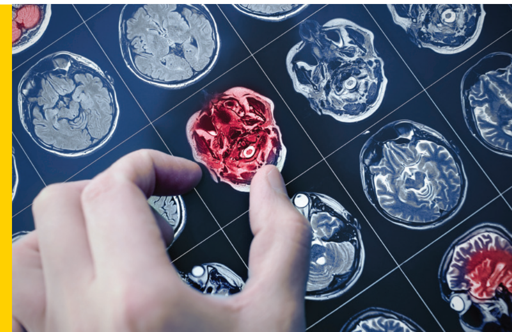
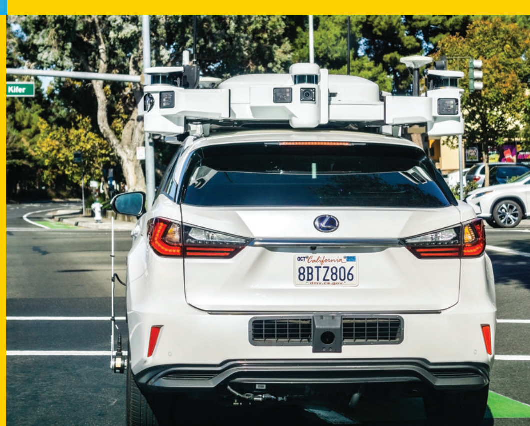
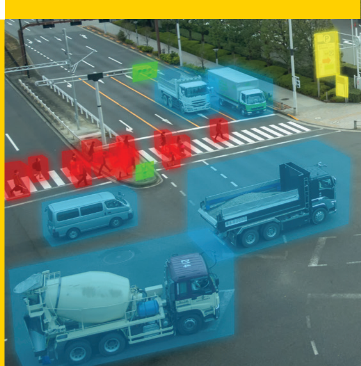
AI Career Pathways:

Put Yourself on the Right Track





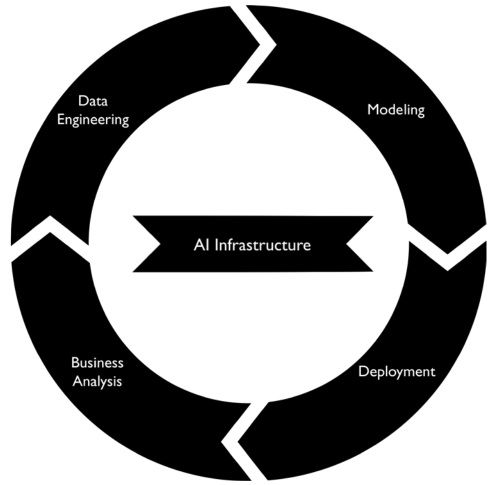


Workera is a deeplearning.ai company that helps data scientists, machine learning engineers, and software engineers meet their career goals by providing mentorship and top-quality job opportunities. Our mission is to make sure that every person, regardless of background, has the opportunity to achieve their fullest potential and fulfill their career goals in AI.

WORKERA

a deeplearning.ai company

Executive Summary

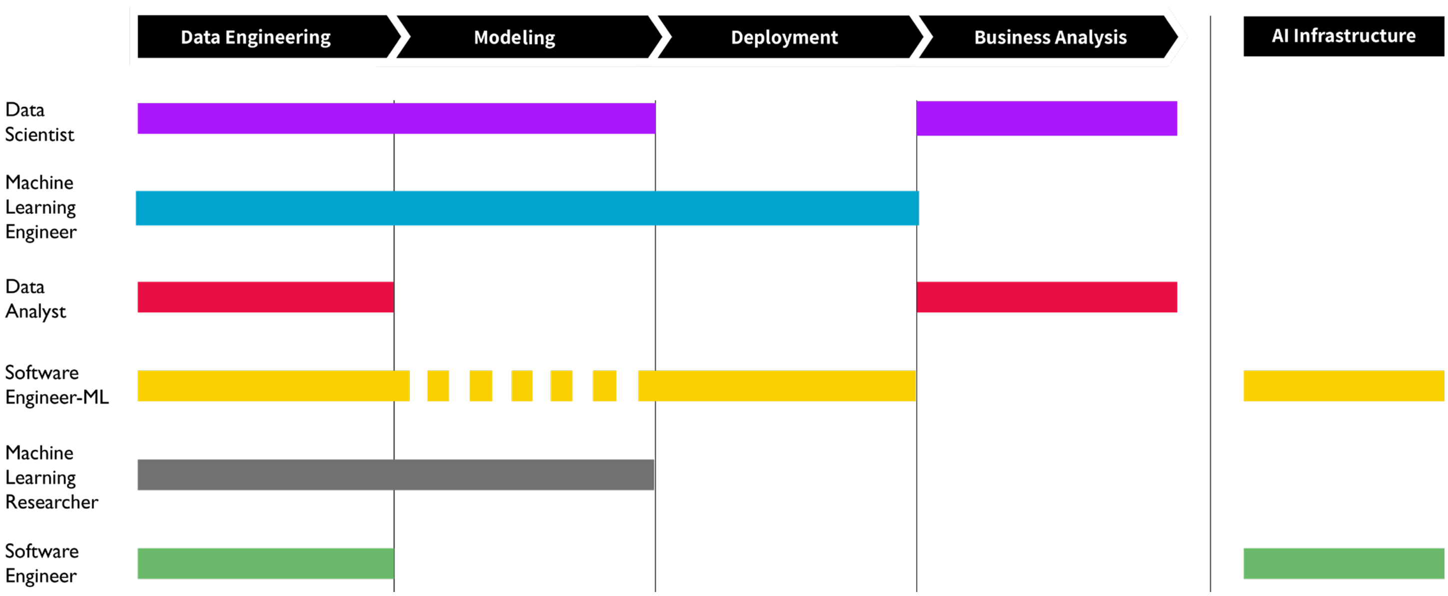


Developing an AI project development life cycle involves five distinct tasks:

- **Data engineering:** People responsible for data engineering prepare data and transform data into formats that other team members can use.
- **Modeling:** People assigned to modeling look for patterns in data that can help a company predict outcomes of various decisions, identify business risks and opportunities, or determine cause-and-effect relationships.
- **Deployment:** People in charge of deployment take a stream of data, combine it with a model, and test the integration before putting the model into production.
- **Business analysis:** Team members responsible for business analysis evaluate a deployed model's performance and business value and adjust accordingly to maximize benefit or abandon unproductive models.
- **AI infrastructure:** People who work in AI infrastructure build and maintain reliable, fast, secure, and scalable software systems to help people working in data engineering, modeling, deployment and business analysis.

Six basic roles perform these tasks.

No single individual has enough skills to carry out all tasks in AI project development. Thus, teams include individuals who focus on part of the cycle. Here is a visual representation of six technical roles and how they relate to various tasks:



Each role requires specific skills and knowledge.

People in charge of **data engineering** need strong coding and software engineering skills, ideally combined with machine learning skills to help them make good design decisions related to data. Most of the time, data engineering is done using database query languages such as SQL and object-oriented programming languages such as Python, C++, and Java. Big data tools such as Hadoop and Hive are also commonly used.

Modeling is usually programmed in Python, R, Matlab, C++, Java, or another language. It requires strong foundations in mathematics, data science, and machine learning. Deep learning skills are required by some organizations, especially those focusing on computer vision, natural language processing, or speech recognition.

People working in **deployment** need to write production code, possess strong back-end engineering skills (in Python, Java, C++, and the like), and understand cloud technologies (for example AWS, GCP, and Azure).

Team members working on **business analysis** need an understanding of mathematics and data science for analytics, as well as strong communication skills and business acumen. They sometimes use programming languages such as R, Python, and Tableau, although many tasks can be carried out in a spreadsheet, PowerPoint or Keynote, or an A/B testing software.

Working on **AI infrastructure** requires broad software engineering skills to write production code and understand cloud technologies.

CONTENTS

PART I

AI Organizations

Data Science vs. Machine Learning Organizations

We identified two types of organizations that use AI:

- **Data science organizations** help a firm's leaders make scientific or data-driven decisions to run their business more effectively. Team members collect data, analyze datasets, and suggest hypotheses and actions.

- **Machine learning organizations** automate tasks to reduce costs or scale products. The output is the automation itself achieved by collecting data, training models, and deploying them.

Although machine learning and data science organizations are different, companies often use the terms interchangeably. You can distinguish one from another by evaluating whether a given organization fits one of the descriptions above. Some companies have hybrid organizations that both make data science decisions and automate tasks. In this report, we will use the phrase "AI organization" when referring to DS, ML, or hybrid organizations.

PART 2

Tasks and skills for the AI development life cycle

AI organizations divide their work into data engineering, modeling, deployment, business analysis, and AI infrastructure. Together, these tasks make up the AI project development life cycle. Each task requires specific skills and can be the focus of multiple roles.

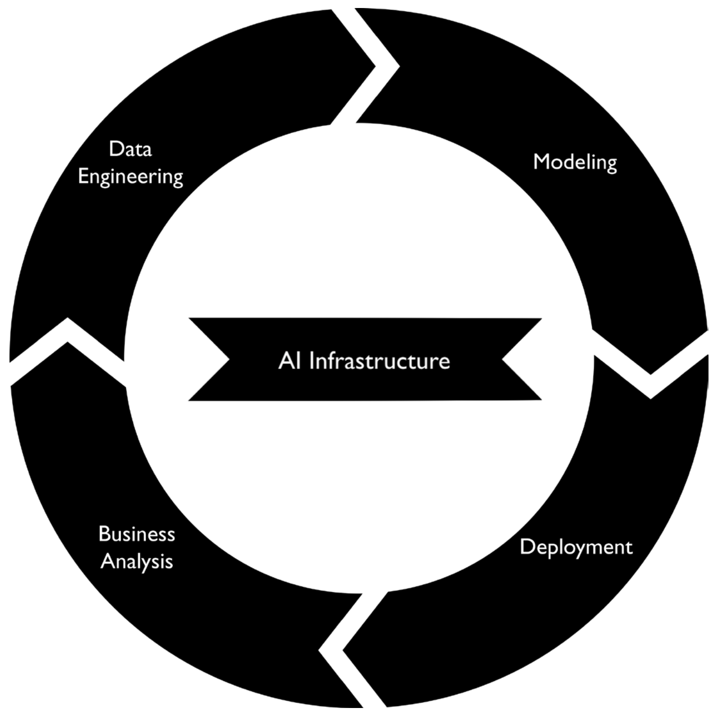
You can find brief descriptions of the skills mentioned in this report in the appendix.

We'll discuss the differences between project development life cycles for machine learning (ML) and data science (DS). Then, we'll look at the goals of each task, the skills needed to perform it, and which roles within an organization focus on which tasks.

Overview of the AI project development life cycle

Here's how the **AI project development life cycle** works.

First, someone prepares data for modeling. Then someone trains a model on this data. Once that happens, the model is delivered to the customer. Team members then analyze the model to determine whether it brought value to the business and/or the user. If all goes well, the cycle will repeat itself with new data, models, and analyses. All the while, people working in AI infrastructure build software to improve the cycle's efficiency.



The ML project development life cycle

An ML project starts with data about a service or product on which you fit models to be deployed into production. These models need to be monitored and their performance evaluated. The firm's AI infrastructure supports these tasks.

The DS project development life cycle

A DS project starts with data on which you can fit a model that can help the company or its client make actionable business decisions about products or services. The AI infrastructure supports all tasks involved.

Now let's consider the tasks in an AI project one by one. We will illustrate each task with concrete examples and identify the technical skills necessary to carry them out.

Data Engineering

Companies collect data and store it across a variety of databases and files. People responsible for data engineering prepare data and transform them into formats that other team members can use.

People who do this work need strong coding and software engineering skills, ideally combined with machine learning skills to help them make good design decisions related to data. Most of the time, data engineering is done using database query languages such as SQL and object-oriented programming languages such as Python, C++, or Java. Big data tools such as Hadoop and Hive are also commonly used.

Data engineering work includes:

Subtask	Examples	Skills involved
Defining data requirements	- Creating a data model - Defining the features of high-quality data - Defining the covariates to be collected to achieve a desired functionality - Providing feedback regarding the clarity and completeness of data requirements	Machine learning Business acumen Software engineering
Collecting data	- Setting up a Mechanical Turk project - Collecting data by manually taking images of cats - Coding a JavaScript tracker on a website to collect user data - Scraping the web and, if necessary, synchronizing data from different sources	Machine learning Software engineering
Labeling data	- Drawing bounding boxes on images - Building a labeling pipeline using Mechanical Turk - Writing a labeling tutorial for workers - Relabeling mislabeled data - Evaluate the labeling performance of workers	Machine learning Software engineering
Inspecting and cleaning data	- Replacing all non-usable structured data records by NaN using a Python library (e.g. pandas) - Converting a continuous feature into a categorical feature using bucketing - Reformatting a data set (for instance, converting images to jpeg and squaring them) - Cleaning a text dataset (for instance, removing special characters)	Machine learning Algorithmic coding
Augmenting data	- Writing a Python script using skimage to rotate, warp, translate, or blur images - Using test-time augmentation to reduce the variance of an algorithm - Synthesizing speech by overlaying distinct audio signals	Machine learning Algorithmic coding
Moving data and building data pipelines	- Writing a script to allow online learning for a model - Designing an ETL system - Writing a script to preprocess training data and send it as input to a model automatically - Writing a script to record model predictions in a database	Domain-specific (for instance, data query) languages
Querying data	- Pulling data from a database	Domain-specific (for instance, data query) languages
Tracing data	- Keeping track of data sources - Setting up a data version control system	Software engineering

Modeling

People assigned to modeling look for patterns in data that can help a company predict outcomes of various decisions, identify risks and opportunities, or determine cause-and-effect relationships. For example, a real estate model might take the size of a house, number of bedrooms, location, and age to predict a selling price.

Modeling is usually programmed in Python, R, Matlab, C++, Java, or another language. It requires strong foundations in mathematics, data science, and machine learning. Deep learning skills are required by some organizations, especially those focusing on computer vision, natural language processing, or speech recognition.

Modeling work includes:

Subtask	Examples	Skills involved
Training machine learning models	- Using one of the following methods: Linear Regression, Logistic Regression, Decision Trees, Random Forest, XGBoost, Support Vector Machines, K-means, K-Nearest Neighbors, Neural Networks, Principal Component Analysis, Naive Bayes Classifier, Lasso/Ridge regression, etc.	Machine learning Algorithmic coding Mathematics Data science
Fitting probabilistic or statistical models	- Fitting a probabilistic graphical model - Testing hypotheses via data experiments - Applying a dimensionality reduction on a dataset to facilitate model training or gather insights	Data science Algorithmic coding Mathematics
Training deep learning models	- Using deep learning for a domain-specific application such as fraud detection, text summarization, machine translation, speech recognition, or object classification, detection, or segmentation - Tuning hyperparameters involved in neural network optimization	Deep learning Algorithmic coding Mathematics Data science
Accelerating training	- Setting up code to train a model on multiple machines in parallel	Domain-specific languages (for instance, CUDA) Algorithmic coding
Defining evaluation metrics (usually also involves a data product manager)	- Choosing F1-score to evaluate a model's performance on a classification task - Implementing evaluation metrics such as accuracy, precision, recall, intersection over union, or mean average precision (mAP)	Machine learning Algorithmic coding Mathematics
Speeding up prediction time	- Applying techniques such as pruning, quantization, or compression to reduce memory requirements - Running inference speed vs. accuracy experiments on a model	Machine learning Algorithmic coding
Iterating over the virtuous cycle of machine learning projects: Idea, Code, Experiment	- Translating a business problem into a machine learning problem. For instance, depending on the quality and quantity of accessible data, an end-to-end network might lead to better results than a pipeline network - Implementing the three-step cycle of ideating with your team, coding to set up experiments, analyzing results	Machine learning Business acumen
Searching hyperparameters	- Organizing experiments to get results in the shortest time period - Setting up hyperparameter search experiments using tools such as AutoML	Machine learning Algorithmic coding
Keeping your knowledge up to date	- Reading research papers - Watching conference lectures or attending conferences	Research Mathematics Data science Machine learning

Deployment

Some AI team members are in charge of making a project available to users. They take a stream of data, combine it with a model, and test it before putting the model into production. People working in deployment need to be able to write production code that holds up to rigorous testing. They should possess strong back-end engineering skills in Python, Java, C++, or other languages and understand cloud technologies such as AWS, GCP, and Azure.

Deployment work includes:

Subtask	Examples	Skills involved
Converting prototyped code into production code	- Refactoring a repository's code - Minimizing duplicate code - Writing clean code to improve readability and consistency, for example, by following the PEP8 guidelines in Python	Software engineering
Setting up a cloud environment to deploy the model	- Mastering cloud tools and infrastructure provided by AWS, GCP, Azure, and the like - Preparing files (usually model architecture and parameters) for deployment	Software engineering
Branching (version control)	- Designing a branching workflow, and using development, staging and production branches - Participating in or leading code reviews	Software engineering
Improving response times and saving bandwidth	- Setting up load-balancing requirements with engineers in charge of AI Infrastructure	Software engineering
Encrypting files that store model parameters, architecture, and data	- Understanding encryption at a high level and leveraging existing functions	Software engineering
Building APIs for an application to use a model	- Setting up HTTP RESTful API services to facilitate communications between software components - Setting up authorization and authentication to access the API	Software engineering
Retraining machine learning models (lifelong learning)	- Monitoring changes in data distribution and staging model updates	Software engineering Machine learning
Fitting models on resource-constrained devices	- Pruning or quantizing a model so it fits memory requirements - Deploying a model on a mobile device using TensorFlow	Software engineering Machine learning

Business Analysis

Some team members evaluate a deployed model's performance and business value. They suggest or make changes to either increase benefit or abandon unproductive models.

Let's say a model is deployed to provide movie recommendations. User preferences and ratings are turned into data. People responsible for business analysis will use this data to evaluate the performance of the recommender system and how much value it creates for the client.

Employees assigned to business analysis need an understanding of mathematics and data science for analytics, as well as strong communication skills and business acumen. They sometimes use programming languages such as R, Python, and Tableau, although many tasks can be carried out in a spreadsheet, PowerPoint or Keynote, or an A/B testing software.

Business analysis work includes:

Subtask	Examples	Skills involved
Building data visualizations	- Visualizing high-dimensional data in lower dimensions using methods such as PCA or t-SNE - Building and presenting graphs produced using Tableau, ggplot or matplotlib - Building visualizations in JavaScript, HTML, or CSS	Domain-specific programming languages Data science Mathematics Business acumen
Building dashboards for business intelligence	- Writing a script that periodically notifies business leaders of trends in the data	Domain-specific programming languages Business acumen
Presenting technical work to clients or colleagues	- Preparing presentations (e.g., PowerPoints decks) - Communicating effectively with team members - Giving technical talks to present research outcomes	Communication Business acumen
Translating statistics into actionable business insights	- Making marketing decisions based on analysis of various sources	Data Science Business Acumen
Analyzing datasets	- Plotting a correlation matrix to analyze covariates - Computing statistical variables such as mean, variance, and mode - Segmenting customers into groups	Data science Algorithmic coding Mathematics
Running experiments to evaluate deployed models	- Working with the deployment team to evaluate business performance of a deployed model - Helping the deployment team make decisions - Translating model performance into business outcomes such as revenue	Data science Algorithmic coding
Running A/B tests	- Optimizing web pages - Evaluating systems in production	Data science Algorithmic coding Business acumen

AI Infrastructure

Employees who work in AI infrastructure build and maintain reliable, fast, secure, and scalable software systems to help people working in data engineering, modeling, deployment, and business analysis. They build the infrastructure that supports the project.

Continuing with the example of a movie recommender, someone in AI infrastructure would ensure that the recommender system is available 24/7 for global users, that the underlying model is stored securely, and that user interactions with the model on the website can be tracked reliably.

Working on AI infrastructure requires strong and broad software engineering skills to write production code and understand cloud technologies such as AWS, GCP, and Azure.

AI infrastructure work includes:

Subtask	Examples	Skills involved
Making software design decisions	- Reducing latency by locating a model close to data	Software engineering
Building distributed storage and data-base systems	- Building databases (SQL, NoSQL, MySQL, Cassandra, etc.) to store data and facilitating access by other team members	Software engineering Domain-specific languages
Designing for scale	- Adding GPU compute or storage as needed	Software engineering
Maintaining software infrastructure	- Managing software upgrades and driving stability through automated monitoring and alerting	Software engineering
Networking	- Controlling access to all infrastructure elements	Software engineering
Securing data and models	- Building security features that allow for production deployments into regulated organizations, satisfying the needs for privacy and security	Software engineering
Writing tests	- Writing unit and functional tests for multiple components across tasks of the AI project life cycle	Software engineering
Carrying out various software tasks	- Building a labeling program, A/B testing framework, or analysis environment	Software engineering

PART 3

The roles of an AI team

Sometimes there's a mismatch between the skills of people who want to work in AI and requirements of hiring managers. To help you close this gap, we will explain the different roles of an AI team, their skill sets, and the tasks they focus on.

The Six Roles of an AI Team

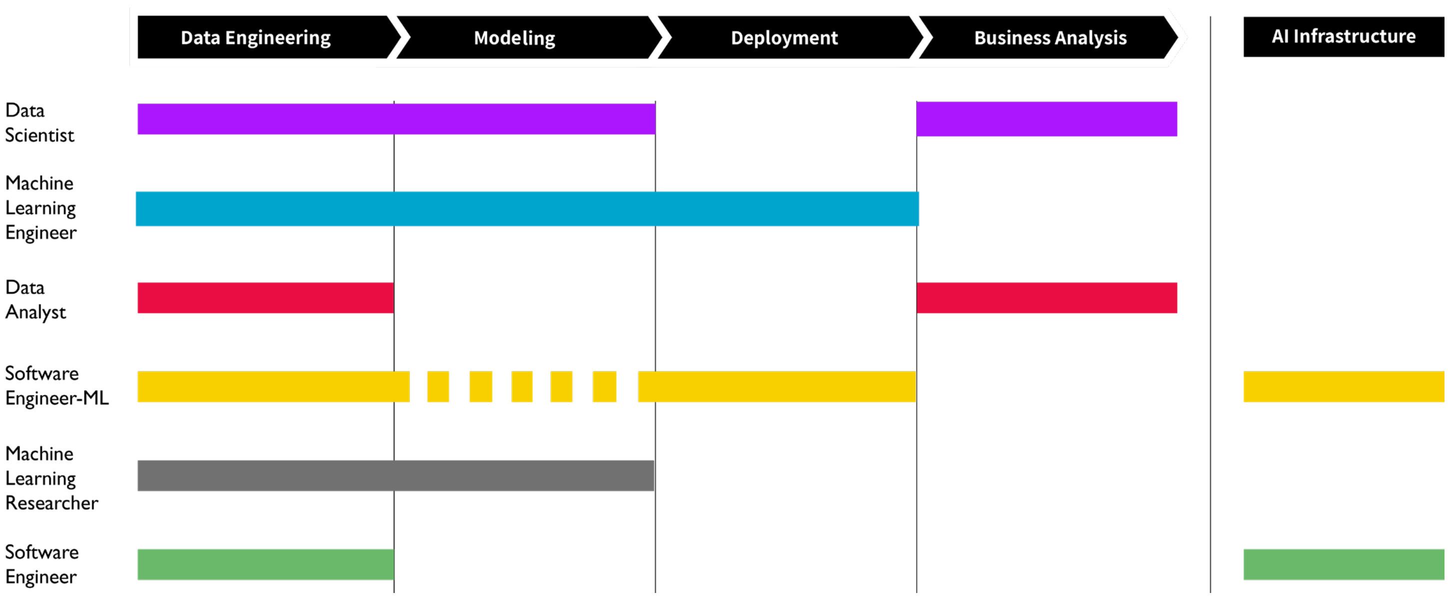
Our research highlighted six technical roles, each with a distinct skill set and focus area. Each role performs a number of tasks in the AI development cycle.

Data is at the core of all these tasks. Everyone working on an AI project needs to know how to prepare data. If not, then the project can become vulnerable to bottlenecks that may slow down the AI development cycle. Understanding how to access and prepare data will make you more valuable to your team and its clients.

In all the companies we researched, people perform several tasks within the cycle. This can be a very efficient way to work because one person can work around potential bottlenecks. For instance, if you were building a movie recommender and it didn't perform well for teenagers, a common fix would be to train your model on more data from teenagers. If you can access and prepare the data as well as train the model, the development cycle will move faster.

Nonetheless, few people have all the skills required to handle the full cycle.

For each role, we list the tasks it may carry out and the skills and tools necessary to achieve those tasks.



Data Scientist

Data scientists carry out data engineering, modeling, and business analysis tasks as shown in Figure 1. Their skills complement those of people who deploy models and build software infrastructure.

Data scientists demonstrate solid scientific foundations as well as business acumen (see Figure 2). Communication skills are usually required, but the level depends on the team.

Companies may refer to this position as data scientist, data analyst, machine learning engineer, research scientist, statistician, quantitative analyst, full-stack data scientist, and other titles.

TASKS

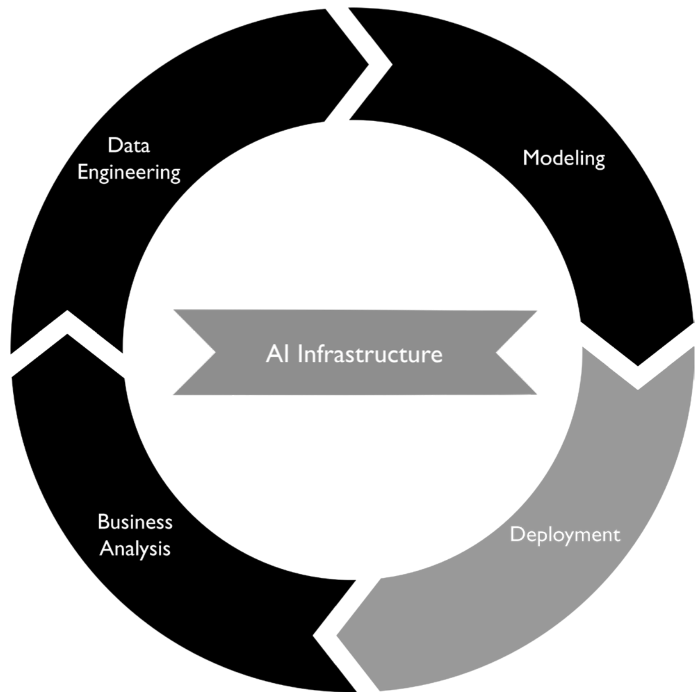


Figure 1. A visual representation of the data scientist's focus within the AI project development lifecycle.

SKILLS

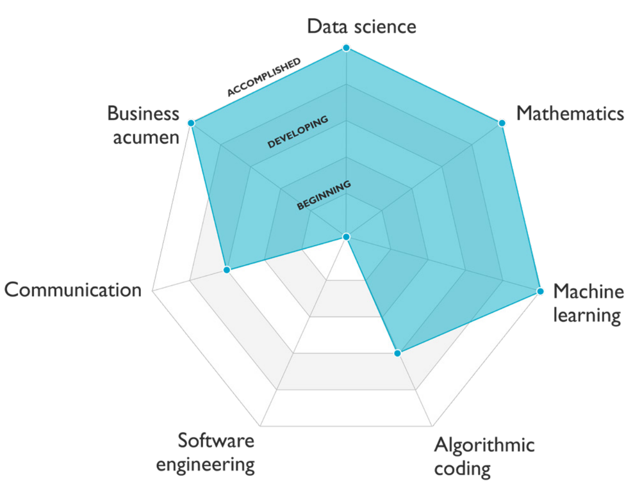


Figure 2. A visual representation of the data scientist's skill set and level of proficiency.

TOOLS

- **Modeling** in Python using packages such as numpy, scikit-learn, TensorFlow, and PyTorch
- **Data engineering** in Python and/or SQL or other domain-specific query languages
- **Business analysis** in Python, R, other domain-specific tools such as Tableau or Excel, or presentation software applications such as PowerPoint or Keynote
- **Collaboration and workflow** using a version control system such as Git, Subversion, or Mercurial along with a command line interface (CLI) such as Unix and an integrated development environment (IDE) such as Jupyter Notebook or Sublime

Data Analyst

Data analysts carry out data engineering and business analysis tasks as shown in Figure 1. Their skills complement those of people who train models, deploy them, and build software infrastructure.

Data analysts demonstrate solid analytical skills as well as business acumen (see Figure 2). They are accomplished in query languages such as SQL and commonly use spreadsheet software tools. However, they don't need algorithmic coding skills. Communication skills are usually required, but the level depends on the team.

Companies may refer to the data analyst position as data scientist, research scientist, business analyst, risk analyst, marketing analyst, and other titles.

TASKS

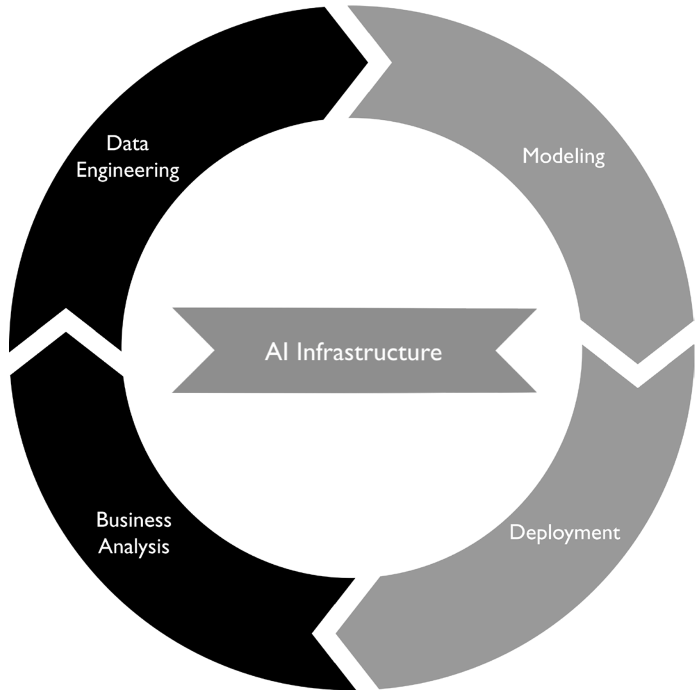


Figure 1. A visual representation of the data analyst's focus within the AI project development lifecycle.

SKILLS

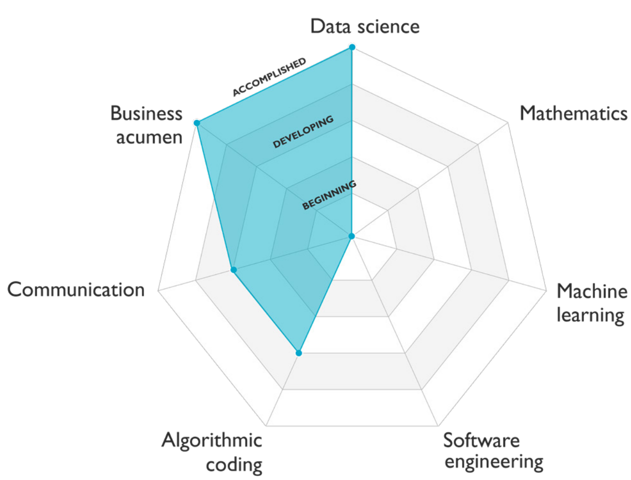


Figure 2. A visual representation of the data analyst's skill set and level of proficiency.

TOOLS

- **Data engineering** in Python and/or SQL or other domain-specific query languages
- **Business analysis** in Python, R, other domain-specific tools such as Tableau and Excel, presentation software applications such as PowerPoint and Keynote, and external software services for A/B testing

Machine Learning Engineer

Machine learning engineers carry out data engineering, modeling, and deployment tasks as shown in Figure 1. They achieve their fullest potential in teams able to support them with business analyses and AI infrastructure.

Machine learning engineers demonstrate solid scientific and engineering skills (see Figure 2). Communication skills requirements vary among teams.

Companies may refer to this position as machine learning engineer, software engineer-machine learning, software engineer, data scientist, algorithm engineer, research scientist, research engineer, full-stack data scientist, and many more titles.

A variant of machine learning engineer is called deep learning engineer. This role requires deep learning knowledge in addition to the skills profile presented in Figure 1. It focuses on applications, usually powered by deep learning, such as speech recognition, natural language processing, and computer vision. Hence, it requires skills specific to deep learning projects such as understanding and using various neural network architectures such as fully connected networks, CNNs, and RNNs.

TASKS

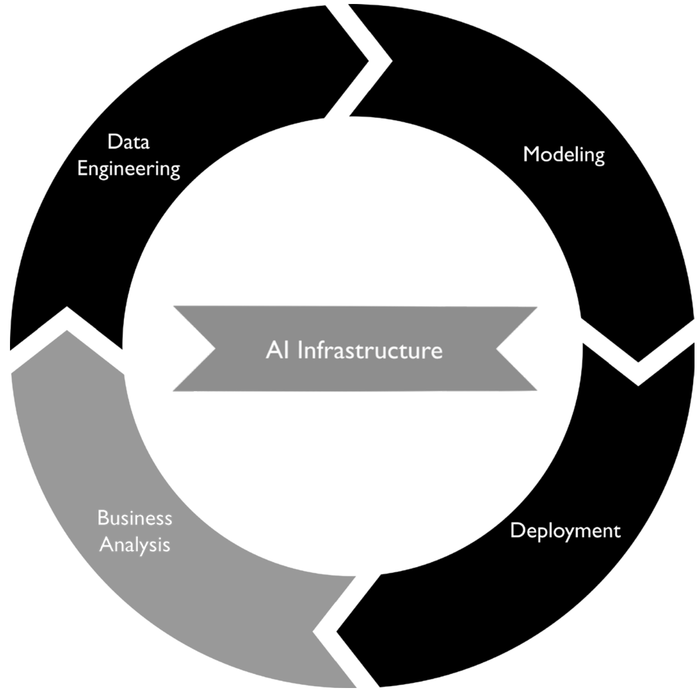


Figure 1. A visual representation of the machine learning engineer's focus within the AI project development lifecycle.

SKILLS

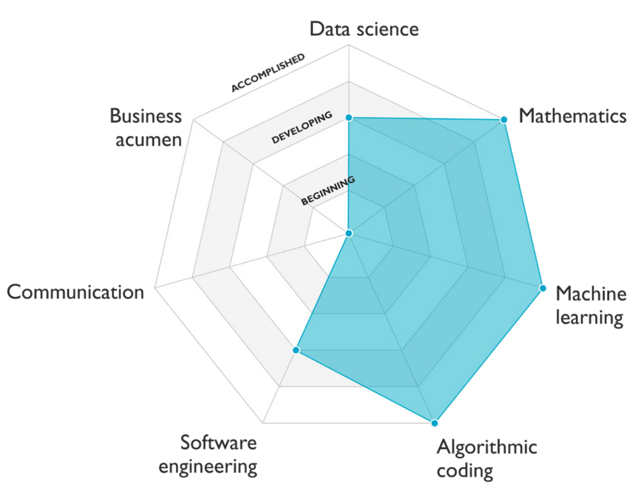


Figure 2. A visual representation of the machine learning engineer's skill set and level of proficiency.

TOOLS

- **Data Engineering** in Python and/or SQL or other domain-specific query languages
- **Modeling** in Python using packages such as numpy, scikit-learn, TensorFlow, and PyTorch
- **Deployment** using an object-oriented programming language (such as Python, and Java, C++,) and cloud technologies such as AWS, GCP, and Azure
- **Collaboration and workflow** using a version control system (for instance, Git, Subversion, and Mercurial), a command line interface (CLI) like Unix, an integrated development environment (IDE) such as Jupyter Notebook, and Sublime, and an issue tracking product like JIRA

Machine Learning Researcher

Machine learning researchers carry out data engineering and modeling tasks as shown in Figure 1. They achieve their fullest potential in a research environment, supported by teams in charge of deployment, business analyses and AI infrastructure.

The machine learning researcher demonstrates outstanding scientific skills (see Figure 2). Communication skills requirements vary among teams.

Companies may refer to this position as machine learning researcher, research scientist, research engineer, data scientist, and many other titles.

A variant of machine learning researcher is called deep learning researcher. This role requires deep learning knowledge in addition to the skills profile presented in Figure 1. It focuses on applications, usually powered by deep learning, such as speech recognition, natural language processing, and computer vision. Hence, it requires skills specific to deep learning projects such as understanding and using various neural network architectures such as fully connected networks, CNNs, and RNNs.

SKILLS

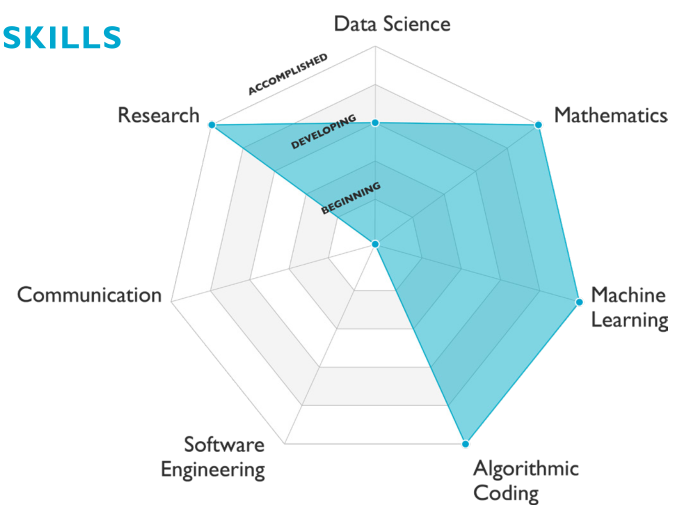


Figure 2. A visual representation of the machine learning researcher's skill set and level of proficiency.

Although it's not represented on Figure 1, some machine learning researchers focus on deployment (for instance life-long learning, model memory, or optimization for edge deployment) and AI infrastructure (such as distributed training, scheduling, experiment, and resource management).

TASKS

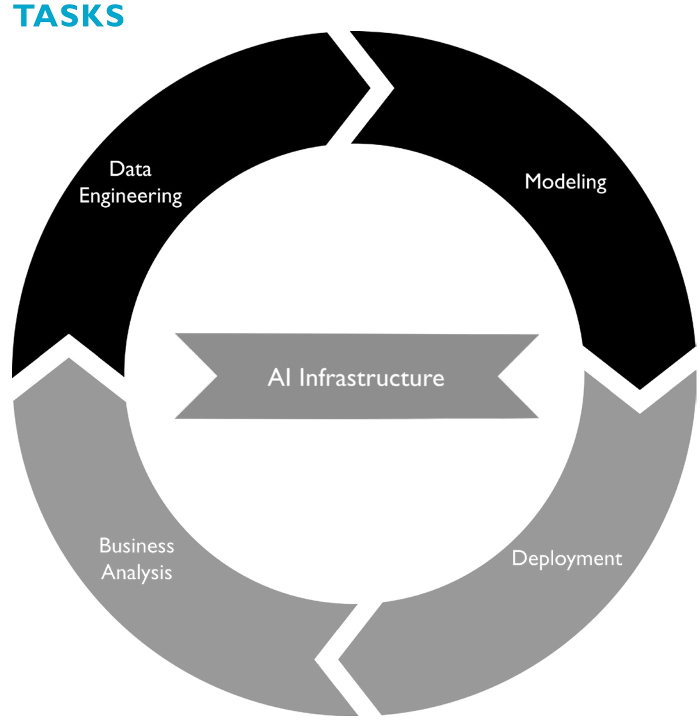


Figure 1. A visual representation of the machine learning researcher's focus within the AI project development lifecycle.

TOOLS

- **Data Engineering** in Python and/or SQL (or other domain-specific query languages)
- **Modeling** in Python using packages such as numpy, scikit-learn, TensorFlow, PyTorch, and the like
- **Collaboration and workflow** using a version control system like Git, Subversion, and Mercurial, a command line interface (CLI) like Unix, an integrated development environment (IDE) such as Jupyter Notebook or Sublime, and an issue tracking product like JIRA
- **Research** by following updates via channels such as Twitter, Reddit, Arxiv, and conferences such as NeurIPS, ICLR, ICML, CVPR, and ACM

Software Engineer-Machine Learning

People who have the title software engineer-machine learning carries out data engineering, modeling, deployment and AI infrastructure tasks as shown in Figure 1. They work well with scientists, analysts and researchers who take charge of business analysis and modeling. The software engineer-machine learning is also the go-to role for early-stage teams or start-ups aiming to deploy machine learning models. Such a versatile individual fits well in start-ups, where engineers tend to carry out a variety of tasks.

This one-person team is an alternative to the team combining a software engineer with a data scientist and/or a machine learning engineer. The latter format is most common for teams working on more mature machine learning projects such as improving an existing machine learning model in production. Also, it is easier to find people to fill this role than to find machine learning engineers, and it is less costly and quicker to fill a single position than to hire a data scientist plus a software engineer.

The software engineer-machine learning demonstrates solid engineering skills and is developing scientific skills (see Figure 2). Communication skills requirements vary among teams.

Companies may refer to this position as machine learning engineer, software engineer, full-stack data scientist, and many more titles.

SKILLS

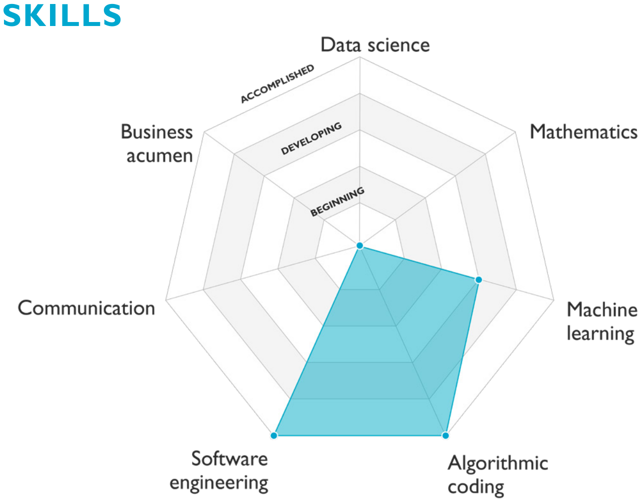


Figure 2. A visual representation of the software engineer-machine learning's skill set and level of proficiency.

A variant of software engineer-machine learning is called software engineer-deep learning. This role requires deep learning knowledge in addition to the skills profile presented Figure 1. It focuses on applications, usually powered by deep learning, such as speech recognition, natural language processing, and computer vision. Hence, it requires skills specific to deep learning projects such as understanding and using various neural network architectures such as fully connected networks, CNNs, and RNNs.

TASKS

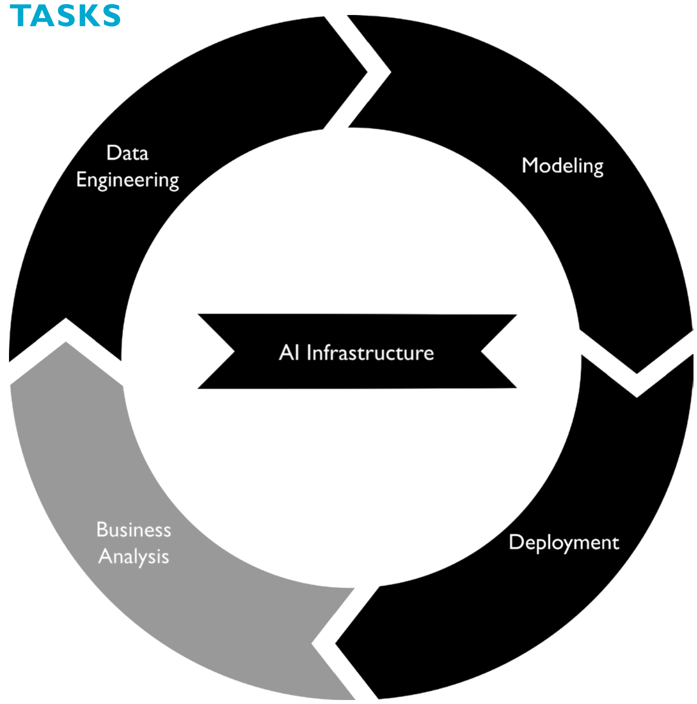


Figure 1. A visual representation of the software engineer-machine learning's focus within the AI project development lifecycle.

TOOLS

- **Modeling** in Python using packages such as numpy, scikit-learn, TensorFlow, and PyTorch
- **Data engineering** in Python and/or SQL (or other domain-specific query languages)
- **Deployment and AI infrastructure** using an object-oriented programming language such as Python, Java, or C++ and cloud technologies such as AWS, GCP, or Azure
- **Collaboration and workflow** using a version control system like Git, Subversion, or Mercurial, a command line interface (CLI) like Unix, an integrated development environment (IDE) like Jupyter Notebook or Sublime, and an issue tracking product such as JIRA

Software Engineer

Software engineers carry out data engineering and AI infrastructure tasks as shown in Figure 1. They work well with people in charge of modeling, deployment, business analyses.

Software engineers demonstrate outstanding coding and software engineering skills (see Figure 2). Communication skills requirements vary among teams.

Companies may refer to this position as data engineer, software engineer, software development engineer, software engineer-AI Infrastructure, software engineer-data.

TASKS

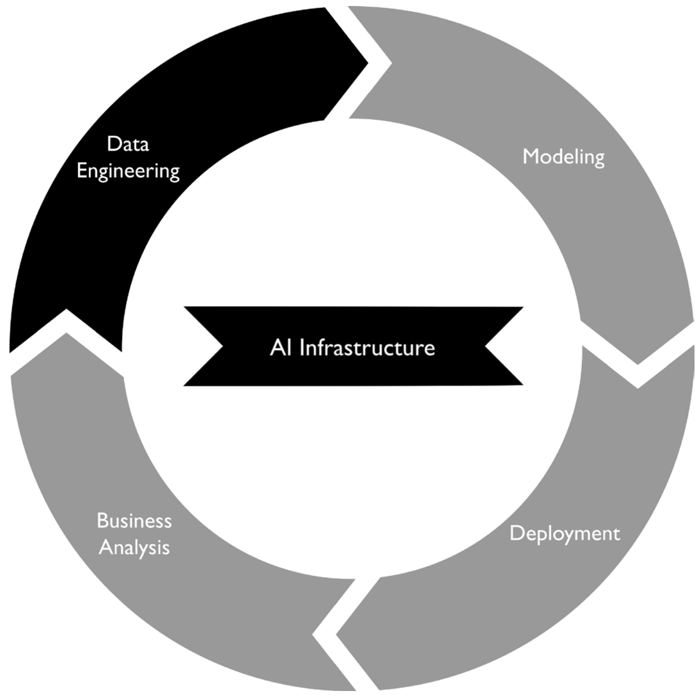


Figure 1. A visual representation of the software engineer's focus within the AI project development lifecycle.

SKILLS

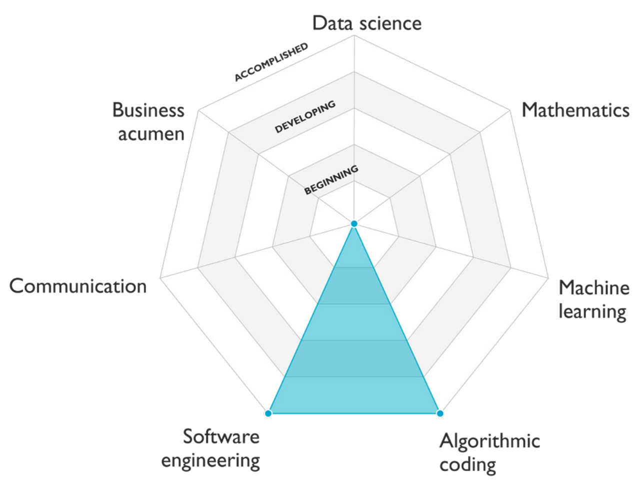


Figure 2. A visual representation of the software engineer's skill set and level of proficiency.

TOOLS

- **Data engineering** in Python and/or SQL (or other domain-specific query languages)
- **AI infrastructure** using an object-oriented programming language such as Python, Java, or C++ and cloud technologies such as AWS, GCP, and Azure
- **Collaboration and workflow** using a version control system like Git, Subversion, or Mercurial, a command line interface (CLI) like Unix, an integrated development environment (IDE) like Jupyter Notebook and Sublime, and an issue tracking product like JIRA

Appendix: Defining the Skills

Here is a short description of the skills mentioned in the report.

Machine learning
People with machine learning skills demonstrate the ability to use classic machine learning models (for example, PCA, K-means, K-NNs, SVM, Logistic Regression, Linear Regression, and Decision Tree learning), methods to train them (such as initialization, optimization, regularization, and hyperparameter tuning), and techniques to strategize machine learning projects.

Deep learning
People with deep learning skills demonstrate the ability to use classic deep learning models (such as fully connected networks, convolutional neural networks, recurrent neural networks, and layers), methods to train them (such as initialization, regularization, optimization, and transfer learning), and techniques to strategize deep learning projects.

Data science
People with data science skills demonstrate the ability to use probabilities (including distributions, conditional probabilities, independence, Bayes theorem, etc.), statistics (including hypothesis testing, bias/variance tradeoffs, mean, variance, and mode) and data analysis (including preprocessing, visualization and metrics such as accuracy, R-squared, residuals, precision, and recall).

Mathematics
People with mathematics skills demonstrate the ability to solve problems using linear algebra (for instance, matrix vector operations, eigenvalues, eigenvectors, and combinatorics), calculus (derivatives, integrals, and so on) and mathematical functions (simple functions, min/max/argmin/argmax, and so on).

Algorithmic coding
People with algorithmic coding skills demonstrate the ability to understand algorithms written with code, implement classic algorithms like sorting and search, and use classic data structures like trees, dictionaries and arrays.

Software engineering
People with software engineering skills demonstrate the ability to use a variety of computer science and software methods such as object-oriented programming, internet protocols, HTTP requests, agile/scrum methodologies, databases, version control (such as Git), containers, and unit testing.

Conclusion

The world needs engineers and scientists to build the future. In fact, all roles defined in this report are in significant shortage as of 2020. Make your move!

This report aims to clarify what AI organizations are, what tasks you will work on, and the existing career tracks. It can help learners around the world choose a career track that matches their skills, background, and aspirations. We hope that it helps you, too, in your learning journey and professional development.

AI organizations are constantly evolving, so this report is a work in progress. We intend to revise it as our team learns more about the supply of and demand for AI talent.

We welcome your feedback. Please send comments and/or questions to Kian Katanforoosh (kian@workera.ai).

- The Workera team

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