INDUSTRY PERSPECTIVES: **INNOVATION**

Machine Learning
Shifts in Business

Summary

We look at AI and Machine Learning, fast moving tech trends. We examine the biggest obstacle to machine learning, dealing with data which is at the heart of any successful Machine Learning project and we highlight a promising full-service stack solution that uses Machine Learning to both overcome data issues as well as gain actionable insight from the data. We also give practical tips on how to start on your Machine Learning journey.

Machine Learning: Shifts in Business

Early last year, Bloomberg News reported that **JP Morgan developed machine learning software** to perform work *in seconds* that took Lawyers 360,000 hours to accomplish. This technology is creating a major shift in how we do business and without exaggeration how we live our lives. The current applications of Machine Learning are widespread: from deciding which trades to execute on Wall Street, determining credit decisions, optimizing inventory, improving product recommendations, predicting whether a user will click an ad, or Google's improving cooling efficiency at data centers. And that just scratches the surface.

IDC expects global spend on AI systems to reach $57.6 Billion in 2021.[1] "We are seeing cognitive and AI technology and solutions weaving into an ever broader and wider array of applications and use cases," said IDC's David Schubmehl.

This forecast underscores that companies are scrambling to digitally transform themselves in order to stay competitive and the stakes couldn't be higher. Digital transformation goes beyond investing in new technology to a complete overhaul of how companies are operating in order to become ever more data-driven. Ignoring the data carries a hefty price tag. PayPal reported losing 10 million a month to hackers until they implemented machine learning to detect fraudulent patterns. It is no surprise that machine learning is on the top of many IT department's priority list for long-term investment.

[1] IDC Press Release, 09/25/2017, https://www.idc.com/getdoc.jsp?containerId=prUS43095417

The Achilles Heel of Machine Learning: Data

The heart of what makes Machine Learning possible is data and a lot of it. Michael Schrage, Fellow at MIT's Sloan Schools on Digital Economy, predicts that organizations should expect 10 to 1000 times more data in the next 12 to 18 months. If businesses don't have access to *all* of their data, they will miss opportunities. "To make data more valuable organizations must consider how to define, measure, and assess value creation inside the enterprise and outside."[2]

Companies that are excited about Machine Learning applications sober when they begin reckoning with their data. Data must be selected, cleaned, organized, and for analysis and the inevitable bottlenecks at this stage threaten project schedules and budgets.

The era of big data further complicates the data unification necessary for Machine Learning. When the data was limited to a few well-structured repositories the time it took to consolidate the data needed was still significant but sometimes manageable. That has changed. Now the time it takes Data Scientists to prepare data for analysis is a whopping 80% of most project schedules. Think about the wilderness of the big data landscape now, data comes from a variety of sources and often at a fast velocity and volume and moves to a variety of destinations. Data is coming from unstructured digital channels chats, social media, and smartphone applications to real-time data about fluctuations in weather, market demand, supply chains and more. The problem is none of this data comes in a form that will readily give you insights to solve your most pressing business problems.

The bottleneck in data unification is so significant it has paved the way for a new role, the Data Engineer, to lend a hand to drowning Data Scientists by clearing the blocked data pipeline and providing a "a reliable architecture for a steady flow of clean and structured data that is ready for further analysis and is viable for production environment."[3] But given the variety and velocity of data, even Data Engineers need tools to help automate and abstract their workload.

The real issue in paving the way to become data driven is how to put the data to work? The MIT Sloan Management Review released an insightful report *Big Data, Analytics and the path from Insights to Value*[4] and reported that 6 out of 10 respondents said their organization has more data than it knows how to use effectively. The report raises the question in many executives' minds, how can all this data be transformed into an information foundation that is unified, consistent, and trustworthy?

Applying the Power of Machine Learning to Solving Data Issues

Industry leaders like Google, Facebook, Microsoft, and Amazon have realized that the best way to manage, query, analyze, and monetize data at scale is to build a Knowledge Graph and they all use Machine Learning in part to build their graphs. A Knowledge Graph creates an abstract layer of knowledge over disparate data systems and organizes and represent information using entities and relationships between those entities instead of lists and tables.

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2. Harvard Business Review, Webinar. "Leadership and Big Data Innovation."
3. https://insidebigdata.com/2017/12/26/heroic-data-engineer-lending-helping-hand-data-drowned-scientists/
4. https://sloanreview.mit.edu/article/big-data-analytics-and-the-path-from-insights-to-value/

Kendall Clark, CEO of Stardog Union, explains: “The reason knowledge engineering is no longer done simply by giving really smart people good tools is the flow of data is too fast, too large, and too diverse. We need automated systems to keep up with ourselves and with the data flows we’ve created.”

Stardog is a full-service solution that uses Machine Learning to tackle the problem of the enterprise data silo. It is purpose-built to enable every enterprise to fully monetize data as a strategic asset and hence conquer the challenge of digital transformation.

At Stardog Machine Learning is used in two ways: First, to create the **Knowledge Graph** which unifies data silos. Then, second, to obtain actionable insight from the data unified. So in addition to creating the Knowledge Graph faster, Machine Learning enables predictive analytics: the ability to predict nodes and edges in a Knowledge Graph, and extract patterns from the data in order to make intelligent predictions based on those patterns. And this is just the beginning, Stardog is leveraging the power of Machine Learning and Artificial intelligence to tackle:

- Graph Extraction from dark data
- Knowledge Base Construction including data cleansing and quality
- Structure Learning including refining schema alignments
- Analytics beyond predictions

Clark continues: “So Machine Learning helps us get to the Enterprise Knowledge Graph faster. And then that superior data accessibility creates a virtuous cycle between greater data unification and better actionable insight based on what the organization in sum knows. More insight enables more data which powers more insight.”

They key to Stardog’s success lies in:

- **Ability to access data where it is**: No need to dismantle the silos or relocate data from several locations into one
- **Unify all data**: Only a Knowledge Graph can unify all data types and every data velocity into a single, coherent, unified whole
- **Actionable Insight into all of your data**: Stardog is the only platform to fuse machine learning, reasoning, and rules for contextualized insight of all the data.
- **Beyond a Graph Database**: Stardog combines a Graph Database with Knowledge Toolkit into a unified Knowledge Graph Platform. It’s this unique combination that lets Stardog go beyond plain graph databases and mere graph analytics platforms.

Where to Start?

In *How to Make Your Company Machine Learning Ready*[5] James Hodson, CEO of AI for Good Foundation, outlines a practical approach:

[5.] Harvard Business Review, *How to Make your Company Machine Learning Ready*. 11/07/2016.

1. Catalogue your business processes: Collect as much data as possible on every procedure or decision made frequently and consistently
2. Focus on Simple Problems: Start with problems that are well defined and understood and where the available data provides information necessary to make a decision. “What makes customers feel happy?” is too vague to start, while “Is this a fraudulent transaction?” may be a better target question.
3. Don’t use Machine Learning when standard business logic will suffice: Machine Learning works best for complex, non-linear patterns, where the set of rules is unclear or unknown.
4. If a process is complicated, use machine learning to create decision support systems: Dig into your processes to create sub-processes that could allow Machine Learning to provide better understanding of the problems in the future.

“...Machine Learning helps us get to the Enterprise Knowledge Graph faster....More insight enables more data which powers more insight.”

Hodson predicts that over the next 10 years, the biggest business gains will stem from getting the right information to the right people at the right time. Machine learning will accelerate finding patterns and automating value extraction and data will drive a real-time economy. Led by the new “Data Driven” paradigm companies are being forced to re-examine and drive innovations across their processes, people, and technology in pursuit of new data-driven insights. There is an irreversible trend towards tightening links between companies, customers, and markets. What this means is that Data has become the most strategic asset of this era, and forward thinking CEOs are wise to invest significantly in data and to treat it as the most valuable enterprise asset that will power their digital transformation.

Are you ready to get started? See how Stardog leverages Machine Learning by downloading a free 30-day trial today!

About Stardog

Stardog is an Enterprise Knowledge Graph platform that allows customers to query massive, disparate, heterogeneous data regardless of structure with simplicity of implementation. Stardog’s enterprise customers include Fortune 500 companies in nance, healthcare, life sciences, energy, media, and government. The company is headquartered in Arlington, Virginia. Stardog is a privately held, venture-backed company. For more information, please visit **Stardog.com**.

Learn more at **http://www.stardog.com**