

AMAZON MACHINE LEARNING AND ANALYTICS TOOLS



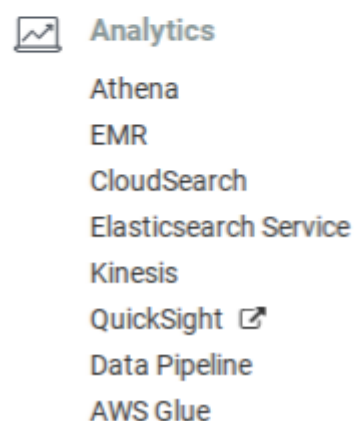
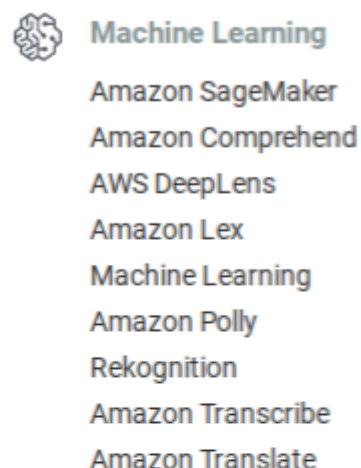
Here we begin our survey of Amazon AWS cloud analytics and big data tools. First we will give an overview of some of what is available. Then we will look at some of them in more detail in subsequent blog posts and provide examples of how to use them.

Amazon's approach to selling these cloud services is that these tools take some of the complexity out of developing ML predictive, classification models and neural networks. That is true, but could it be limiting.

In other words, linear and logistic regression and especially neural networks (used for deep learning) are not for the faint of heart. Amazon ML picks the algorithm for the user. Data scientists are used to being able to do that and to modifying the parameters for said model. Amazon would say users do not need to do that, as their algorithms will do what the data scientist does, which is to change the parameters automatically to reduce the error rate (i.e., the difference between predicted and observed values) to their lowest value.

The Amazon Machine Learning and Analytics Console

When you log into the Amazon AWS console it presents this list of items. You can pick from these and add them to your account. But be careful as the meter starts running when you do that.



The Machine Learning tools at the top are mainly geared toward voice, image, and text analysis, except for the Machine Learning model. (We already wrote about how to use Google Natural Language API [here](#).)

Voice and image recognition is not really a business application. It is a service that you can program yourself using neural networks and train that with publicly downloadable free datasets or pay Amazon to use their cloud. But most people doing analytics in their daily jobs are not going to be interested in creating their own Apple Siri or other voice recognition type system.

Instead they are more like to benefit from less esoteric tools like Athena or QuickSight. QuickSight, in fact, is so easy the end user could use it. So you could set that up and let your end users play with it, thus freeing up your data science resources, somewhat.

Athena lets you wrap a schema around any data in Amazon S3 (i.e., one of their cloud storage products) and then run queries against that.

So let's look at a couple of these products briefly to see which might be of use to you.

First, a word. Anyone who uses Amazon EC2 knows that subscription fees can mount quickly. Amazon says that for most of the products listed on the AWS management console there are no up-front fees and you pay as you go. But note that the tutorials are not including in the free tier pricing, so watch your subscription fees. (You can create billing alerts on your Amazon account. So here would be a good place to stop and do that.)

Amazon Product

Overview

ML does what a Python or Scala programmer using Spark or similar language and platform would do using Spark ML, TensorFlow, or other API.

To use it, the user uploads data to Amazon S3 or Redshift. Then Amazon splits that into testing (30%) and training (70%) data sets. Then it builds predictive models and shows the results without requiring coding. But you do need to write a program to put your data into a format that ML can understand.

In other to use the Amazon ML models you create what data science programmers would call a **feature-label** matrix. You do this by putting some feature that you want to predict (i.e., the dependent variable) and labels (i.e., independent variables) into a file. In other words, you might assume that sales are a function of price, time of year, advertising budget etc.

Then Amazon ML will pick the best model to run predictions or your sales given the price, time of the year, advertising budget, etc. **Best** means the model that produces the most accurate results. To put that into data science terms, it will run logistic or linear regression against the data. But it does this automatically without you having to write any code.

This lets you wrap a schema around data loaded into Amazon S3 and run queries against it.

This is really just a cloud way of running Elasticsearch. So it is infrastructure and not a product. You would probably spend less money by installing your own system as all you need are virtual machines. Beside you will have to configure logstash and filebeats and the other connectors yourself and connect those to your applications and infrastructure systems, like web servers, application servers, firewall logs, and security detection tools.

ElasticSearch is usually called **ELK**, for **ElasticSearch**, **Kibana**, and **LogStash**, as these 3 products are designed to work together. They are the most popular tool for gathering log data across an enterprise.

SageMaker uses notebooks. iPython (now called Jupyter) and Zeppelin are notebooks that data scientist have long used. These are interactive web pages where you can write Scala or Python or other code to query Spark and other data stores. Then you can hide that code and publish it is live web pages that your users can view.

Machine Learning

Athena

Elasticsearch Service

SageMaker

DeepLens

Is an actual physical video camera and cloud service to do image recognition. Connects to SageMaker and other Amazon tools like Amazon Kinesis Video Streams.

The screenshot shows the AWS console interface for creating a new ML Datasource. The breadcrumb trail is 'Amazon Machine Learning > Datasources > Create datasource'. The page is divided into five steps: 1. Input Data (active), 2. Schema, 3. Target, 4. Row ID, and 5. Review. The main heading is 'Input data'. A introductory paragraph explains that the first step is to provide historical data to the ML model. A callout box offers a sample dataset 's3://aml-sample-data/banking.csv' for users who are not ready with their own data, and provides a link to a tutorial. Below this, there are two options for where the data is stored: S3 (selected) and Amazon Redshift. The 'S3 data access' section contains a text input field for the 'S3 location' with the placeholder 's3:// bucket-name/file.csv', followed by instructions on how to format the path and a 'Learn more' link. There is also a 'Datasource name' input field and a '* Required' label. At the bottom of the form are 'Reset', 'Cancel', and 'Verify' buttons. The footer includes 'Feedback', 'English (US)', and copyright information for Amazon Web Services, Inc. (2008-2018).

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Amazon Machine Learning Datasources Create datasource

1. Input Data 2. Schema 3. Target 4. Row ID 5. Review

Input data

The first step to create an ML model is to show Amazon ML your historical data. This data must include the correct answers to the questions that you want the ML model to answer. Amazon ML will create a training datasource object containing statistics about your training data.

Just trying out Amazon ML and don't have your data ready? Use `s3://aml-sample-data/banking.csv` This dataset contains information about customers as well as descriptions of their behavior in response to previous marketing contacts. You use this data to identify which customers are most likely to subscribe to your new product.

You can preview the file here [banking.csv](#)

Want a more guided experience? [Start with the Amazon Machine Learning Tutorial](#)

Import your data to create an Amazon ML datasource. Amazon ML can use your datasource to create and evaluate an ML model, and you can use the datasource to review your data.

Where is your data? S3 Amazon Redshift

S3 data access

Tell Amazon ML how to access your data and give it permission to access it.

S3 location *

Enter the path to a single file or folder in Amazon S3. You need to grant Amazon ML permission to read this data. [Learn more](#).

If you already have a schema for this data, provide it in a file at `s3://<path-of-input-data>.schema`. If you don't have a schema, Amazon ML will help you create one on the next page.

Datasource name

* Required

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