Democratizing AI with Apache Spark

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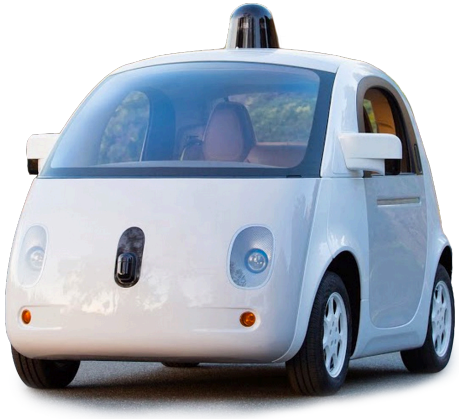
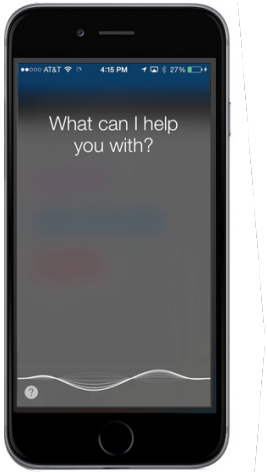
AI is changing the world

Self-driving cars



SIRI/assistants



AlphaGo

Why now?

Data is the catalyst

More data

Clickstreams

Sensor data (IoT)

Video

Speech

Handwriting

…

Better training, tuning, validation

AI hasn't been democratized

The hardest part of AI isn't AI

"Hidden Technical Debt in Machine Learning Systems ", Google NIPS 2015

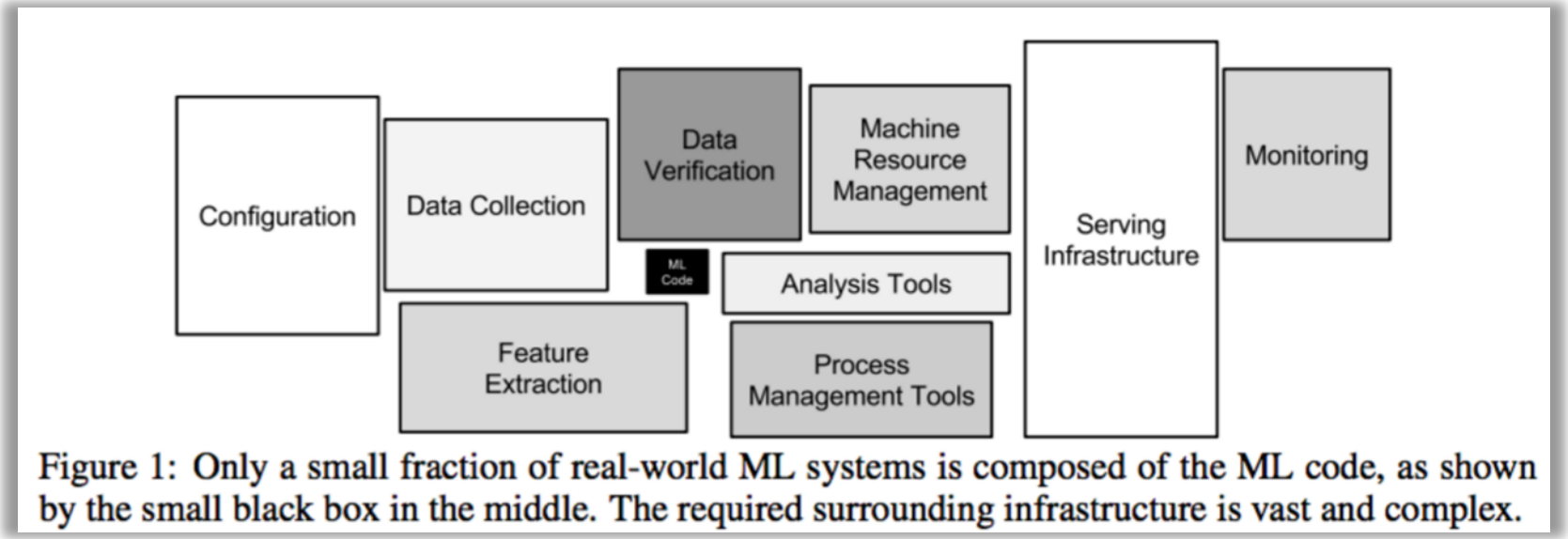


Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small black box in the middle. The required surrounding infrastructure is vast and complex.

How do we democratize AI?

Spark + AI

"Hidden Technical Debt in Machine Learning Systems ", Google NIPS

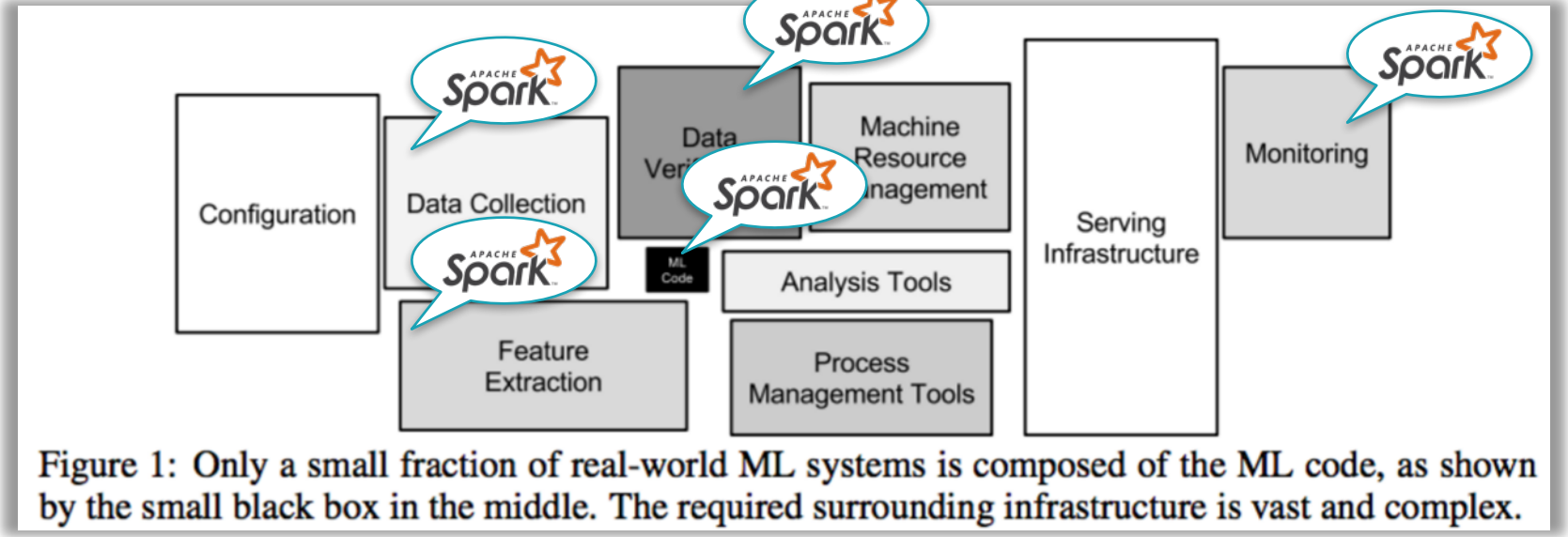


Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small black box in the middle. The required surrounding infrastructure is vast and complex.

FLEXIBLE | **FAST** | **BIG DATA**

Some gaps remain

1. **Manage Data infrastructure**
   - Create, configure, monitor resilient **big data clusters**.
   - **Securely** access silos of **disparate data sources**.
   - Enforce **proper data governance**.
2. **Empower teams to be productive**
   - **Interactively explore** data and prototype ideas.
   - Securely share big data clusters among analysts.
   - Debug, troubleshoot, version-control big data applications.
3. **Establish Production-Ready Applications**
   - Setup **robust ML data pipelines** for ETL/ELT.
   - **Productionize real-time** applications with HA, FT.
   - Build, serve, maintain advanced machine learning models**.**

Databricks: Closing the gap

1 Just-in-Time Data Platform

- Separate compute & storage
- Integrate existing data stores
- Efficient cache on first access

Agile + Low TCO

2 Integrated Workspace

- Interactive notebooks, dashboards, reports
- Real-time exploration, machine learning, graph use cases

Accelerate Time to Value

3 Automated Spark Management

- Workflow scheduler for ML, streaming, SQL, ETL
- Performance-optimized, high availability, fault-tolerant

Performance

Enterprise AI use-cases

Predict credit score, credit limit, anomalies

Predict energy demand based on massive weather data

Natural language processing to extract author graph

Predict player churn, predicting network outages

Predict machine equipment failure

New Frontier of AI: Deep Learning

Detect cancer

Improve cancer detection

Understand speech

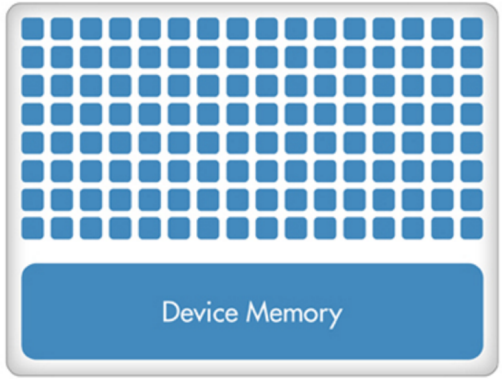
Recognize Mandarin and English

Infer location

Identify landmarks in photos

Faster and easier deep learning with Databricks

GPUs



Massive parallelism

TensorFlow on Spark

- TensorFlow: The most popular deep learning framework.
- TensorFrames: Makes TensorFlow computations faster and easier to program on Spark.

TensorFrames and GPUs support out-of-the-box

Deep Learning on Databricks

Automated management

Just-in-time data platform

Interactive exploration

TensorFrames + GPUs

Jobs & Workflows

Thank you.

Deep Learning references

- Image recognition (Geo ID):
  - https://www.technologyreview.com/s/600889/google-unveils-neural-network-with-superhuman-ability-to-determine-the-location-of-almost/
- Cancer screening:
  - http://www.popsci.com/how-deep-learning-technology-could-be-next-step-in-cancer-detection
  - https://blogs.nvidia.com/blog/2016/09/19/deep-learning-breast-cancer-diagnosis/
- Speech translation:
  - https://www.technologyreview.com/s/544651/baidus-deep-learning-system-rivals-people-at-speech-recognition/

Databricks

Spark Enterprise Platform

Cloud-hosted data platform based on Spark

Develop Spark, shepherd community, evangelize Spark

75% of Spark written by Databricks, 10x more than others

Strategic Support

Only company that can make customer's with data problems successful

Deep Spark Training

Trained 20,000 in 2015 – MOOCs, on-site training, SPOCs

Analytics Transforming Industries

PHARMA

Predicting Diabetes in Rural Counties

Next-Gen Product R&D

MEDIA

Generating programs based on Nielsen ratings

Predictive Analytics

INDUSTRIAL

Real-time detection of failing wind-turbines

Anomaly Detection

Real-time Data-Driven Analytics Applications

Databricks Just-in-Time Data Platform

Powered by Apache Spark

Enterprise Security
Access Control, Auditing, Encryption

Integrated Workspace

DASHBOARDS
Reports

NOTEBOOKS
github, viz, collaboration

BI Tools

Qlik

tableau

Your Custom Spark Apps

PRODUCTION JOBS

Orchestrated Spark In The Cloud

Open Source Spark

+

Databricks Managed Services

- **Clusters:** Auto-scaled, resilient, multi-tenant
- **Data Integration:** Universal secure and fast
- **Interfaces:** BI tools & REST API

Your Storage

amazon web services
Microsoft Azure

CLOUD STORAGE

NETEZZA
Pivotal Greenplum

DATA WAREHOUSES

HDFS MAPR cloudera HBASE

HADOOP / DATA LAKES

Databricks Just-in-Time Data Platform

Powered by Apache Spark

Integrated Workspace

Dashboards
Reports

Notebooks
github, viz, collaboration

BI Tools

Qlik

tableau

Your Custom Spark

Production Jobs

Orchestrated Spark In The Cloud

Open Source Spark + databricks

Managed Services

- **Clusters:** Auto-scaled, resilient, multi-tenant
- **Data Integration:** Universal secure and fast
- **Interfaces:** BI tools & REST API

Your Storage

Cloud Storage

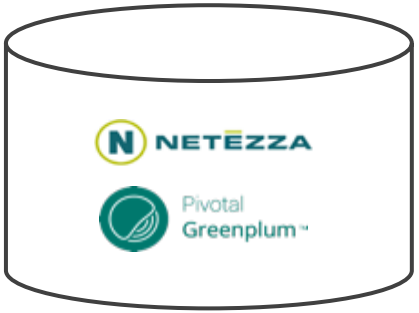
Data Warehouses

Hadoop / Data Lakes

Enterprise Security Access Control, Auditing, Encryption

Today's Data Reality

Cloud Storage



Data Warehouses

Hadoop / Data Lakes

Siloed, Unstructured, Fast-Growing Data

Databricks Just-in-Time Data Pla

Powered by Apache Spark™

OPTIONAL

Integrated Workspace	BI Tools	Your
Notebooks Dashboards	Qlik tableau	Production Jobs

Orchestrated Apache® Spark™ in the Cloud

Open Source Apache Spark + databricks Managed Services

Your Storage

Cloud Storage | Data Warehouses | Data Lakes

Integrated Enterprise Security Framework