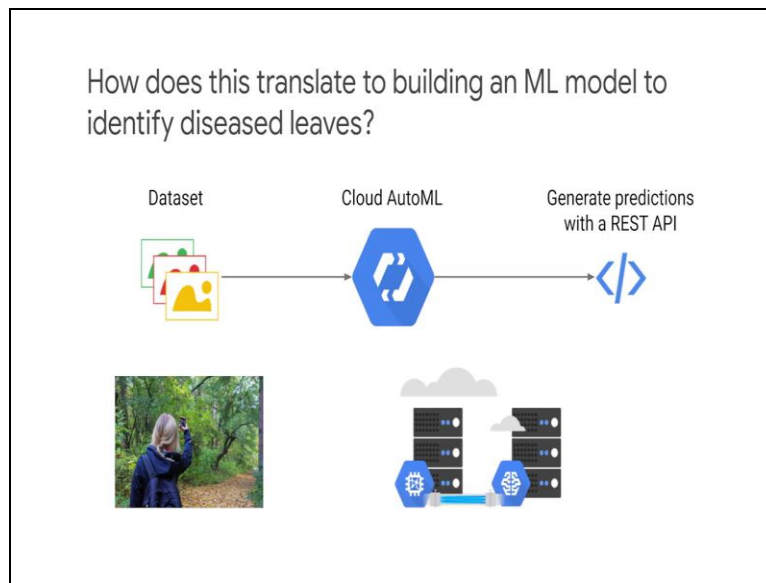
Data

Algorithms

Hardware Software

Much of the hype around ML now is because the barriers to entry of building these models has fallen dramatically. You do not have to be an astrophysicist to do machine learning. And this is because the convergence of a number of critical factors. The increasing availability of data the increasing maturity and sophistication of those ML algorithms for you to choose from and the increasing power in the availability of computing hardware and software through things like cloud computing.

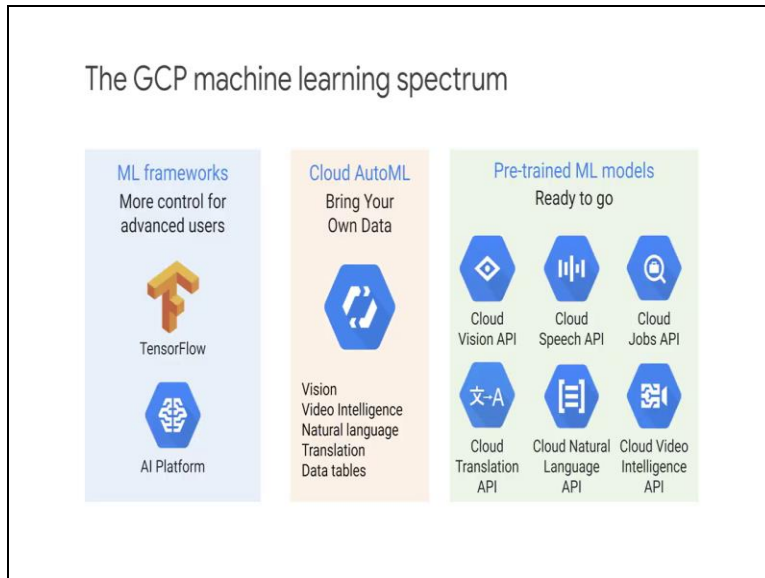
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Let me show you an example. Imagine, we want to build that ML model to identify those disease leaves to predict the health of the trees. Remember, we can do that using a standard algorithm for image classification. You do not need to have a PhD in image processing. You just need to know which algorithm should you choose off the shelf but back to our ML model. Another critical ingredient for ML is that data we need to collect lots of images of leaves.

Today you can do that pretty easily with the camera on your phone. Finally, we need the hardware and the software to make that happen. And that is easier now than it has ever been in the past. We can use the cloud to power our ML model so that we can do it cost effectively different options exist when it comes to leveraging machine learning.

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Advanced users who want more control over the building and training of their ML models will use tools that offer the levels of flexibility that they are looking for. This could involve developing custom models through an ML library like tensor flow that s supported on AI platform. This option works well for data scientists with the skills and the need to create a custom tensor flow model.

But increasingly you do not have to do that Google makes the power machine learning available to you even if you have a limited knowledge of machine learning. You can use cloud Auto ML like you are going to do in one of your labs to build on Google's machine learning capabilities, to create your own custom machine learning models that are tailored to your specific business needs.

And then, integrate those models into applications and websites all without writing a line of Tensor flow code. Alternatively, Google has a range of pre trained meaning you do not need to bring your own data machine learning models that are ready for immediate use within applications in ways that the respective API's are designed to support. Such pre-trained models are excellent ways to replace user input with machine learning.