Exploring AI ENGINEERING Careers

Leanne Currie-McGhee

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AI Engineer at a Glance

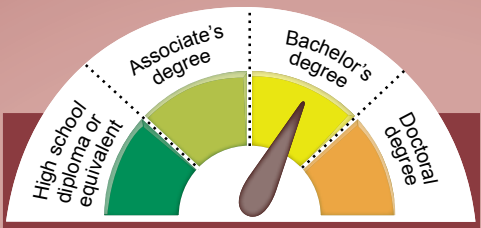
Working Conditions

Certification and Licensing

Voluntary certifications in AI, machine learning, and/or cloud computing

Personal Qualities

- [x] Creative
- [x] Analytical
- [x] Curious



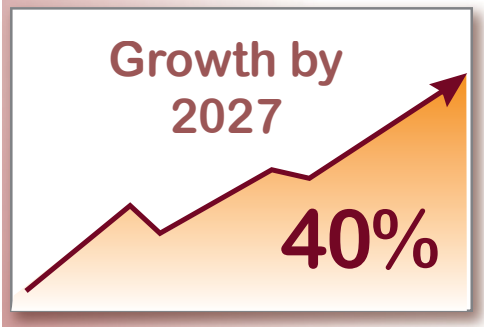
Minimum Educational Requirements

Bachelor's degree in computer science or related discipline

Pay

Average salary of $101,752 in July 2025

Future Job Outlook



35,445

AI-related positions in the United States in 2025, according to Veritone

Number of jobs

Note: Please see page 63 for source information.

CHAPTER ONE

What Does an AI Engineer Do?

Kairan Quazi is not your average teenager. He earned a degree in software engineering at age fourteen. His senior thesis focused on AI and predicting human speech. Immediately after his graduation, in 2023, he began work at the space technology company SpaceX as an AI engineer. Quazi was drawn to AI because of his love for technology and his ability to push the boundaries of what it can do.

AI is a technology that allows computer systems to perform tasks that typically require human intelligence, such as thinking, learning, and even making decisions. Often, AI creates systems that can accomplish these tasks faster than humans. AI systems use computer programs that are called models, which are trained on large amounts of data to recognize patterns and make predictions from these patterns. Quazi worked on AI systems at SpaceX that helped make the company's satellite internet network faster and more efficient.

Building on the AI expertise he gained at SpaceX, in 2025 Quazi made a change. He took a job in the finance industry with a firm that handles US retail stock trades. Today, Quazi works in quantitative finance (also known as quant finance); this field combines math, coding, and AI to help businesses and individuals make financial decisions. In this role, AI engineers such Quazi create computer models that predict stock prices, identify smart investment opportunities, or measure how risky a trade might be. "Quant finance offers a pretty rare combination: the complexity and intel-

lectual challenge that AI research also provides, but with a much faster pace," says Quazi. "I'll be able to see measurable impact in days, not months or years."[3]

The Work of an AI Engineer

AI engineers like Quazi use programming, data analysis, and specialized AI tools to design systems that help machines perform tasks, such as recognizing objects, understanding language, and predicting outcomes. They apply different techniques to create AI models and systems. One such example is machine learning. Machine learning is a method used by AI engineers to teach computers to learn from data and get better at tasks over time. Quazi's work in quant finance involves using machine learning to teach the computer to analyze financial data and predict stock trends.

> **"Quant finance offers a pretty rare combination: the complexity and intellectual challenge that AI research also provides, but with a much faster pace."[3]**
>
> **—Kairan Quazi, teen AI prodigy**

Another area that AI engineers may specialize in is computer vision**,** which is used to teach computers to "see" and understand images and videos. Self-driving cars use computer vision to recognize pedestrians, other vehicles, and road signs. Another area of AI involves large language models (LLMs). These are programs that can understand and generate human language. ChatGPT is an LLM. It can answer questions and interact with users in a way that sounds like a real person. Sometimes AI engineers focus on multiple areas at once. For example, when building a mobile app that can take a photo when a person smiles, AI engineers first use computer vision to help the app detect a face and then machine learning to make the app recognize a smile and take the photo.

AI systems are used in different ways. They can be narrow, meaning they focus on a single task, such as answering questions or filtering spam. They can also be generative, where they create new content, such as text, images, or music. In either case, it is the job of the engineer to develop systems that use data to make

decisions, recognize objects, generate and understand language, or a combination of these skills.

Building the Brains Behind AI

AI engineers design, develop, build, test, and update AI systems. Their focus is to use AI models to develop practical software that can solve problems or make predictions. For example, they could develop fraud-detection programs for banks. This type of program would recognize and alert the bank about unusual spending patterns in real time. For health care settings, AI engineers might create systems that help doctors identify early signs of disease that appear in medical scans. No matter what industry they work in, the goal is to build intelligent tools that make decisions and improve the way businesses or organizations operate.

To do this, AI engineers design algorithms, which are step-by-step instructions that tell a computer how to analyze data and respond to it. They also train models, which means feeding large amounts of data into a computer program so it can learn patterns and make predictions. AI engineers sometimes start from scratch, but more often they modify and update existing models using frameworks like TensorFlow or PyTorch, which provide prebuilt tools that work with the models.

Once an AI system is working, engineers must continue testing and improving it. They monitor how accurately it performs and adjust it by entering new data to make it "smarter" over time. For example, Netflix AI engineers created and continually update its computer models to study what viewers watch, skip, or rate highly. The models learn viewers' preferences and suggest shows or movies that they are likely to enjoy. The engineers modify the system to keep recommendations accurate and personalized. Their work allows Netflix to personalize each customer's experience and keep millions of viewers engaged. In the past, Netflix has reported that 80 percent of what people watch is discovered via the company's recommendation system, making the AI work vital to viewership.

AI in Space

Although AI engineers may not end up in space, their work just might. In 2025, Chinese AI engineers implemented an LLM named Wukong AI, which was used aboard China's Tiangong space station during in-orbit missions. Wukong AI is a chatbot with expertise in navigation and tactical planning. AI engineers trained it by inputting large datasets of aerospace flight data. It was used to support astronauts during a six-and-a-half-hour space walk, providing them with quick answers to technical questions and mission guidance.

This is not the only example of AI in space. AI engineers in the United States developed Astrobee, a free-flying robot system that uses AI. Astrobee was deployed in 2019 to help astronauts perform tasks on the International Space Station. In 2016, German AI engineers designed CIMON, an AI buddy that provides emotional support and information to astronauts. CIMON was sent to the International Space Station in 2018.

Machines That See

Some AI engineers specialize in computer vision and write computer code that tells the system how to process each image, breaking it down into shapes, colors, and patterns. They program models that can recognize objects, patterns, and movements. They train these models by inputting into the program massive numbers of pictures or videos, allowing the program to gradually learn what different images represent. AI engineers then integrate the trained models into real-world systems by connecting them to devices or software that use the data in real time. As an example, they might link, via programming, a computer vision model to a camera system in a self-driving car. Doing this enables the computer to recognize traffic lights, pedestrians, and road signs. It then quickly analyzes what it sees and tells the car's control system whether to brake, accelerate, or slow down.

AI engineers are adapting models for systems that have all sorts of practical uses. For example, researchers at the University of Florida developed drones equipped with cameras to take detailed photos of hemp crops. In 2023, AI engineers who worked on this project created systems that analyzed the images from the drones and determined plant size, health, and growth. This allowed the system to point out areas where plants were lacking nutrients or receiving more than they needed. Farmers used the

AI engineers develop sophisticated software that can solve problems and make predictions. In health care settings, that could involve AI that helps doctors identify early signs of disease that show up in medical scans.

information needed to make knowledgeable decisions about fertilizing the crops. This technology helps crops grow healthier and saves time, money, and resources.

In another example, AI engineers in Madhya Pradesh, known as the "Tiger State of India" because it has the highest tiger population in the country, are currently using computer vision to develop a system that will protect wildlife. The system the AI engineers are developing "will capture images of tigers, leopards, and other big animals, analyze the visuals, and instantly send alerts to train drivers about animal presence near tracks,"[4] explains project leader Saurabh Das. The engineers design and train the computer models that make this process possible. They program the AI to recognize the shapes and movements of large animals in the images collected by sensor-based cameras powered by solar energy or batteries. Once trained, the AI program can rapidly ana-

SOURCE NOTES

Introduction: The New Frontier

1. Quoted Anna Tong and Kenrick Cai, "OpenAI, Google and xAI Battle for Superstar AI Talent, Shelling Out Millions," Reuters, May 21, 2025. www.reuters.com.
2. Quoted in Daniel Daines-Hutt, "How a ZTM Student Became a Machine Learning Engineer," *Zero To Mastery Blog*, May 15, 2024. https://zerotomastery.io.

Chapter One: What Does an AI Engineer Do?

3. Quoted in *Economic Times,* "Who Is Kairan Quazi, the 16-Year-Old Bengali Techie Who Left Elon Musk's SpaceX to Become a 'Wolf of Wall Street,'" August 21, 2025. https://economictimes.indiatimes.
4. Quoted in Meenakshi Sharma, "Not Just Animal Instinct, AI Now to Protect MP's Wildlife," *Times of India,* August 19, 2025. https://timesofindia.indiatimes.com.
5. Quoted in Ioana Patringenaru and Daniel Kane, "This Bespoke AI Tutor Helps Students Learn," *UC San Diego Today,* May 15, 2025. https://today.ucsd.edu.

Chapter Two: How Do You Become an AI Engineer?

6. Jason Crandall, "How I Became an AI Engineer," Medium, November 14, 2024. https://medium.com.
7. Quoted in El Dorado High School, "El Dorado Aztecs Tackle Real-World Problems at AI Hackathon," Socorro Independent School District, June 5, 2025. www.sisd.net.
8. Quoted in Holly Wojcik, "Penn Engineering Launches First Ivy League Undergraduate Degree in Artificial Intelligence," *PennToday*, February 13, 2024. https://penntoday.upenn.edu.
9. Quoted in Canadian Broadcasting Corporation, "Why MIT Researcher Is Calling for 'Algorithmic Justice' Against AI Biases," May 12, 2025. www.cbc.ca.

Chapter Three: What Skills and Personal Qualities Matter Most—and Why?

10. Quoted in Byron Reese, "A Conversation with Sameer Maskey," *Voices in AI* (podcast), Episode 87, May 16, 2019. https://voicesinai.com.

INTERVIEW WITH AN AI ENGINEER

Kriti Goyal works as a machine learning engineer in Seattle. This interview was conducted by email.

Q. Why did you become an AI professional?

A. My family is one of doctors, and the path of medicine was laid out for me; it was noble, respected, and understood. The world of technology, of Silicon Valley, might as well have been on another planet. The turning point wasn't a grand plan; it was a video my cousin showed me from Code.org. It had all these tech legends—Mark Zuckerberg and Bill Gates—but the message was what struck me. It said that with code, you don't need permissions, a factory or massive capital. Just a laptop and an internet connection to turn ideas into reality. I saw early on through school and my internships that AI was going to be the great disruptor, and I knew I didn't want to be a spectator; I wanted to be in the driver's seat.

Q. What does your typical workday look like?

A. My day splits into three parts. First, mornings are for disciplined curiosity—not just skimming papers but connecting dots between breakthroughs and real problems we're solving. This isn't always directly productive, but it's where innovation begins. The second part is collaboration mode—aligning with teams upstream, downstream (clients), my team, and management. We're whiteboarding, debating design, clarifying assumptions, and translating high-level vision into a written blueprint. This phase is all about building consensus and clarity. The third part, my favorite, is building. It's the state of deep work and flow, where the real creation happens—turning abstract math and architectural docs into functional reality, products that millions interact with. Honestly, that feeling is the reason I got into this field in the first place.

FIND OUT MORE

AI4ALL
https://ai-4-all.org
AI4ALL is a nonprofit that works to increase diversity and inclusion in AI careers. The organization offers summer programs, mentors, internships, and online resources so that high school and college students can explore AI. Teens can also participate in virtual AI classes.

Association for the Advancement of Artificial Intelligence (AAAI)
www.aaai.org
The AAAI is a professional scientific organization that promotes research and advancement of AI. Its website provides information about conferences, publications about AI topics, and a job search engine. Teens can search and read about various AI news in the "AI Topics" section of the website.

Google AI
https://ai.google
Google AI provides Google's research and projects in AI. The website showcases its latest work in areas like machine learning, health, and climate. On this website, teens can read articles and learn how AI is being used in real-world applications. The site also provides links to free courses, such as its Introduction to Generative AI.

Khan Academy
www.khanacademy.org
Khan Academy offers free, interactive lessons in many subjects, including computer science, coding courses such as Python, and AI for education. Teens can take these courses at their own pace. The courses include lessons, quizzes, and videos.

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