# The Demand for Al Programs

An analysis of the demand for educational programming in the field of Artificial Intelligence. Prepared by Validated Insights.





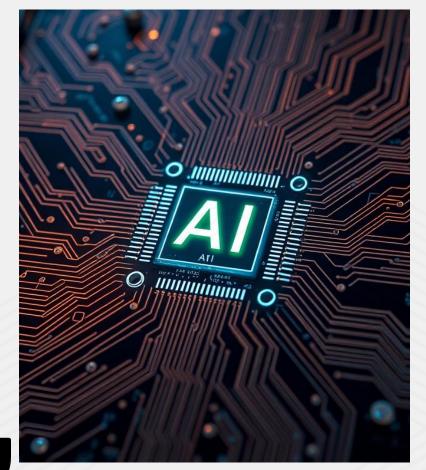
#### The market for AI education is robust, and just at the beginning of a growth trajectory.

We stand at a pivotal moment where Artificial Intelligence is not just a buzzword, but a transformative force reshaping industries, economies, and daily life. From automating complex tasks to driving unprecedented innovation, Al's impact is undeniable and rapidly accelerating, fundamentally altering the skills employers demand and the knowledge individuals need to thrive.

This report delves into the rapidly evolving demand for Artificial Intelligence education, highlighting why mastering AI is now a critical competency across virtually every sector. We explore what this shift means for educational institutions and aspiring professionals. emphasizing the urgent need for robust AI learning pathways and the opportunities that lie within this burgeoning field.



Rarely do we dive into an exploration of the demand for academic programs in a given field and see the sort of picture that we see with Al. Not only is this a burgeoning field of study, but it's impacting the demand for every other field of study.





### **Key Findings**

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#### Market Size & Growth

The market for AI education was worth \$16.2 billion in 2024 and is projected to grow at a 22.7% CAGR.



#### Workforce Interest

80% of white collar workers are interested in upskilling in Al/ML. When compared to other potential fields up upskilling, AI/ML is the 8th most sought skill by employees.



#### **Higher Education Trends**

Only 0.2% upskill in AI/ML via credit-bearing higher ed programs, but 21% of upskillers intend to enroll in college or university across all fields of study.



#### **Enrollment & Innovation**

About 4.000 students were enrolled in degrees and certificate in AI/ML in 2023. That same year, UT Austin and edX launched a \$10k online master's in Al which they anticipate will enroll 4,000 students soon.



#### Search & Job Market

Al-related search traffic grew at a 137.8% CAGR (2021-2024). About 2% of all job postings now call for AI skills: 15% of computer skill jobs now require AI.



#### **Employment Outlook**

Employment of AI/ML Developers & Engineers is projected to grow at a 40.0% CAGR, about 100X faster than the average for all occupations. Employment of AI/ML practitioners more broadly will grow at a 12.6% CAGR.

## Sizing the Market





## Sizing the Market for AI Education

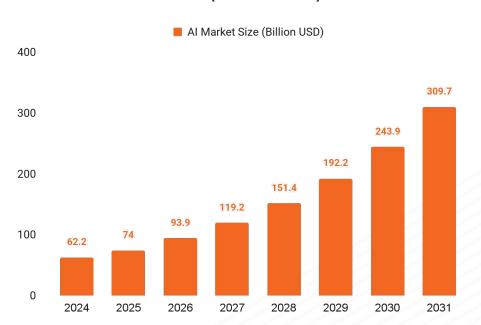
The AI market in the United States is worth an estimated \$93.9B in 2025, and this revenue is projected to grow at a 27.0% CAGR through 2031. The result is that the AI market will grow more than 4X over the next six years.

The increasing adoption of AI has driven massive growth in the market for education, training, and development in the domain of AI/ML. As it stands, roughly 4% of the white collar workforce is pursuing upskilling in the field of AI, while 80% indicate interest in doing so, just 10 pp behind the percentage that are interested in Leadership training (90%). We estimate that the market for AI education and training was worth \$16.2B in 2024, and project that the market will grow at a 22.7% CAGR in the coming years.



### Sizing the Artificial Intelligence Market

#### The AI Market in the US (2024 to 2031)



\$74.0B

Al Market Size 2025

27.0%

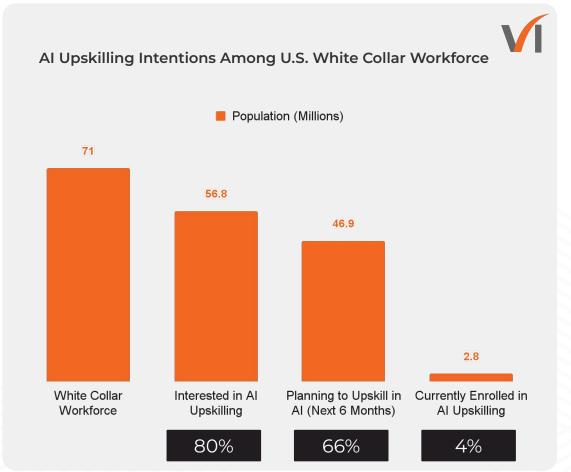
Projected CAGR (2025-2031)

The **\$74B** market for Artificial Intelligence in the United States is projected to grow more than **4X** from 2025 to 2031 to nearly **\$310B**.

#### **Market Sizing**

# There are 46.9M workers indicating planning to upskill in Al

The white collar workforce in the United States stands at 71 million. When surveyed, 80% (56.8 million) express some interest in Al upskilling, and 69% (46.9 million) go so far as stating that they intend to do so within the next six months. Despite this, only 4% (2.8 million) of these workers are currently enrolled in, or pursuing AI upskilling in a structured and supervised manner, highlighting a significant gap between interest and action.



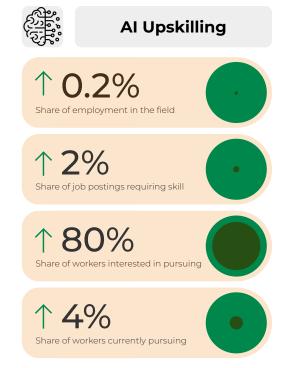
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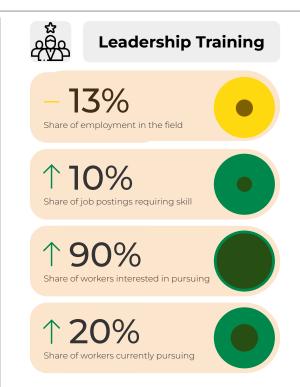
#### Case Study: AI Upskilling vs. Leadership Training & Development



The AI Upskilling market was worth an estimated \$16.2B in 2024, or about ½ the size of the Leadership Training & Development market. This market is projected to grow at a 22.7% CAGR in the coming years, more than twice as fast as the Leadership Training & Development market.

Recent surveys indicate that as much as 80% of the workforce is interested in pursuing this type of training..





The Leadership Training & Development market in the United States alone was worth an estimated \$81.2B in 2024 and is projected to grow at a 10.2% CAGR in the coming years.

Recent surveys indicate that as much as **90%** of the workforce is interested in pursuing this type of training and that as much as **20%** of the workforce is currently engaged in this type of upskilling.

Source(s): AWS, Bain & Company, edX, Emeritus, Global Insight Services, Indeed, InStride, Lightcast via the Federal Reserve Bank of Atlanta, Training Mag, and the U.S. Bureau of Labor Statistics (BLS), the AI upskilling market is estimated based on the Leadership upskilling market size corrected for the percent of the workforce engaged in AI training, the projected market growth for the AI upskilling market is based on the projected growth in AI talent per Bain & Company

## **Student Demand**



**Lead Growth** 



#### **Student Demand for AI Education**

graduate certificates in the field grew at a

245% CAGR from 2019 to 2023.

\$	Completions Growth	Completions of degrees and certificates in Artificial Intelligence grew almost 10X from 2016 to 2023.		Generative AI Course Boom	Just 14 months after ChatGPT launched, enrollment in Generative AI courses on platforms like Coursera and Udemy reached 3.5 million.
Q	Search Interest	Searches for keywords related to the Artificial Intelligence field of study grew at a 137.8% CAGR from 2021 to 2024.	В	Master's Degrees Lead Volume	Master's degrees make up an estimated 78% of all degree and certificate enrollments in Al. These completions have grown at a 35% CAGR and new enrollments have grown at a 56% CAGR.
Ф	Non-Degree Programs	Non-degree programming is leading growth in the AI education market. Completions of	<b>(</b>	Wider Impact	The rapid expansion in both formal and informal AI education highlights the

growing importance of AI skills for students

worldwide.



#### While 8.7 million people are learning AI, only ~7,000 are enrolling

There are estimated to be 8.7 million people that are learning AI currently. Of this total, 32.8% are taking structured courses, and only 0.2% are in higher ed.

#### 56.8 Million White Collar Workers Interested in Al Upskilling 8.7 Million Currently **48.1 Million Not Currently Doing So Doing So** 1.2 Million 5.8 Million 2.8 Million Upskilling 46.9 Million Planning to Do So Upskilling Planning Independently to Do So 2.8 Million While only 0.2% of the AI Upskilling upskilling market is pursuing a Alternative higher ed program, 21% of the **Program** broader upskilling market intends to enroll in higher ed. ~7.000 enrolled in credit-bearing higher ed If the AI upskilling market saw program that share, total enrollments would be almost 600.000.

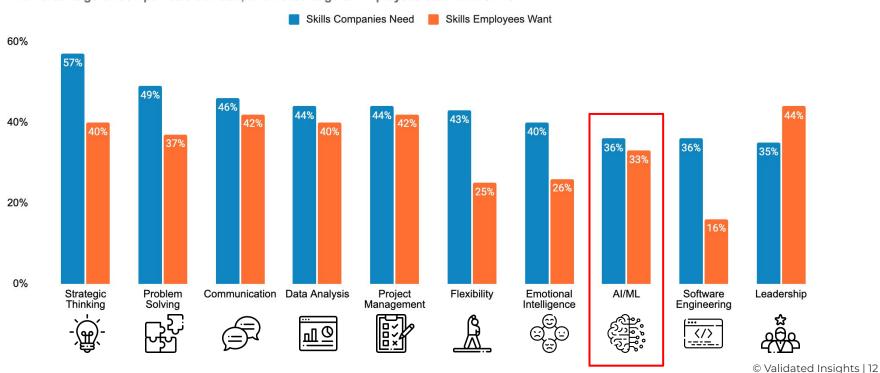
- There are estimated to be 56.8 million people interested in upskilling in the domain of Al. Of this total, 8.7 million (15.2%) are currently doing so.
- Of these 8.7 million people learning Al, 32.8% are doing so via a structured and supervised learning program, the rest are doing so in an independent manner via videos, online resources, reading, and other learning resources.
- Of those learning AI in a structured and supervised learning program including industry certifications, MOOCs, higher ed programs, bootcamps and other related programs, only 0.2% are learning AI via a credit-bearing program from a higher education institution, the other 99.8% are learning these skills from alternative education providers or programs.



#### Companies need, and employees want AI/ML skills

AI/ML is the 8th most needed skill per employers, and the 8th most sought skill for development among employees.





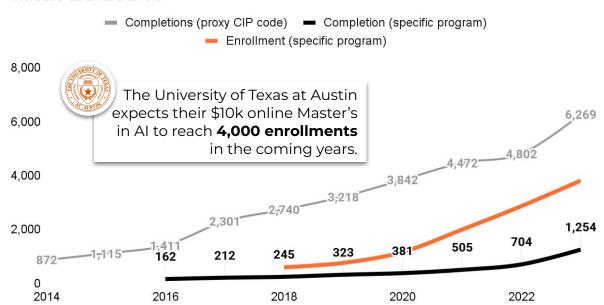


#### AI/ML completions are growing at an accelerating rate

From 2016 to 2023 completions of degrees and certificates in Artificial Intelligence grew almost 10X, from 162 to 1,254 (a 34.0% CAGR).

#### Total Artificial Intelligence Completions and Fall Enrollment by Year

Includes all award levels

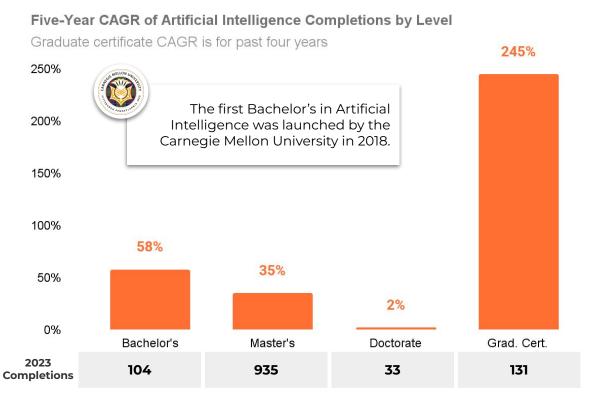


- From 2016 to 2023 completions of Artificial Intelligence programs across all award levels grew almost 10X, from 162 to 1,254 (34.0% CAGR). From 2022 to 2023 alone these completions grew 78.1%.
- From Fall 2022 to Fall 2023, while all Al/ML completions grew 78.1%, total enrollment in all Al/ML programs grew 33% and new enrollment in all Al/ML programs grew 64%.
- Encoura reports that, using a proxy CIP code, completions of AI/ML programs grew at a 24.5% CAGR from 2014 to 2023.



#### AI/ML completions are growing, particularly certificate programs

Over the past four years, Certificate of AI/ML completions grew at a 245% CAGR and Bachelor's of AI/ML completions grew at a 58% CAGR.

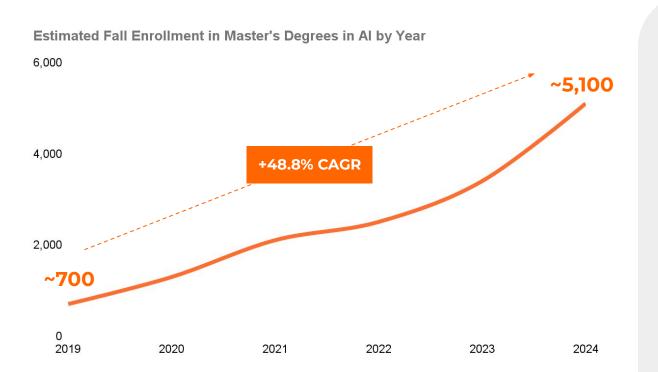


- While the most common level of education for Al/ML is the master's degree, with 935 completions reported in 2023, faster growth is being observed at both the bachelor's degree level and at the graduate certificate level. Even though the MS in Al/ML lagged behind other program levels in terms of completion growth, the program still saw completions grow rapidly, at a CAGR of 35% over the past five years.
- Over the past four years, completions of graduate certificates in Al/ML grew at an astonishing 245% CAGR. BS in Al/ML completions also saw strong growth, growing at a 58% CAGR over the same time frame



#### Enrollment in AI/ML master's has grown at a 48.8% CAGR since 2019

From Fall 2019 to Fall 2024, fall enrollment in master's degrees in Al/ML grew at a 48.8% CAGR, from ~700 to ~5,100.

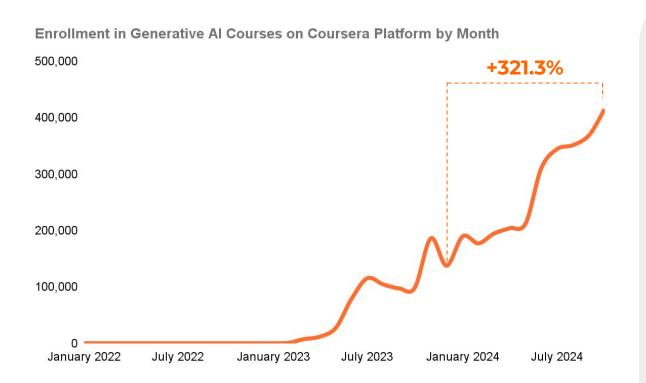


- Based on 2023 completions, master's degrees represent about 78% of all enrollments in degrees and certificates in AI/ML at higher education institutions.
- From 2018 to 2023, completions of master's degrees in Al/ML grew at a 35% CAGR. Growth is accelerating, however. From Fall 2019 to Fall 2024 estimated enrollment in these programs grew at a 48.8% CAGR. New enrollment in these programs grew even faster, growing at a CAGR of 56% over that same span). The fact that new enrollment in these programs is outpacing completions of these programs indicates that a continued strong growth trajectory is anticipated.



#### **Enrollment in Generative AI coursework is exploding**

ChatGPT launched in November 2022. By January 2024 almost 3.5 million students had taken Generative AI courses with either Coursera or Udemy.

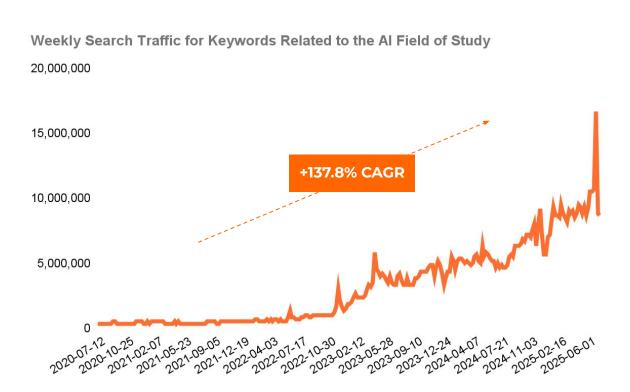


- COUISEIO first launched Generative AI coursework in February of 2023. By July of 2023 these courses had already reached 100,000 current enrollments, and by December of 2024 these courses had already enrolled more than 4 million students total.
- **ûdemy** first launched Generative Al coursework in November of 2022. By January of 2024 these courses had already eclipsed 2.4 million total enrollments.
- Great Learning reported that Generative AI courses on the platform saw enrollment grow 2.6X from November 2023 to February 2024.
- edx reported that enrollment in Al-related courses grew 54% year-over-year in 2023.



#### Search traffic for AI education has exploded

From 2021 to 2024 search traffic for keywords related to the Artificial Intelligence field of study grew at an astonishing 137.8% CAGR.

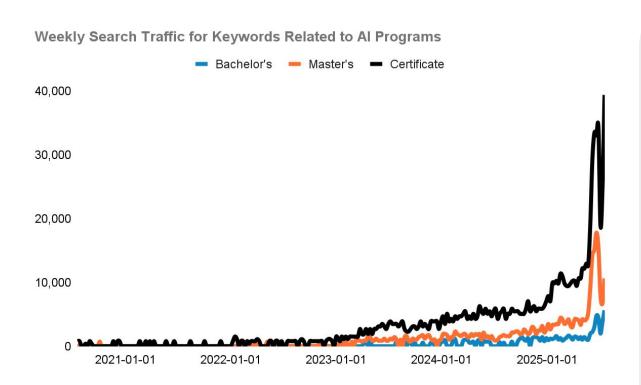


- From 2021 to 2024 total search traffic for keywords related to the Artificial Intelligence field of study (as defined by Google) exploded, growing at a 137.8% CAGR.
- From 1H of 2024 to 1H of 2025 search traffic for these AI-related keywords further grew 78.0%, which is actually a deceleration given the rapid growth rate observed in recent years.
- Through the first six months of 2025 there has been an average of 40 million monthly searches for keywords related to the "Artificial Intelligence" field of study, as defined by Google.



#### Search traffic for AI degrees and certs has boomed in 2025

From 1H 2024 to 1H 2025 search traffic for keywords related to AI certificates grew 191.0%, for AI master's traffic grew 251.4%, and bachelor's saw a 213.9% rise.

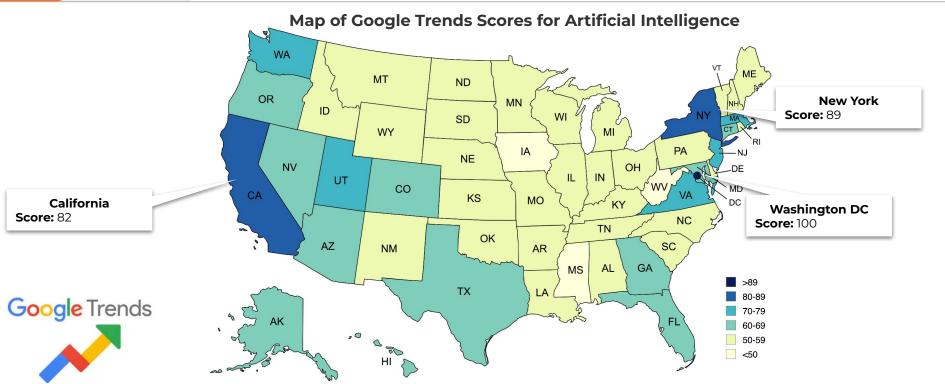


- As of June 2025 there were 129,838 searches for keywords related to Al certificate programs. Searches for keywords related to Al certificate programs grew 191.0% from 1H 2024 to 1H 2025.
- As of June 2025 there were 62,648 searches for keywords related to Al master's degree programs. Searches for these keywords grew 251.4% from 1H 2024 to 1H 2025.
- As of June 2025 there were 14,529 searches for keywords related to Al bachelor's degree programs.
   Searches for these keywords grew 213.9% from 1H 2024 to 1H 2025.



#### CA, DC & NY lead in terms of relative search demand

The states with the highest Google Trends Scores for the Artificial Intelligence field of study are Washington DC, New York, and California.



## **Labor Market Demand**





#### **Labor Market Demand for AI Education**

Rising Demand for AI Skills

From 2010 to 2024, the share of online job postings requiring AI skills grew from 0.5% to 1.7%, reflecting a substantial increase in demand.

Recent Trends and **Growth Rate**  Despite a brief drop in 2022 and 2023, Al job postings have grown at a 6.1% CAGR since 2021, indicating steady long-term growth.

**Explosive** Growth in **Job Postings** 

Between 2012 and 2024, the number of Al job postings grew almost 7X from 109,000 to 750,000, highlighting the rapid expansion of Al-related opportunities.

Al Talent **Shortage**  There is an estimated shortage of nearly 700,000 Al workers, and this gap is expected to persist in the coming years.

AI Skills in Computer Job Openings

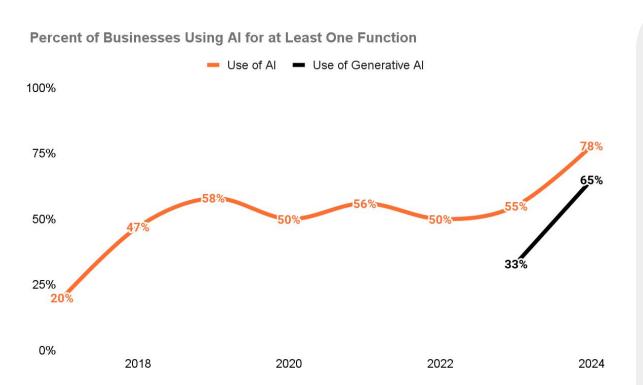
As of 2024, an estimated 15% of all job openings that require computer skills also call for AI skills, showing AI's integration into tech roles.

**Fducation** Gap in Al Workforce Data shows the Al workforce in the U.S. remains educated at levels below business needs, signaling a need for more advanced Al education.



#### The percentage of businesses using AI has skyrocketed

From 2017 to 2024 the percentage of businesses that report using AI for at least one function skyrocketed from 20% to 78%.



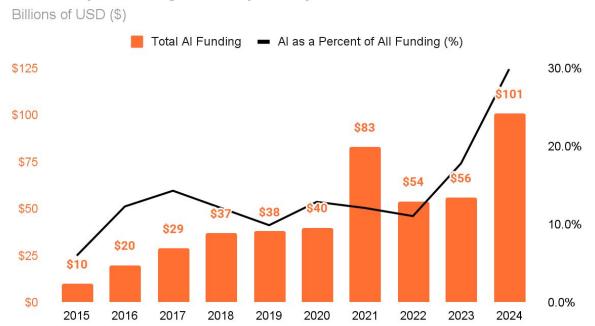
- From 2017 to 2024 the percentage of all businesses that report using AI for at least one function grew from just 20% to 78%.
- From 2019 to 2023 the percentage of businesses reporting using Al remained relatively flat. Then, from 2023 to 2024, the percentage shot up from 55% to 76%.
- The percentage of businesses that report using generative AI tools for at least one function grew from 33% to 65% from 2023 to 2024. Other data sources found that this percentage was actually 73% in 2024. By 2028, 93% of companies are projected to be using generative AI tools.



#### Al investment has rebounded and is back on a growth trajectory

Venture capital funding to AI companies grew 80.4% in 2024 to \$101B, the largest year on record. From 2015 to 2024 this funding grew at a 29.3% CAGR.

#### **Venture Capital Funding to Al Companies by Year**



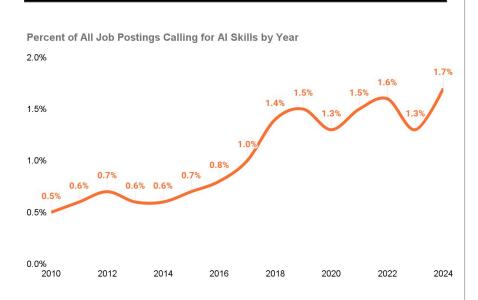
- From 2015 to 2024 total venture capital funding to Artificial Intelligence companies grew at a 29.3% CAGR to \$101B. In 2024 alone this funding grew 80.4%, and 2024 was the largest year on record for this funding.
- In 2015 just 6.0% of all venture capital funding went to Artificial Intelligence companies. In 2024, Al's share of total funding had grown to 29.9%.
- This venture capital investment is anticipated to spur continued employment growth of Al professionals, as VC-backed companies have shown to see employment grow 8X faster than non-VC-backed companies (National Venture Capital Association).



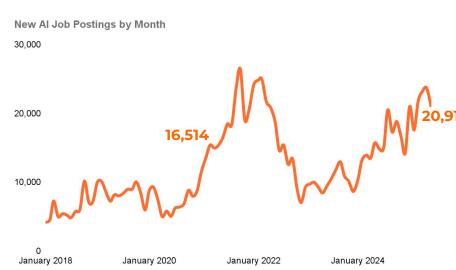
#### Al job postings are growing faster than all job postings

The share of all job postings calling for AI skills grew from 0.5% in 2010 to 1.7% in 2024. Post-COVID, from June 2021 to June 2025 AI job postings grew at a 6.1% CAGR





From June 2021 to June 2025 all Al job postings grew at a 6.1% CAGR, from 16,514 to 20,912. This is in spite of the significant declined observed in late 2022 and early 2023.



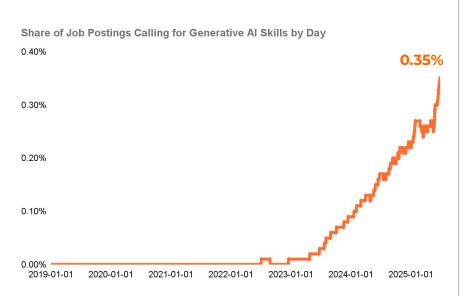
As of June 2025 there were 56.388 active AI job postings.

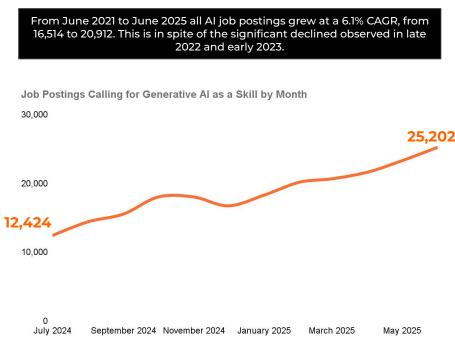


#### Job postings calling for GenAl have exploded, volume remains low

From January 2024 to January 2025 the share of job postings calling for Generative Al skills jumped 170%. Over the past year these postings have more than doubled.

From January 2024 to January 2025 the share of job postings calling for Generative AI skills skyrocketed 170%. As of the end of June 2025, however, only 0.35% of postings call for these skills.



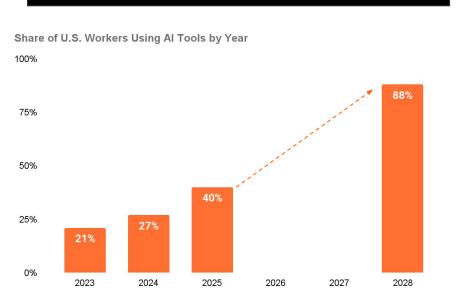




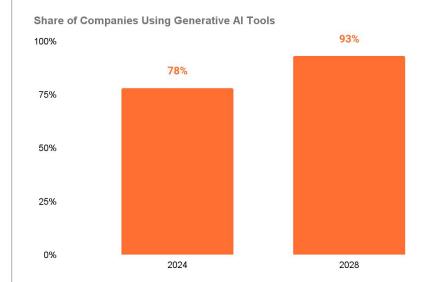
#### Al adoption is growing, and a larger share of the workforce is using Al

From 2024 to 2028 the share of companies using AI is projected to grow from 78% to 93%. Even though 78% were using these tools in 2024, only about 27% of workers were.

The share of employees in the United States who report using AI at work at least some over the course of the year nearly doubled from 21% in 2023 to 40% in 2025. 88% expect to use AI by 2028.



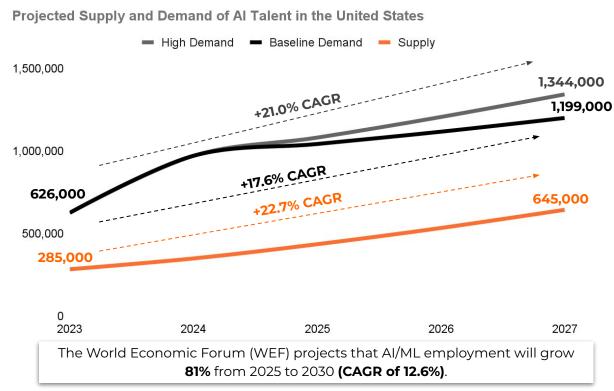
As of 2024 78% of companies were utilizing Generative Al. By 2028, however, 93% of companies anticipate doing so.





#### There will be a shortage of 554k-699k AI/ML workers in 2027

In 2023 there was a shortage of 341k AI/ML workers. By 2027 that shortage is projected to grow to 554k to 699k.

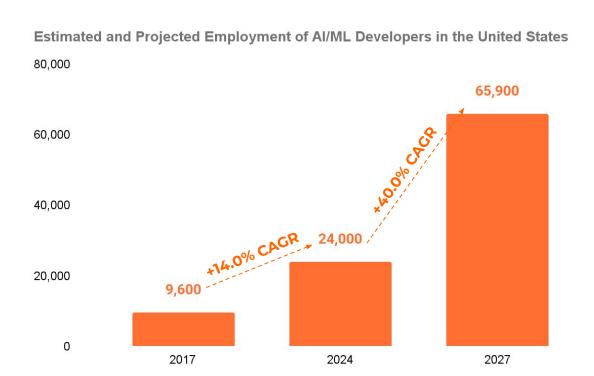


- As of 2023 there were estimated to be 285,000 AI/ML workers in the United States, but a demand for 626,000 of these trained workers. This means that in 2023 there was an estimated shortage of 341,000 AI/ML workers.
- Bain & Company projects that the supply of Al/ML talent will grow at a 22.7% CAGR from 2023 to 2027 to a total of 645,000 Al/ML workers. They also project that, in the baseline scenario, demand for Al/ML workers will grow at a 17.6% CAGR to 1,199,000 and that in the high demand scenario, demand for these workers will grow to 1,344,000. Accordingly, by 2027 there is projected to be a shortage of 554,000 to 699,000 Al/ML workers.



#### AI/ML Engineer employment will almost triple from 2024 to 2027

From 2024 to 2027 employment of AI/ML Engineers is projected to grow at a 40.0% CAGR, or 100X faster than the average for all occupations.



#### **Key Takeaways**

- As of 2024, there are estimated to be only 24,000 Al/ML Engineers in the United States. This represents only 0.4% of the total Tech workforce in the United States. Employment of Al/ML Engineers is projected to grow rapidly in the coming years, with a projected employment CAGR of 40.0% from 2024 to 2029 (which is 100X faster than the projected growth of all occupations between 2023 and 2033). This is a significant acceleration from the 14.0% CAGR estimated for the 2017 to 2024 time frame.
- While there are estimated to only have been about 24,000 Al/ML
   Engineers in 2024, the total technical workforce in the field of (or adjacent to Al) was estimated to have been about 375,000. Assuming the share of total employment in the U.S. remains constant, this pool of employment is projected to grow at about a 17.8% CAGR to 2030.

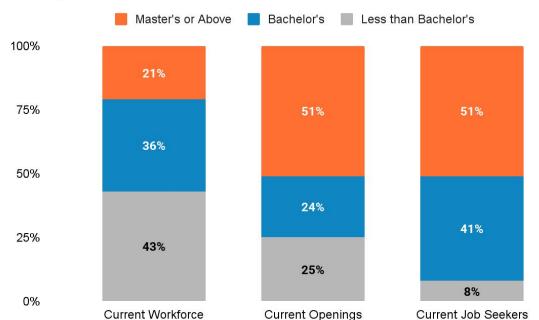
Source(s): AIM Research, BytePlus, Interview Query, Tencent, data assumes that the percentage of AI/ML Engineers that reside in the United States in 2024 was the same as in 2017, Validated Insights analysis



#### There is a shortage of highly trained AI professionals

Currently, only 21% of the AI workforce has a graduate degree. Job postings indicate that employers would prefer that 51% of these workers do, however.

#### **Existing Educational Attainment and Requirements in the Al Workforce**



## Source(s): 365 Data Science, Georgetown University Center for Security and Emerging Technology (CSET), and Indeed, current workforce data assumes 24,000 professionals have the educational attainment of Technical Team 1 and the remaining workforce has the attainment of the Product Team

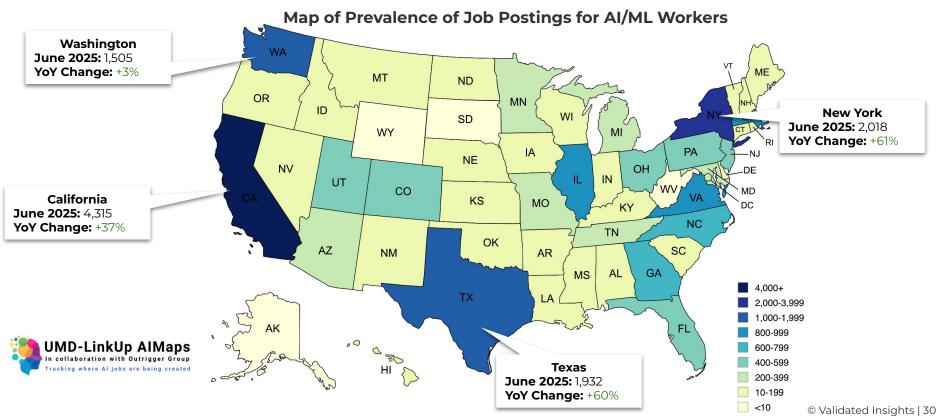
- Currently, 43% of the AI workforce has less than a bachelor's degree. An additional 36% has a bachelor's degree, and 21% has a graduate degree.
- An analysis of job postings show that 51% of job openings for AI roles call for a graduate degree, 24% call for a bachelor's degree, and just 25% allow for applicants to have less than a bachelor's degree.
- People seeking employment in Al roles have a high level of educational attainment. 51% of this population has a graduate degree, 41% has a bachelor's degree, and just 8% has less than a bachelor's degree.



Source(s): UMD-LinkUP AI Maps

#### CA, NY, TX & WA lead the market in terms of demand for AI skills

In June 2025 46.7% of all job postings for AI experts came from California, New York, Texas, or Washington.



## Recommendations



## **VI** Recommendations

Key ideas to remember related to the demand for academic programs in Artificial Intelligence.



# Think about alternative credentials

>99% of people that are currently pursuing training to upskill in the domain of Artificial Intelligence are doing so with providers outside the realm of credit-bearing higher education.



#### Recall the need for Generative AI skills

Demand for Generative AI skills is rapidly growing, and training is needed to ensure businesses are fully capable of reaping the benefits of AI innovations.



# Ensure alignment for technical professionals

For programs intended to suit technical AI professionals, there remains a significant shortage of graduate-degree-prepared expertise in the workforce.

## **Appendix & Sources**



# Appendix 1 The Variation in Estimates of the Reality of Al



## **Appendix 1**



#### On the Size of the Artificial Intelligence Market

Estimates published by Statista estimate that the aggregate market for AI in the United States in 2025 is worth \$74.0B and that the market will grow at a 27.0% CAGR in the coming years. Other providers estimate that the market may indeed be much larger, and projections of growth of the market vary widely. For example, Precedence Research estimated that this market is worth \$173.6B in 2025 and projects that the market will grow at a 19.3% CAGR.

#### On the Appetite for, or Interest in Al Upskilling

A 2025 survey by edX found that 80% of the workforce is estimated to be interested in Al upskilling. This is in line with a similar estimate produced by the Association for Talent Development (ATD) also in 2025 which found that just over 70% of employees are either "extremely" or "very" interested in pursuing Al upskilling as well as a 2025 study by Multiverse that found that 91% of employees wanted to improve their AI skills. A 2023 survey by the University of Phoenix and the Harris Poll found that 63% of the workforce was interested in "reading, hearing, or seeing more" about Al.

#### On the Number of People Currently Pursuing Al Training or Learning About Al

A 2025 survey by edX found that 4% of the workforce is estimated to be currently enrolled in a program to upskill or reskill in the domain of Al. 2024 survey data from the Pew Research Center found that 51% of all workers "have taken a class or gotten extra training" and that 24% of these workers who did so did to in the domain of Al. We assume that this 12.2% represents the sum total of persons that pursued any learning or educational opportunities including independent learning outside of structured and supervised coursework, with 4.0% being enrolled in structured and supervised programs and 8.2% pursuing learning and development in Al independently.

#### On the Share of Workers or Employees Using AI at Work

Gallup surveys in 2023, 2024, and 2025 indicate that the share of the workforce that is using Al for work at least some over the course of the year grew from 21% to 40%. The Board of Governors of the Federal Reserve System performed a meta-analysis of various surveys regarding AI uptake at work and estimates vary widely depending on exactly how the question is worded and the composition of the survey audience.

#### On the Share of Businesses Using AI and Generative AI

McKinsey & Company data shows that the percentage of companies utilizing AI for at least one business function grew from 20% in 2017 to 78% in 2024. Compare this to survey data from the Cengage Group which estimated that 73% of companies utilized AI in 2024. Projections from AWS indicate that in 2028 93% of businesses will be utilizing AI. McKinsey & Company data also indicates that the percentage of companies utilizing Generative AI for at least one business function grew from 33% in 2023 to 65% in 2024.

## Sources



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