

What it Really Takes to Get AI Skills:

Making AI and Data Knowledge a Reality in
Government

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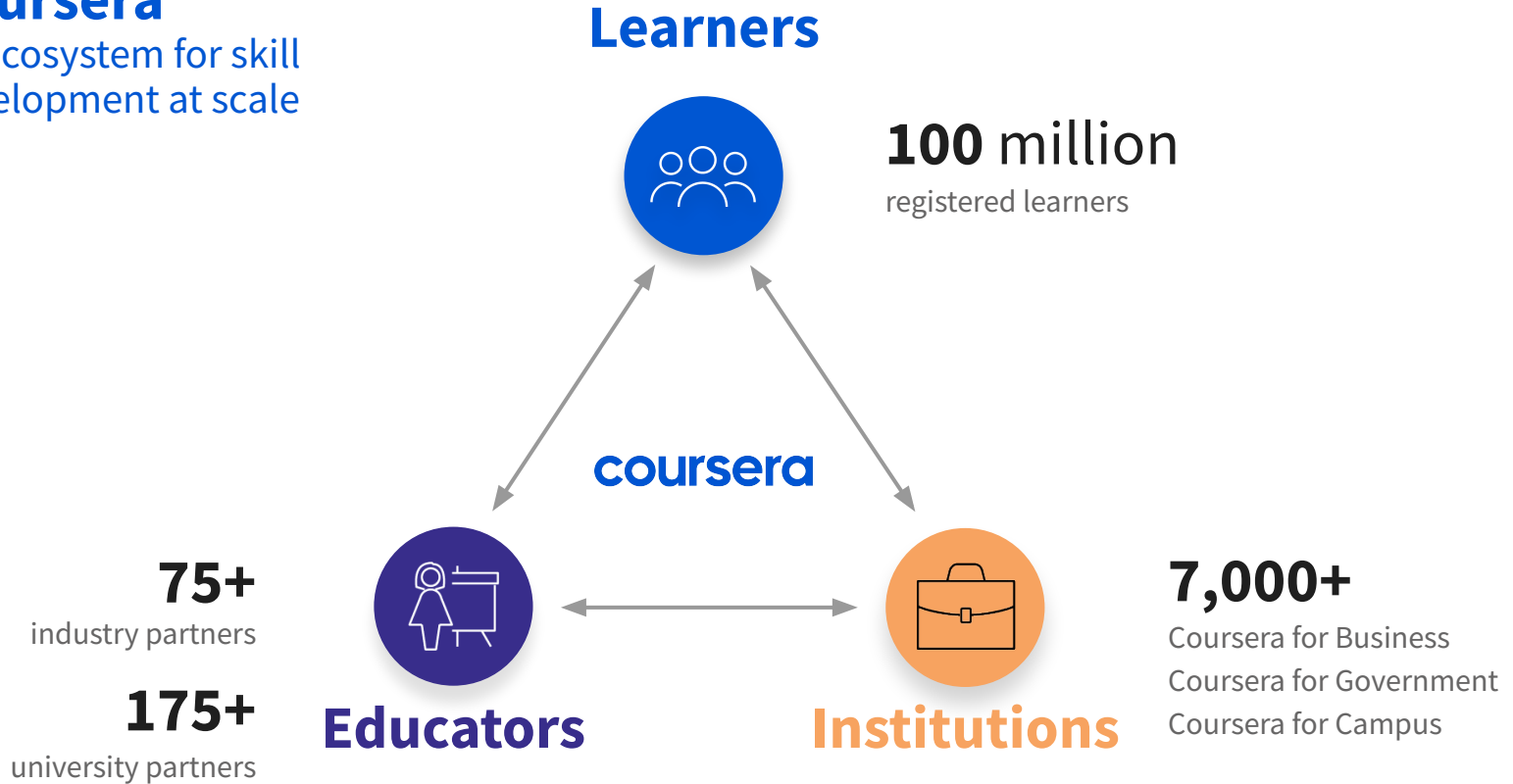


Agenda

- 01 Why Data & AI skills?**
Recent trends and drivers for employee AI and data skills development across more than just data science teams
- 02 What to do?**
Use cases and best practices for organizations making AI skills development a reality
- 03 How to do it?**
The benefits of partnering to expedite your training and skills achievement at government scale

Coursera

An ecosystem for skill development at scale



Learn from 250+ leading universities and companies



Why Data & AI skills?

Recent trends and drivers for employee AI and data skills development across more than just data science teams

What do we mean by AI?

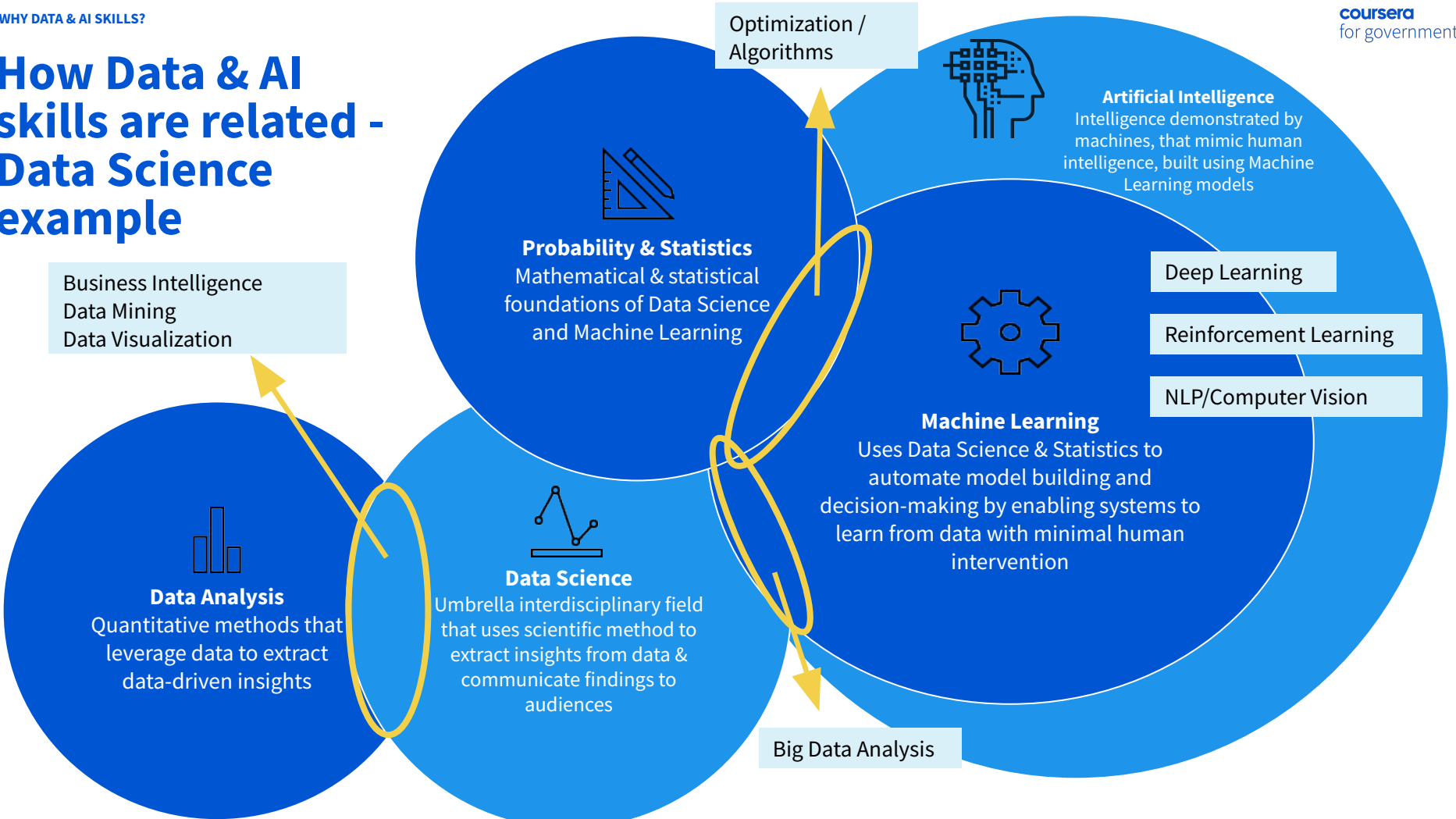
As defined by the [National Artificial Intelligence Initiative Act of 2020](#) (DIVISION E, SEC. 5001), “The term ‘artificial intelligence’ means a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments.

Artificial intelligence systems use machine and human-based inputs to –

- (A) perceive real and virtual environments;
- (B) abstract such perceptions into models through analysis in an automated manner; and
- (C) use model inference to formulate options for information or action.”

Topics typically encompassed by the term “AI” include machine learning, computer vision, natural language processing and understanding, intelligent decision support systems, and autonomous systems, as well as the novel application of these techniques to various domains.

How Data & AI skills are related - Data Science example



Business Intelligence
Data Mining
Data Visualization

Data Analysis

Quantitative methods that leverage data to extract data-driven insights

Data Science

Umbrella interdisciplinary field that uses scientific method to extract insights from data & communicate findings to audiences

Probability & Statistics
Mathematical & statistical foundations of Data Science and Machine Learning

Optimization / Algorithms

Machine Learning

Uses Data Science & Statistics to automate model building and decision-making by enabling systems to learn from data with minimal human intervention

Artificial Intelligence
Intelligence demonstrated by machines, that mimic human intelligence, built using Machine Learning models

Deep Learning

Reinforcement Learning

NLP/Computer Vision

Big Data Analysis

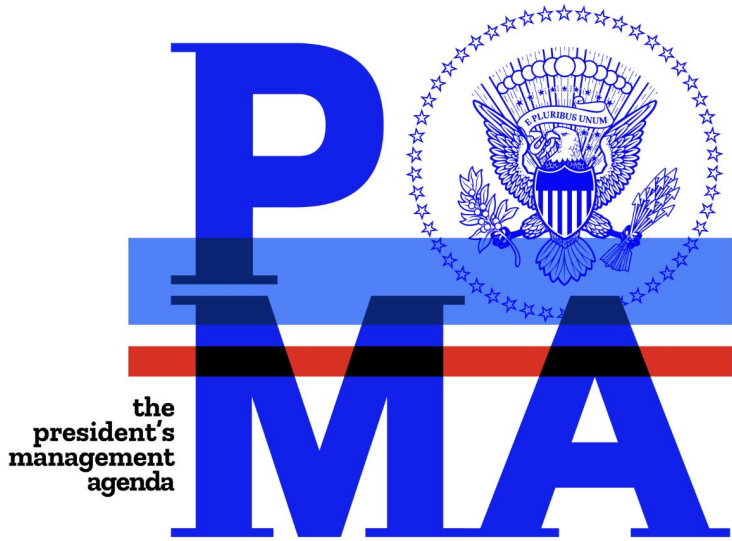
 An official website of the United States government [Here's how you know](#) 













Federal Data Strategy

Leveraging Data as a Strategic Asset

- Home
- About 
- Action Plan 
- Action Progress 
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 An official website of the United States government [Here's how you know](#) 

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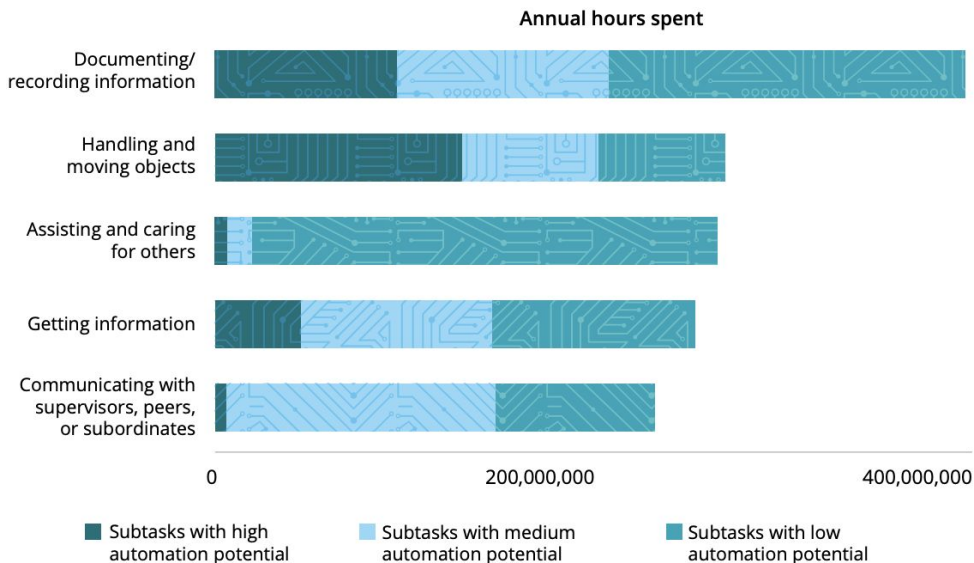
NATIONAL ARTIFICIAL INTELLIGENCE INITIATIVE

OVERSEEING AND IMPLEMENTING THE UNITED STATES NATIONAL AI STRATEGY



Potential savings of using AI in government run into the billions of dollars and 30% of total hours worked.

Figure 3. Automation potential of subtasks within the five most labor-intensive federal activities



Source: Deloitte analysis of OPM Fedscope and DOL O*NET data.

Deloitte University Press | dupress.deloitte.com

Figure 11. Time and money savings from AI under three levels of investment

Level of investment	Savings category	Federal	State government
Low	Annual person-hours	96.7 million	4.3 million
	Hours as percentage of total	2.23%	3.94%
	Salary	\$3.3 billion	\$119 million
Medium	Annual person-hours	634 million	15.3 million
	Hours as percentage of total	14.63%	13.93%
	Salary	\$21.6 billion	\$420 million
High	Annual person-hours	1.2 billion	33.8 million
	Hours as percentage of total	27.86%	30.84%
	Salary	\$41.1 billion	\$931 million

Source: Deloitte simulation of likely changes to labor inputs to government tasks.

Deloitte University Press | dupress.deloitte.com

In the data domain, the talent gap prevails.

Finding enough people with the right skills to do all the data-related tasks to drive business results and innovation remains a significant challenge.

Data scientists ranks number three in the top 50 jobs

[Glassdoor](#)

Recruiting costs \$27,000 - \$30,000 to fill a single position

[IADSS](#)

Median base salary of **more than \$107,000**

[Glassdoor](#)

Demand for data scientists continues to grow, **37% YoY**

[LinkedIn](#)

Data Science and Analytics jobs remain open **45 days on average**

(+5 days vs. average)

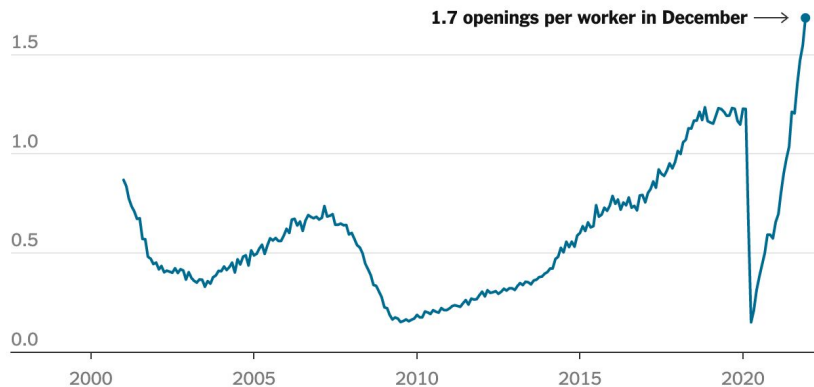
[IBM](#)

There are more job openings per worker now than at any point in the past 20 years.

Lots of jobs, not enough workers

There were nearly 11 million jobs posted in December and fewer than 7 million unemployed workers, the highest ratio in the two decades the government has been keeping track.

2.0 openings per unemployed worker



Notes: Unemployment figures adjusted to account for workers misclassified as employed. Data is seasonally adjusted. • Source: Labor Department • By The New York Times

“

There is much still unknown....
What we do know is that shifts
and twists of this magnitude
are quite unprecedented.

Thomas A. Lubik,
Federal Reserve Bank of Richmond

Data and analytics roles, specifically, are hard to hire for; the public sector has the same problem but pays 40% less.

+13%

How much longer data and analytics roles remain open compared to the market average

Median base salaries for Data Science roles (US)

\$100K

Private Sector

vs.

\$70K

Federal Employees



81%

Leaders say **lack of data literacy** hurts their ability to meet key objectives

[Experian](#)

Demonstrating the ROI and the predictability of what data literacy can deliver is also a challenge.

72%

of leaders say their staff members often **don't realize they are creating or using data** in daily operations

35%

cite a **lack of digital literacy** as one of their top three roadblocks to their data and analytics teams' success

[Gartner 5th Annual CDO Survey](#)

ONLY

4%

have a **formal data literacy program** and of those, **only 16%** are offering training to all employees

ONLY

14%

are focusing on **leveraging specific analytics technology** of those organizations that do foster data literacy

[Experian](#)

What to do?

Use cases and best practices for organizations making data & AI skills development a reality

Opportunities - Data Literacy

Ensuring everyone understands what data is and how to use it.

Biotech

AI is a critical tool in the discovery of new medicines. How might we help our leadership understand the opportunities and threats in this space?

Provide online, self-paced training on data literacy to our leadership.

Consulting

More of our consulting work has shifted to digital transformation, and our consultants need to speak the language of data and AI. How might we train them to do so?

Provide online, self-paced training in AI and data literacy that consultants can take both during and in between projects.

Telecom

We are becoming a network-native digital services company, and we need to be more data-driven in our decision making to make use of our new technology.

Provide data and AI literacy training across the organization to help their employees use their data in new ways.

Opportunities - Reskilling

Training people to operate in a new roles that require more data skills.

Automotive

Cars are computers with wheels. How might we ensure we have the talent we need to build the vehicles of the future?

Reskill thousands of mechanical engineers to be AI-focused software engineers and move them into product development roles.

Manufacturing

Most of our workers are blue collar and finding talent is hard. How might we get the data-skilled talent we need to stay competitive?

Create a new strategy to focus on lifelong learning and develop AI & data analytics skills for every level of the organization, including leadership.

Shipping

We're developing a machine learning platform to help make our customers' supply chains smarter. How might we train our people to take full advantage of this new platform?

Reskill our mobility group as part of this digital transformation so they better understand how to gather, use, and analyze data.

Opportunities - Upskilling

Training people to continuously update and develop their data skills.

Consulting

How might we help over 100,000 consultants stay on the cutting edge of cloud, AI, and data analytics and reduce time in between projects?

Map our skill priorities areas and learning paths for specific roles and types of engagements so consultants can quickly upskil themselves on what they need to know for each project.

Defense

We invested \$1B investment in R&D to develop better digital capabilities. How might we arm our employees with the skills to take advantage of our new digital assets?

Provide intermediate and advanced level content for 10,000 technical staff in topics ranging from advanced artificial intelligence to autonomy, data science, and agile development.

Energy

We want to become a net-zero energy operator by 2050. To do this, we need to become more data-driven so we know where to invest our time and resources.

Implement a selective Analytics Academy and create career paths for employees who want to become analytics practitioners.

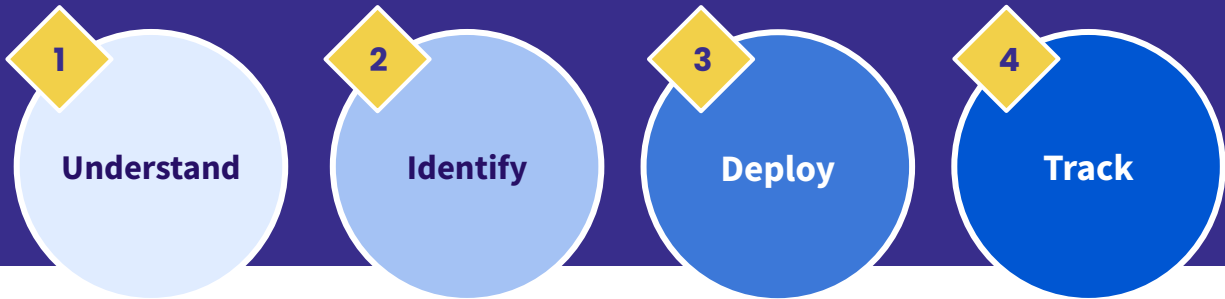
How to do it?

The benefits of partnering to expedite your training and skills achievement at government scale

Workplace learning has evolved to be skills-first

Skills-first Learning

Develop critical skills for critical roles



PRODUCTS

LEVELSETS

Find your starting point

SKILLSETS

Deploy relevant content for every role

SKILLS DASHBOARD

Track & benchmark skills



All powered by the **COURSERA SKILLS GRAPH**

FIGURE 30

Data and AI jobs of tomorrow, typical learning agenda and time to achieve mastery in key skills

A. Typical learning agenda

Rank	Skill
1	Data Analysis
2	Computer Programming
3	General Statistics
4	Leadership And Management
5	Regression
6	Machine Learning
7	Big Data
8	Python Programming

B. Top 10 skills by required level of mastery and time to achieve that mastery

Rank	Skill	Expected mastery score (0 to 6, best)	Typical mastery gap	Average days to master skill
1	Statistical Programming	5.50	54%	72
2	Communication	4.36	34%	80
3	Leadership and Management	3.61	66%	39
4	Data Management	3.61	45%	84
5	Marketing	3.57	55%	43
6	Finance	3.56	46%	67
7	Sales	3.43	84%	13
8	Computer Programming	3.43	41%	76
9	Business Analysis	3.24	65%	34
10	Machine Learning	3.06	54%	86

Source

Coursera.

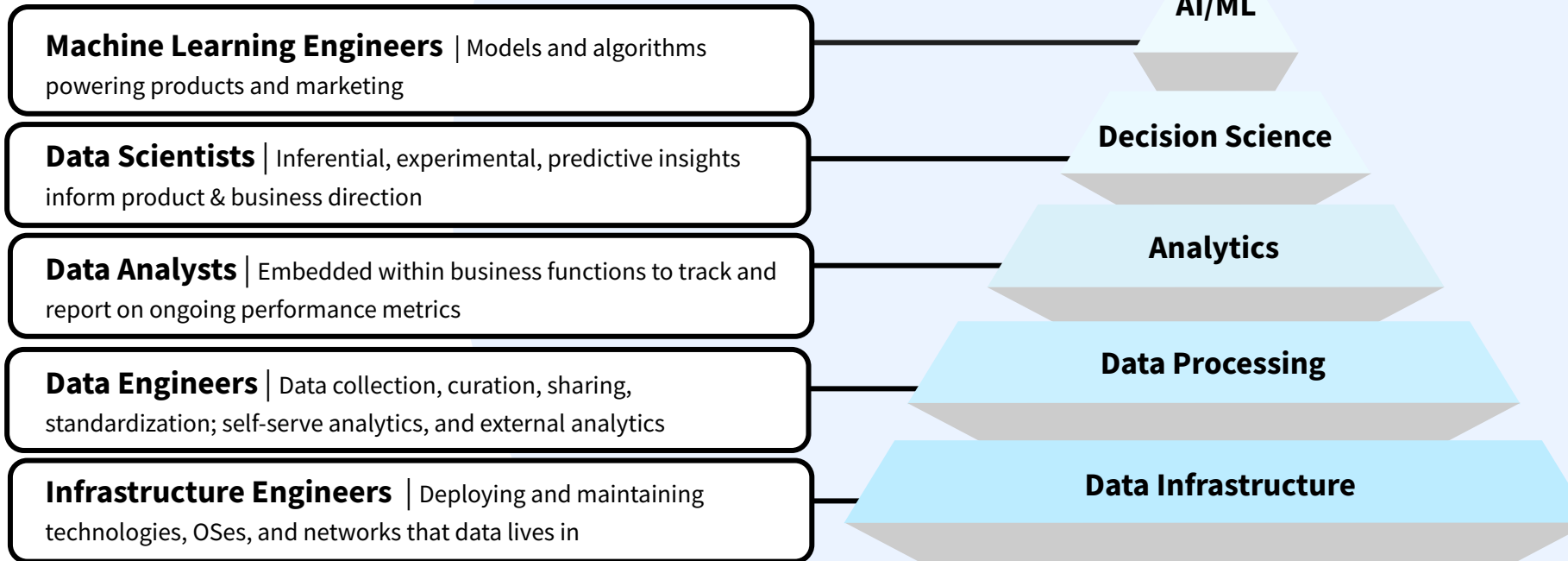
Note

Mastery score is the score attained by those in the top 80% on an assessment for that skill. Mastery gap is measured as a percentage representing the score among those looking to

transition to the occupation as a share of the score among those already in the occupation.

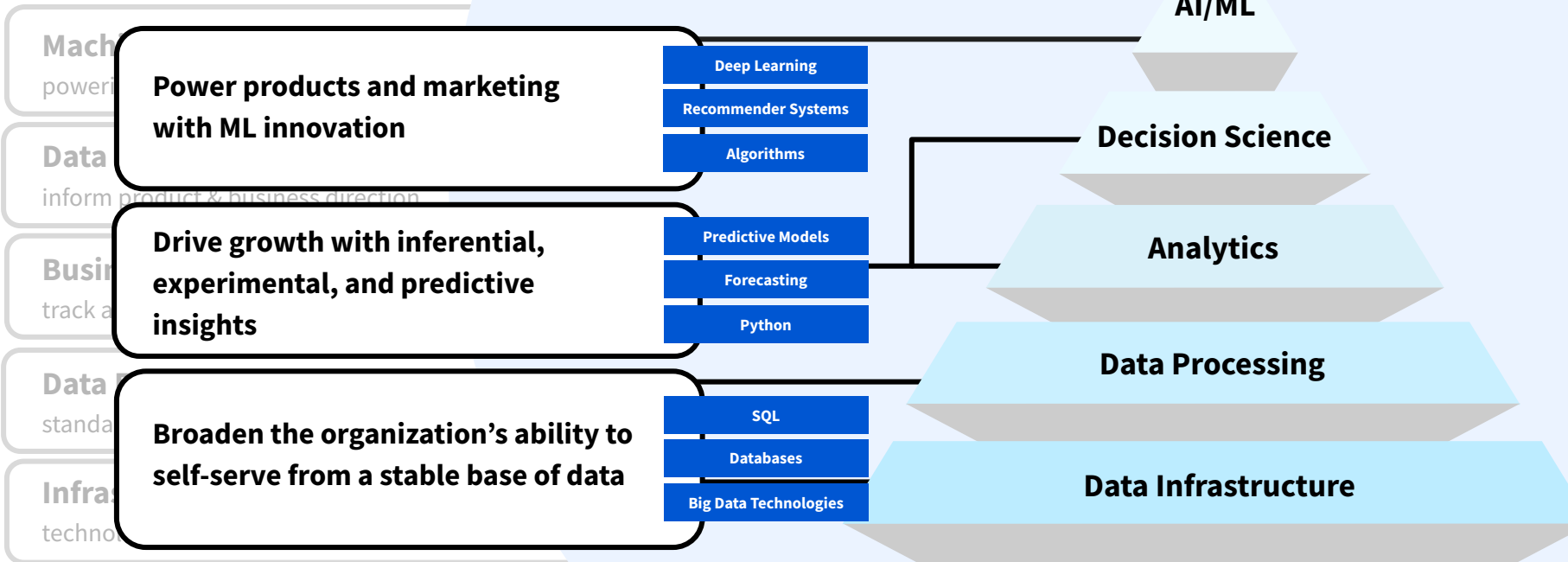
RESKILLING

How do “digital” organizations create value from data and who creates it?



UPSKILLING

Map skills and roles to organizational priorities



What are people in leading organizations learning?

Courses



Foundations: Data, Data, Everywhere



AI For Everyone



Programming for Everybody (Getting Started with Python)



Neural Networks and Deep Learning



Ask Questions to Make Data-Driven Decisions



Introduction to Machine Learning in Production



What is Data Science?



Analyze Datasets and Train ML Models using AutoML

Projects

NLP: Twitter Sentiment Analysis

Fake News Detection with Machine Learning

Basic Image Classification with TensorFlow

Detecting COVID-19 with Chest X-Ray using PyTorch

Professional Certificates



Google Data Analytics



IBM Data Science



Deep Learning

SkillSets

Offer in-demand skills for high-growth jobs

- Deliver job-based learning leveraging world-class content
- Accelerate skills acquisition with personalized learning programs
- Drive mastery of digital tools and create portfolios of work

The screenshot displays the 'Data Scientist' SkillSet page. On the left, a blue panel features a star icon and the title 'Data Scientist'. Below the title, a paragraph describes the role: 'Data Scientists deliver the analysis, modeling, and experimentation that inform product and business direction, empowering organizations to identify and deliver relevant products, mitigate risk and fraud, and improve internal operations. They also often develop algorithms to create personalized products and experiences to drive growth and innovation.' Below this text is the Coursera logo with the note 'This SkillSet was created by coursera'.

On the right, the 'SkillSet Targets' section lists six skills with progress bars and target scores:

Skill	My Score	Target
Mathematics	~10%	160
Statistical Programming	~10%	160
Data Visualization	~10%	60
Probability & Statistics	~10%	160
Machine Learning	~10%	60
Data Management	~10%	60

Below the targets is a link: 'How to read proficiency targets'. At the bottom, there is a section for 'Top recommendations for Mathematics' with a 'How to start' link and a progress bar showing 'My Score' and '160 Target'.

At the very bottom of the screen, there is a horizontal row of four colorful icons representing different data science and technology concepts: a grid with lines, a graph with a curve, a gear with a 'W' inside, and the Python logo.

Guided Projects

Train learners to solve job-relevant problems

- Equip learners with skills in real-world tools such as Tableau
- Minimize IT resourcing with zero download/configuration needed
- Boost skill development with hands-on, short-form projects¹

The image shows a computer monitor displaying a Coursera guided project. The screen is split into two main sections. The left section shows a Tableau Public interface with a bar chart titled "TripDuration" showing "Avg. TripDuration" by "Customer Subscrip.". The right section shows a video player with a live video of an instructor and a smaller version of the same Tableau chart. The browser window title is "My Cloud Workspace" and the URL is "1024 X 768". The browser address bar shows "coursera". The video player shows "1. Introduction 4 min" and "100%" zoom.

¹ [Coursera Drivers of Quality in Online Learning, Coursera, Oct 2020](#)

*User image may differ

Data & Analytics Academy

Accelerate your digital transformation

Become a data-driven organization. Develop your employees' skill proficiency in critical data and analytics skills to drive better business decisions and revenue growth.

- **50 SkillSets** for in-demand skills and data-related roles
- Powered by **world-class content from technology leaders like GCP, AWS, and deeplearning.ai**
- Hands-on Guided Projects for **data, automation, cloud tools**
- **Track and measure** the development of data, AI, and ML skills

DATA & ANALYTICS ACADEMY

Data skills for everyone



AI Basics for Everyone



Data Analysis for Everyone



Data Analysis for Leaders



SQL for Everyone

Program Teams

Leverage data to inform strategy and accelerate decision making



SQL for Data Analysts



Data-Driven Decision Maker



Tableau for Business Analysts

Data Engineering

Build, link, and integrate data stores



Big Data for Data Engineers



BI for Data Engineers



Data Mining for Data Engineers

Data Science

Build models to generate, interpret, and leverage insights



NLP for Data Scientists



Python for Data Scientists



AWS for Machine Learning Engineers

Reskill into key roles



Business Analyst



Data Analyst



Data Engineer



Data Scientist



ML Engineer

World-class content



Hands-on learning



Track, measure, and benchmark skills

*Pictured here is a subset of the SkillSets available in the Leadership Academy

Leadership Academy

Lead without limits

Build your employees' skill proficiency in core leadership skills with the Leadership Academy from Coursera.

- **SkillSets** for in-demand human skills across all levels
- Powered by **world-class content from top universities**
- Hands-on Guided Projects teach how to use **planning and data analysis tools**
- **Track, measure, and benchmark** the development of human skills

LEADERSHIP ACADEMY

Lead Transformation



Digital Transformation



Design Thinking



Agile Aware



Change Management

Lead Yourself

Core human skills for productive interactions, to influence others, and impact the agency

Sample SkillSets:



Emotional Intelligence



Diversity & Inclusion



Interpersonal Skills



Storytelling

Lead Teams

Develop teams that can collaborate, adapt, and thrive at all levels

Sample SkillSets:



New Managers



Team Management



People Development



Culture

Lead Organizations

Empower your workforce with strategic management and organizational development capabilities

Sample SkillSets:



Managing Managers



Program Planning



Org Development



Strategic Management

World-class MBA content



Hands-on learning



Track, measure, and benchmark human skills

Thank you