Gartner Data & Analytics Summit
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Gartner Summits

The State of AI and Machine Learning

Erick Brethenoux

Artificial intelligence (AI) projects grant organizations the superpowers to

classify and predict

in ways workers cannot achieve alone.

Rapid technology innovations in data science and ML are making it a roller coaster ride.

Key Issues

1. What is AI/ML? How can they benefit the business?
2. What are the key trends driving the adoption of AI/ML?
3. What are the top six pitfalls to avoid?

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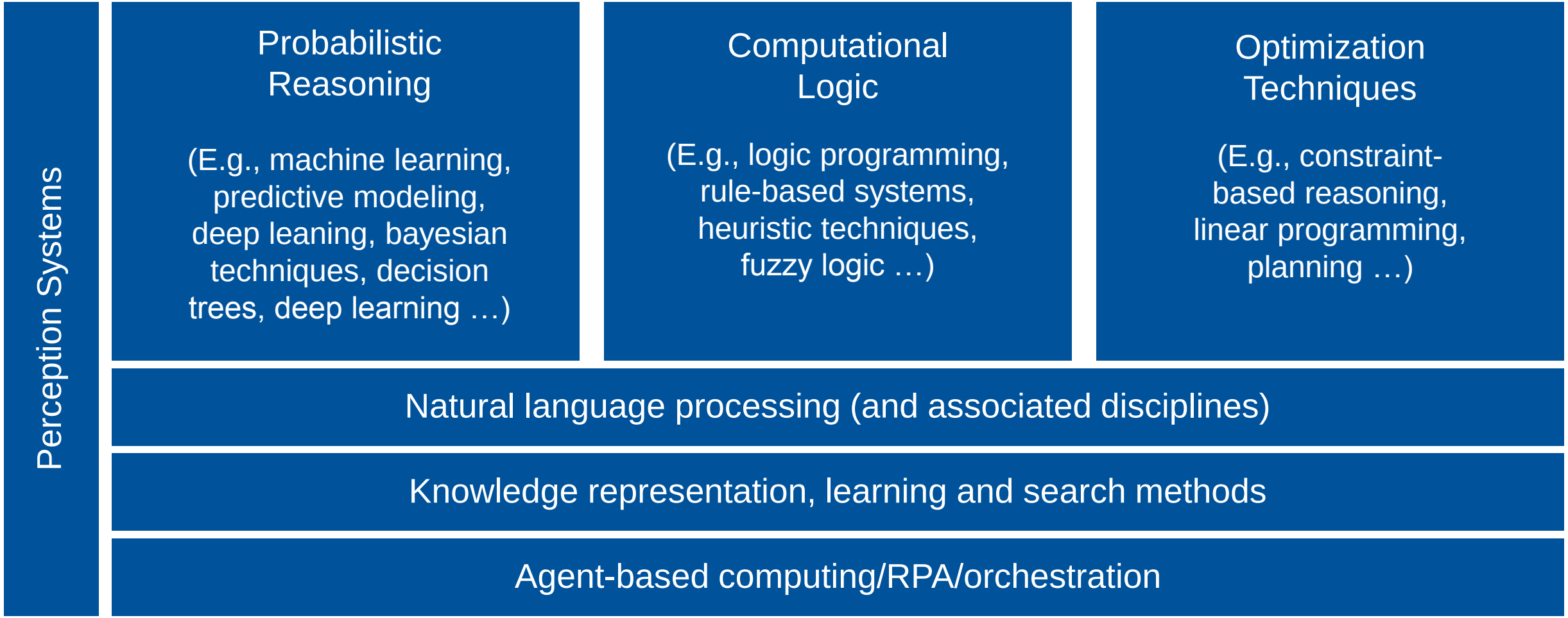
… at the Core, Machine Learning Is About Creating Mappings Informed by Input/Output Pairs

Type of Problem	Inputs	Outputs
Loan Application	Application data	Will the applicant repay the loan? (0 or 1)
Demand Prediction	Market situation	How many products will be bought? (n)
Self-Driving Cars	Car sensory data	Break, accelerate, tilt the wheel? (x, y)
Failure Prediction	Sensor readings	Will a failure happen within 4 weeks (0 or 1)
Customer Churn	Profile and activities	Will customer cancel the contract? (0 or 1)
Medical Diagnosis	Pixel data from a retinal scan	Will the disease breakout? (0 or 1)

AI Techniques



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When We Interviewed Clients, This Is How They Defined AI

"Capabilities of machines/computers to carry out cognitive tasks and, more specifically, complex decision making tasks, which rely on **cognition and learning in continuously** changing environments."
— Exec., Telecommunications

"The ability to use computing platforms to automate **human-like decision making** with the goal of eventually **outperforming the human."**
— Exec., Transportation

"Algorithms that match and **exceed the reasoning ability of human beings** that are applied to a wide variety of problems and situations."
— Exec., Government

"A disruptive technology embracing **cognitive intelligent 'agents'** which has the potential to optimize the delivery of services to our staff and students, which previously would have been done via face-to-face communication or similar."
— Exec., Education

Common AI definitions focus on automation, increased performance, and a combination of opportunity and threat in equal measure.

What AI Is Good for …

- **Automate sorting** processes and actions
- **Automate predictions** in detail
- Address **historical desires** first (not new business models … yet)
- Address data with **clear parameters**
- Credible, good-quality data with **sufficient scope** to fully address the problem
- Pursue **reasonable and possible goals.** The moon comes after simple flight

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What Business Goals Are Organizations Pursuing With AI?

Improved speed and efficiency

"Process improvement and efficiency — ensuring staff are better utilized on value-added processes."

"Reduce operating costs and increase operating efficiencies."

Better data processing and analytics

"Use AI for predictive analytics and handling huge amount of event logs and tickets we have to process on a daily basis."

"Leveraging the treasure trove of unstructured data for analysis and future efficiencies."

Enhance customer experience and engagement

"Customer care and service desk optimization."

"New customer services or significantly enhance process effectiveness/value/cost savings."

Base: n = 79 Gartner Research Circle Members/Excludes 'blanks'
Q. Lastly, what specific business goal or objective is your organization trying to address with AI?

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Technology Skills Enable Use Case Imagination

Search	Sentiment	Detecting Credit Card Fraud	Spam Filtering for Email
Writing Recognition	Speech Understanding	Stock Analysis	Structural Health Monitoring
Syntactic Pattern Recognition	Topic Spotting	Weather Prediction	Face Detection
Finance — Derivatives Trading	Game Playing	Software as a Service	Customer Segmentation
Machine Translation	Medical Diagnosis	Mood Analysis	Brain Machine Interface
Optical Character Recognition	Recommen-dation Systems	Robot Locomotion	Advertising — Targeting
Bioinformatics	Automatic Word Completion	Classifying DNA Sequences	Computer Vision

Retail	▪ Segmentation, marketing, customer experience
Automotive	▪ Computer vision in cabin and roadway
Logistics	▪ Automated packing, transportation, planning, safety improvement
Healthcare	▪ Lifestyle management, drug discovery, resource planning, patient experience
Medical	▪ Diagnoses, pharmaceutical optimization, computer vision
Oil and Gas	▪ Increase production and to optimize costs

CEB is now Gartner

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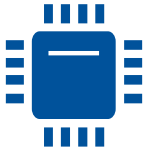
Why So Much Interest in AI Now?

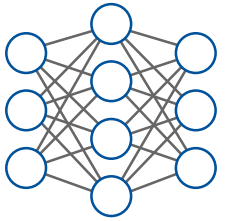
Open Source

Cloud

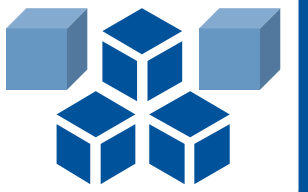
High-Performance Computing



New Algorithms



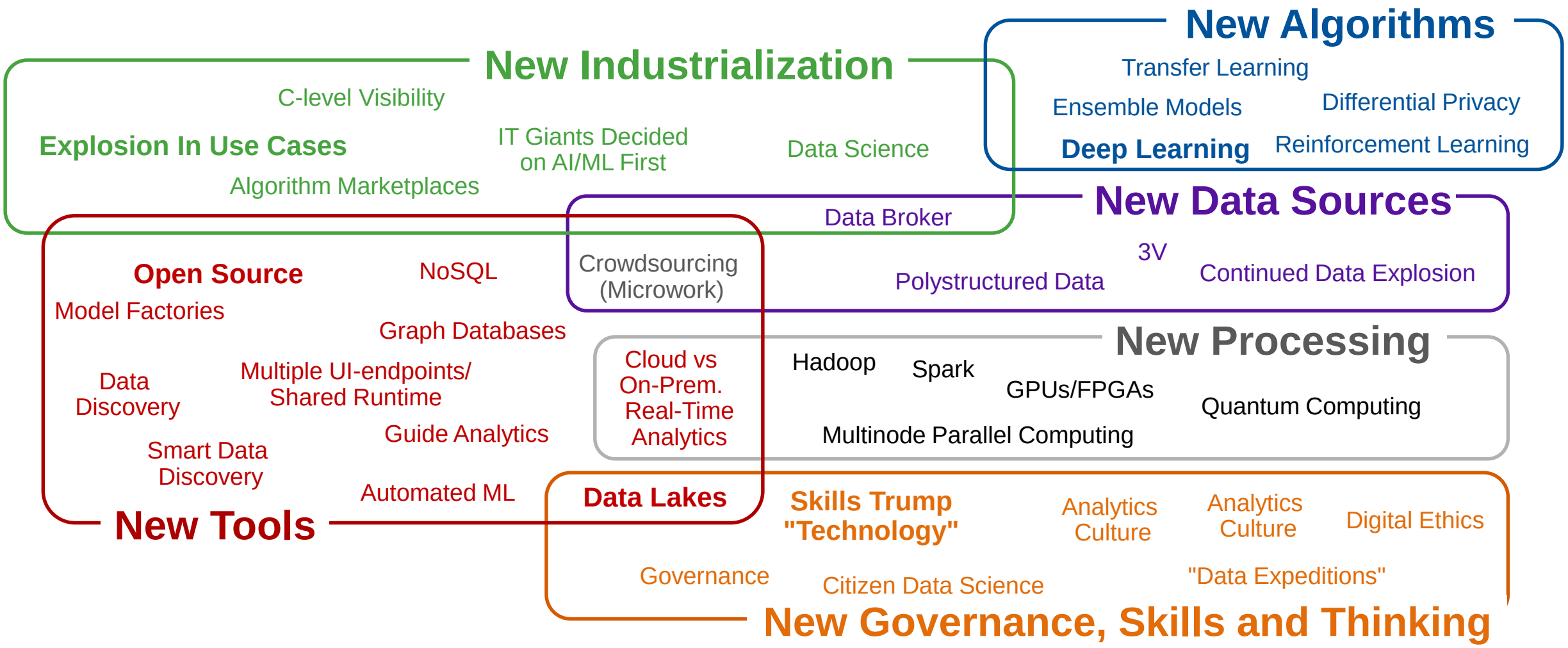
Big Data



Digital Disruption

Proven ROI

So Many Buzzwords, Where to Begin?



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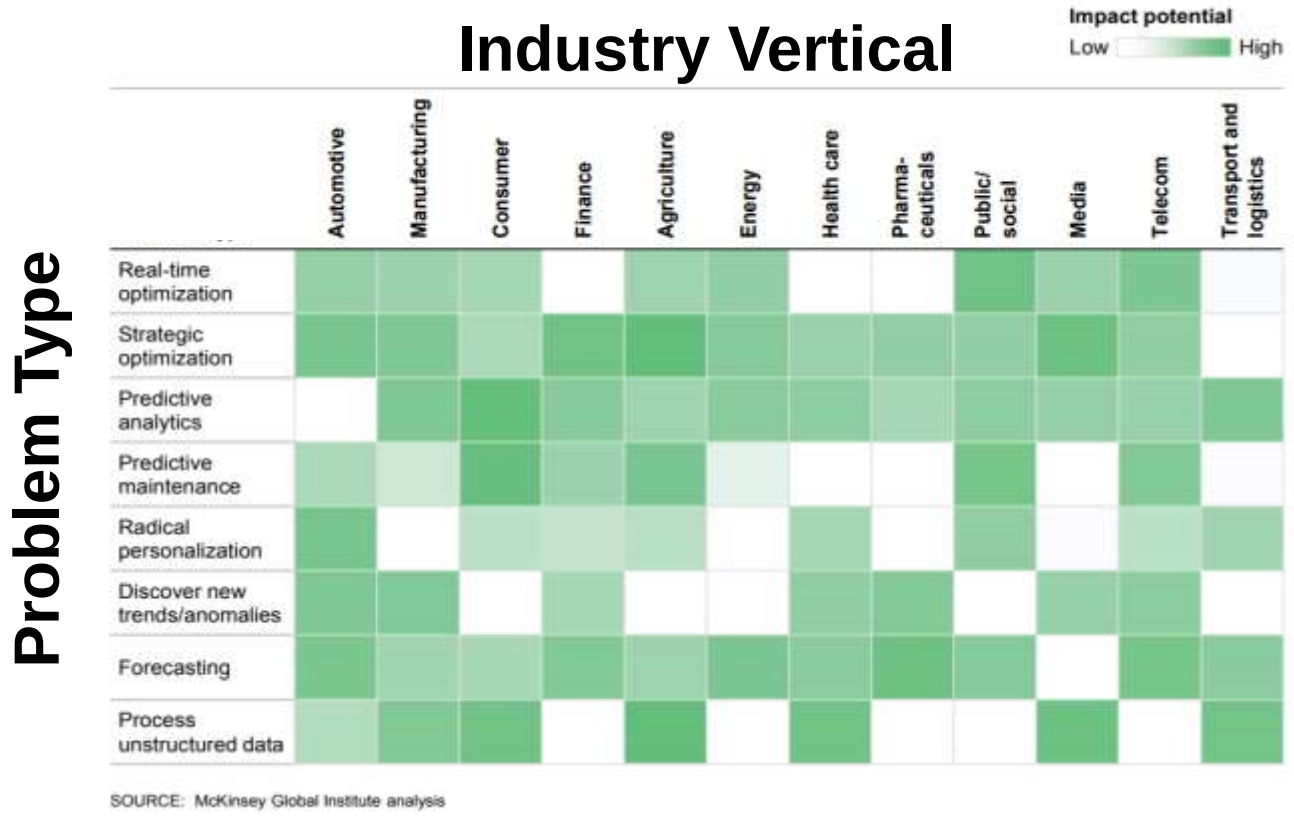
Pitfall 1

Building AI Systems for Engineers (vs. Business Users)

Recommendation: Partner with business to identify high-impact areas where data science can deliver immediate value to the business.



SOURCE: McKinsey Global Institute analysis

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Pitfall 2

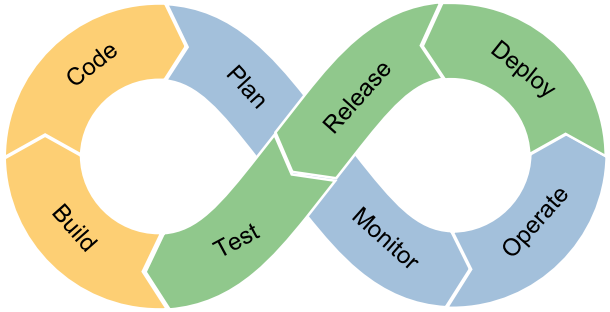
Failing to Understand That Building Models Is Academics/Deploying Them Is Economics

Recommendation: Help your data science lab operationalize machine learning: Think data science ops.

Data Science Lab

Innovation, Exploration, Proactive

- New Data Sources
- "What Drives X?"
- New Technologies
- Testing, Prototyping



Promote

Data Science Production

Deploy, Manage, Enterprise Needs

- Model Deployment
- Application Development
- Model Management
- Governance

Fail Fast, Try Again

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Pitfall 3

AI and Machine Learning Consume a Lot of Data

Recommendation: Plan for storing and managing lots more data.

"High-performance engines require lots of high-quality fuel."

And deep learning techniques require lots and lots of data.

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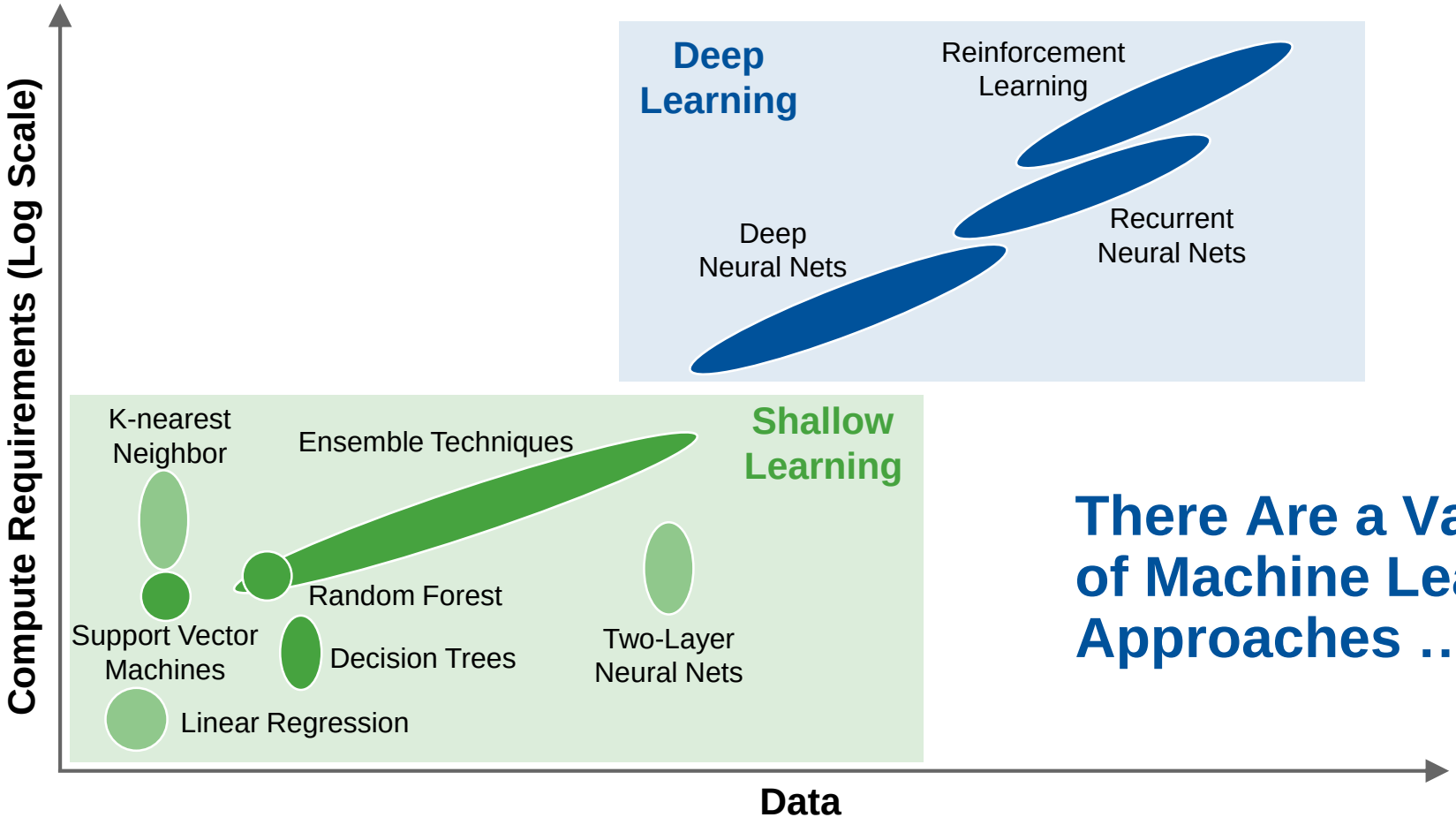
Pitfall 4

Thinking Deep Learning Is Always the Best Technique

Recommendation: Use the simplest technique to do the job.



There Are a Variety of Machine Learning Approaches …

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Pitfall 5

Improvising a Machine Learning Architecture

Recommendation: Equip your teams with the right data science tools and infrastructure.

Data Science and Machine Learning Platforms

And More …

Deep Learning Frameworks	Visualization
▪ TensorFlow ▪ Theano ▪ Microsoft Cognitive Toolkit (CNTK) ▪ Caffe	▪ Qlik ▪ Tableau Software ▪ Microsoft

Cloud Platforms
▪ Amazon ▪ Google ▪ Microsoft

Stream Processing	Big Data Platforms
▪ Apache Kafka ▪ Apache Storm	▪ Apache Hadoop ▪ Apache Spark

Source: "Magic Quadrant for Data Science and Machine-Learning Platforms," 22 February 2018 (G00326456)

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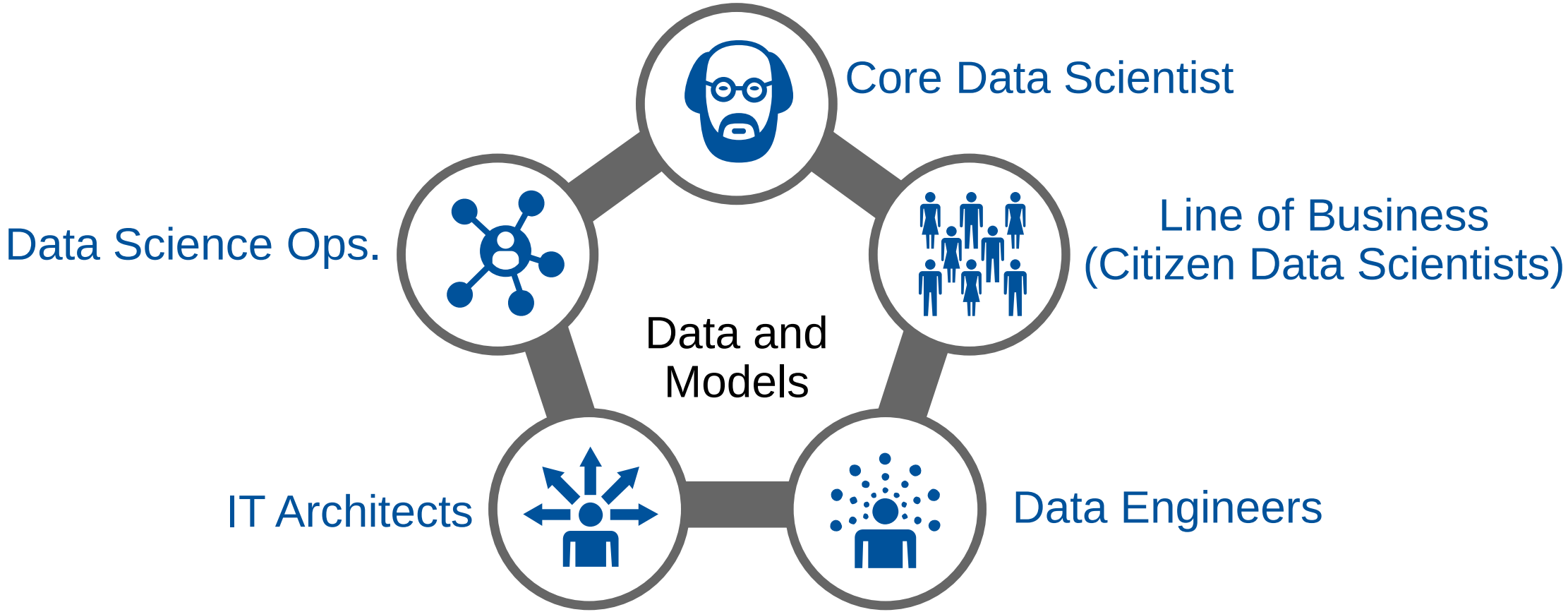
Pitfall 6

Leaving Data Science to Just the Data Scientists

Recommendation: Remember, data science is a team sport: Invest in your people.



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Success in AI and ML comes from taking chances!

Great things never come from comfort zones.

Recommendations on How to Start …

- ✓ Engage the business:
  - Identify at least three separate business initiatives that can benefit from exploiting amazing innovation (AI) technologies in 2018 to 2019.
- ✓ Use the three-phase approach:
  - Scope initiatives for quick time to value
  - Identify the right skills
  - Experiment and learn
- ✓ Respect the impact on people:
  - The impact of software and robots on employment, work and careers of people will be profound.

Recommended Gartner Research

- **Magic Quadrant for Data Science and Machine-Learning Platforms**
  Carlie J. Idoine, Peter Krensky and Others (G00326456)
- **Five Ways Data Science and Machine Learning Deliver Business Impacts**
  Erick Brethenoux and Alexander Linden (G00343858)
- **Hype Cycle for Data Science and Machine Learning, 2017**
  Peter Krensky and Jim Hare (G00325005)
- **How to Start a Machine-Learning Initiative With Less Anxiety**
  Svetlana Sicular (G00331893)
- **Machine-Learning and Data Science Solutions: Build, Buy or Outsource?**
  Peter Krensky and Alexander Linden (G00315415)

For information, please contact your Gartner representative.

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