



INNOVATE2018

ONLINE CONFERENCE

DEVELOPER EDITION

From Notebook to Production with Amazon SageMaker

October 2018

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@awscloud



#AWSInnovate

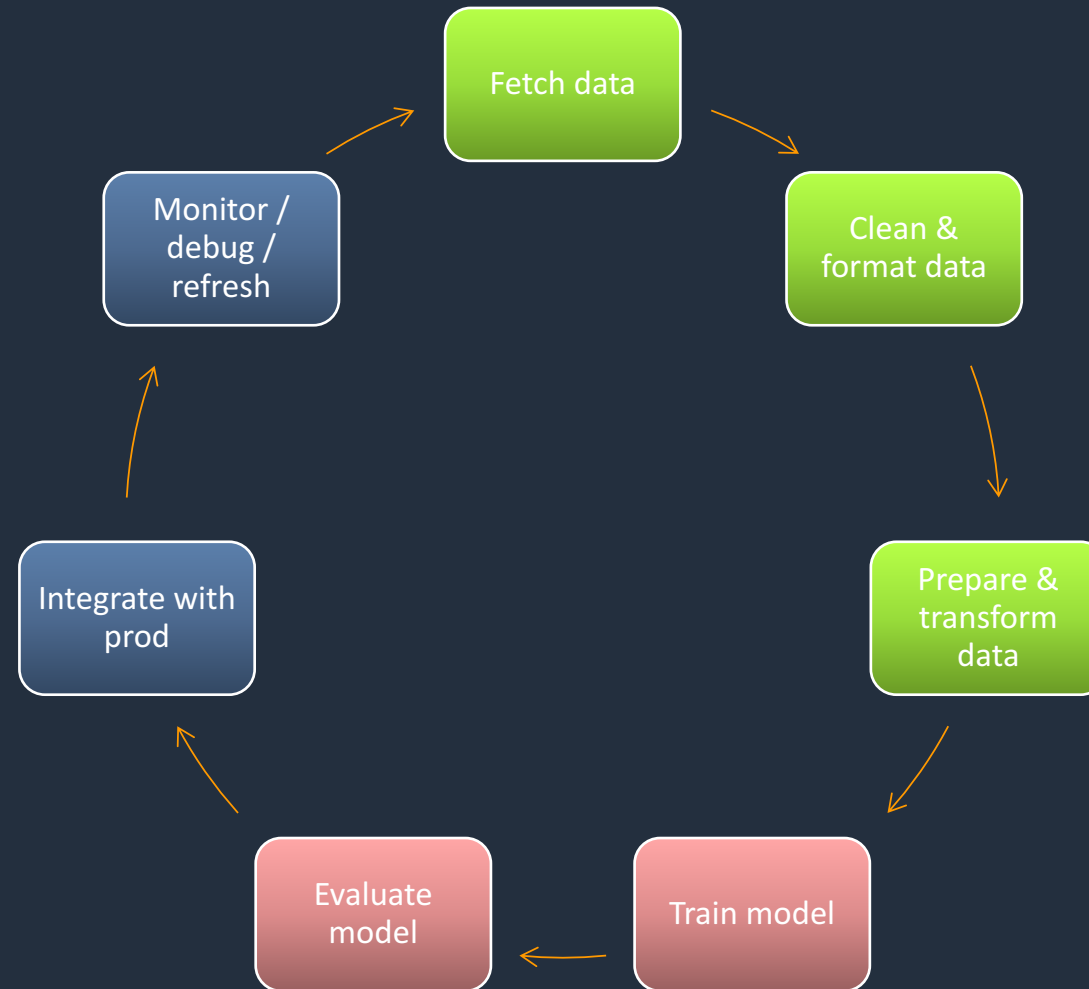
Topics in this talk

- Amazon SageMaker features
- Customer stories
- Creating Jupyter Notebooks
- Performing hyperparameter tuning
- Hosting production models securely

The machine learning process

Deployment

- Set up and manage inference clusters
- Manage and auto scale inference APIs
- Testing, versioning, and monitoring



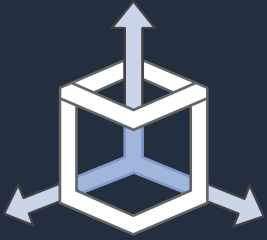
Data wrangling

- Set up and manage data workbench
- Get data to workbench securely

Experimentation

- Set up and manage clusters
- Scale / distribute ML algorithms

Introducing Amazon SageMaker



End-to-end
machine
learning
platform



Zero
setup



Flexible
model
training



Pay by
the
second

Real-time Fraud Detection with Amazon SageMaker

AI and ML at **Intuit** have three areas of focus.

- ✓ Smart Products
- ✓ Fraud detection and prevention
- ✓ Customer Care and Expert advice



In order to keep fraudsters out of their systems and data, Intuit always stays several moves ahead by leveraging AI/ML-generated insights from data that can determine **real-time fraud detection** in TurboTax: Specifically

- Account take-over detection at login
- Identity theft detection at filing



Improve customer service with Amazon SageMaker

Zendesk builds software for better customer relationships. It empowers organizations to improve customer engagement and better understand their customers. More than 94,000 paid customer accounts in over 150 countries and territories use Zendesk products.



“Amazon SageMaker will lower our costs and increase velocity for our use of machine learning. With Amazon SageMaker, we can transition from our existing self-managed TensorFlow deployment to a fully-managed service. Amazon SageMaker also gives us easier access to other popular deep-learning frameworks, while managing the infrastructure for authoring, training and serving our models.”

- David Bernstein, Director of Strategic Technology, Zendesk



Customize your travel using Amazon SageMaker

Hotels.com is a leading global lodging brand operating 90 localized websites in 41 languages.

The Hotels.com logo is displayed in a red, rounded, sans-serif font.

- Hotels.com is always interested in ways to move faster, to leverage the latest technologies and stay innovative.

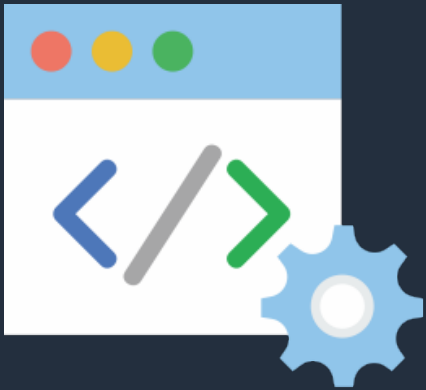
“With Amazon SageMaker, the distributed training, optimized algorithms, and built-in hyperparameter features should allow my team to quickly build more accurate models on our largest data sets, reducing the considerable time it takes us to move a model to production.”

- Matt Fryer, VP and Chief Data Science Officer, Hotels.com & Expedia Affiliate Network



Amazon SageMaker's four components

①



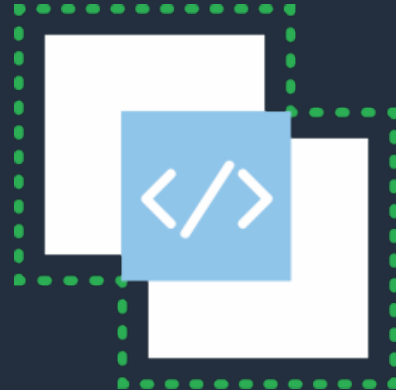
Notebook
Instances

②



Algorithms

③



ML Training
Service

④



ML Hosting
Service

Zero setup for data exploration ①



Resizable
as you
need



Common
tools pre-
installed



Easy
access to
your data
sources



No
servers to
manage

Demo

Algorithms designed for scale ②



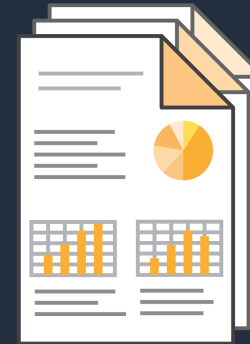
Streaming datasets, for cheaper training



Train faster, in a single pass



Greater reliability on extremely large datasets



Choice of ML algorithms



Tuned for the Intel Chipset

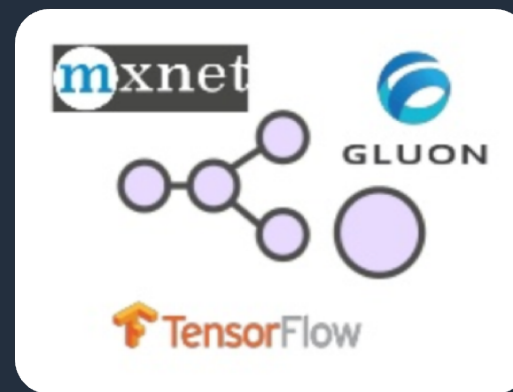
Distributed training that works for you ③



Amazon-
optimized
algorithms
using the
AWS SDK



Apache
SparkML
SageMaker
Estimators



Bring your
own deep
learning
script



Custom
algorithm
Docker
images

Hyperparameter optimization

- Bayesian optimization
- Tunes hyperparameters as a linear regression problem
- Test with 1 permutation at a time or hundreds

Learning Rate,
Regularization
+ Network Depth
+ Network Width
+ Dropout

Points / Axis	Searching	2 HP	3 HP	4 HP	5 HP
2	Corners	4	8	16	32
3	Corners and Middle	9	27	81	243
5	Small variation	25	125	625	3,125
10	Reasonable range	100	1000	10,000	100,000

Demo

Quickly deploy to production ④



Launch

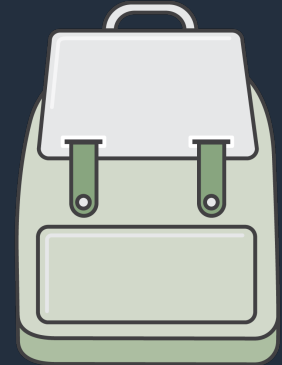
One step
deployment



Low latency,
high
throughput,
and high
reliability



A/B
testing



Use your
own
model

Demo

Amazon SageMaker

- End-to-end support for machine learning projects
- APIs for exploration, training, and hosting
- Automatically scaled, automatically secured



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Thank you!

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