Navigating The Cloud and AI/ML Landscape:

Understanding Core Technologies and Recruitment Trends

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- Cloud and DevOps Engineer @ Singapore (2023 - present)
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- Community Involvement:
  - Google Developer Expert Cloud - Modern Architecture
  - AWS Container Hero
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  - University of Texas at Austin, Computer Science
  - Universitas Gadjah Mada, Software Engineering
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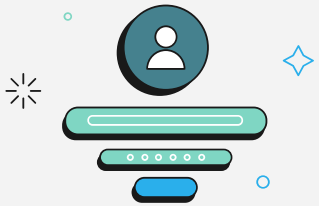

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01 The **rapid evolution** of Cloud Computing and Artificial Intelligence/Machine Learning (AI/ML) in modern enterprise environments.

02 The **critical role** of AI/ML in automating processes, enhancing analytics, and improving decision-making capabilities.

03 Why understanding cloud-native technologies and AI/ML frameworks is **essential** for engineers, data scientists, and IT professionals.

04 Objectives of this presentation:

- In-depth analysis of cloud computing architectures and AI/ML frameworks.
- Emerging trends and their real-world applications.
- Recruitment trends, high-demand job roles, and required skill sets in the industry.

History of Clouds

1980s : On-premise servers

You own everything

2000 : Data centers

Colocation center
You pay for the hardware
You manage
You rent the space

2006 : Virtualization

You control & configure virtual machines
You rent hardware & space
Pay for what you provision

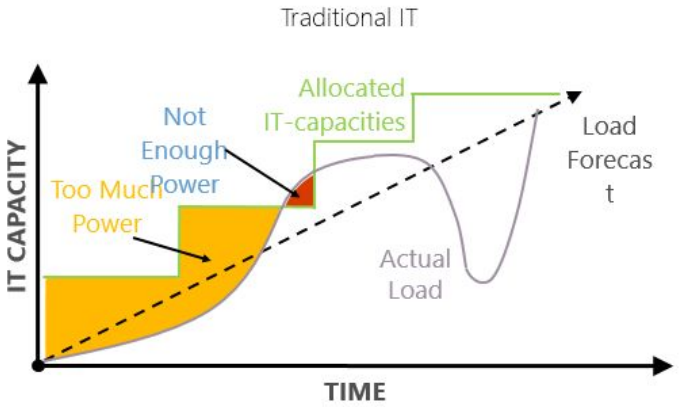
2009 : Managed service

Completely managed by cloud provider
Pay for what you use

IT Traditional Investment

Agility

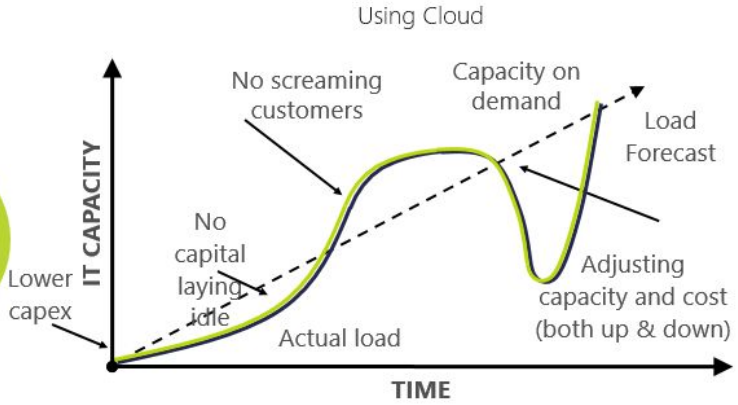
Scale



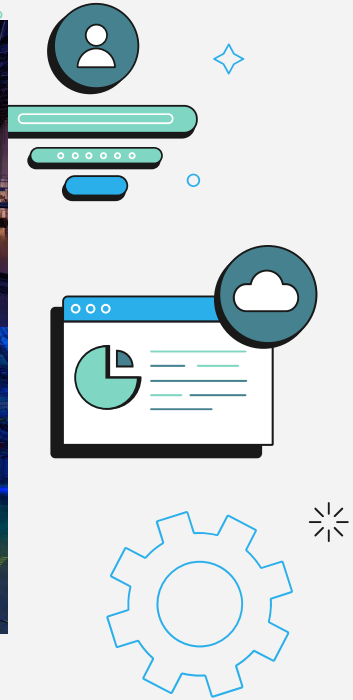
Cloud Computing Model

Agility

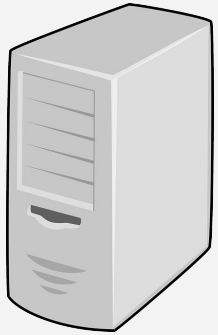
Scale



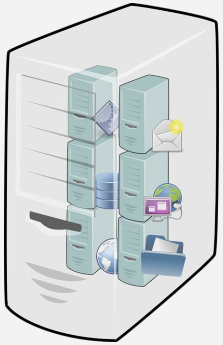
Core Cloud Computing Technologies



A virtual machine is a software-based computer

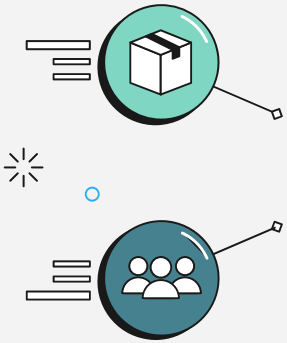


Physical
Computer

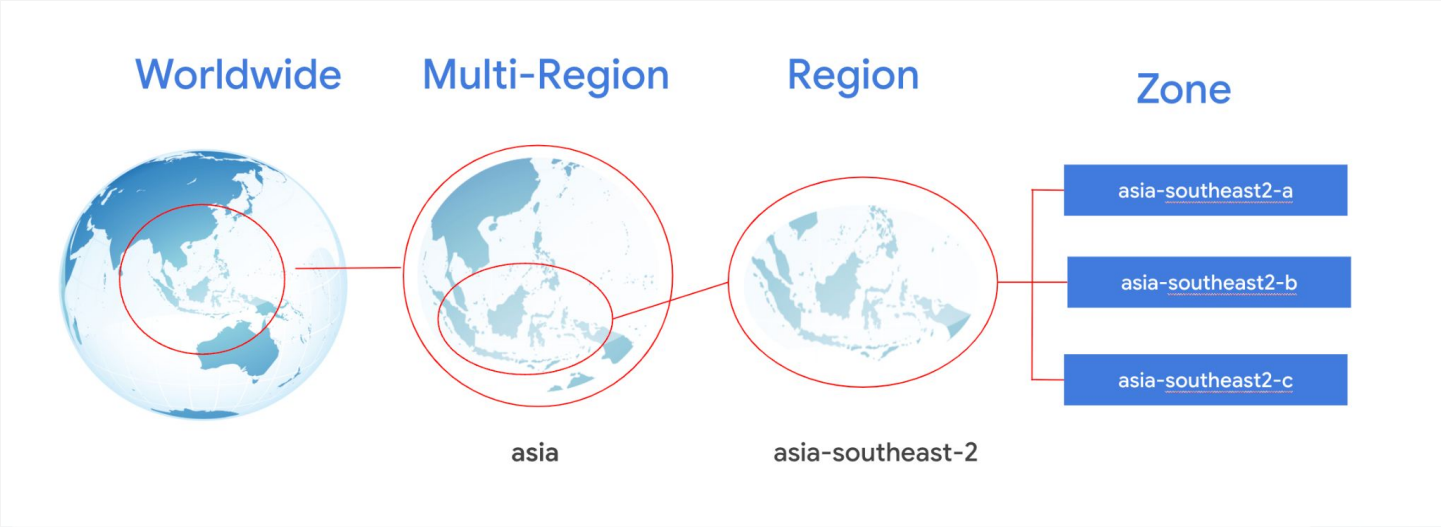


Virtual Machines in a
Physical Computer

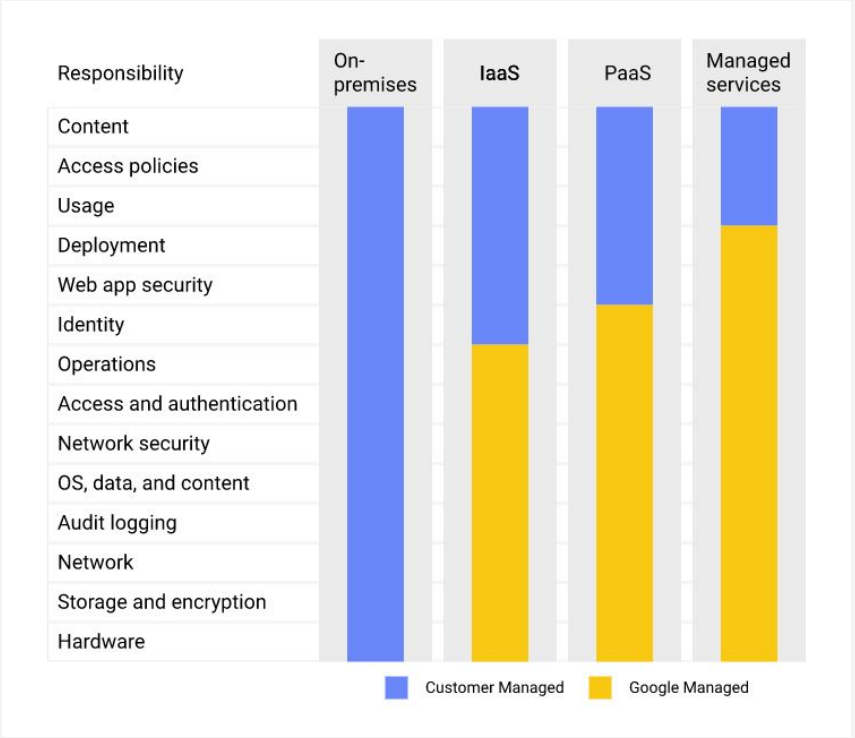
Cloud Computing



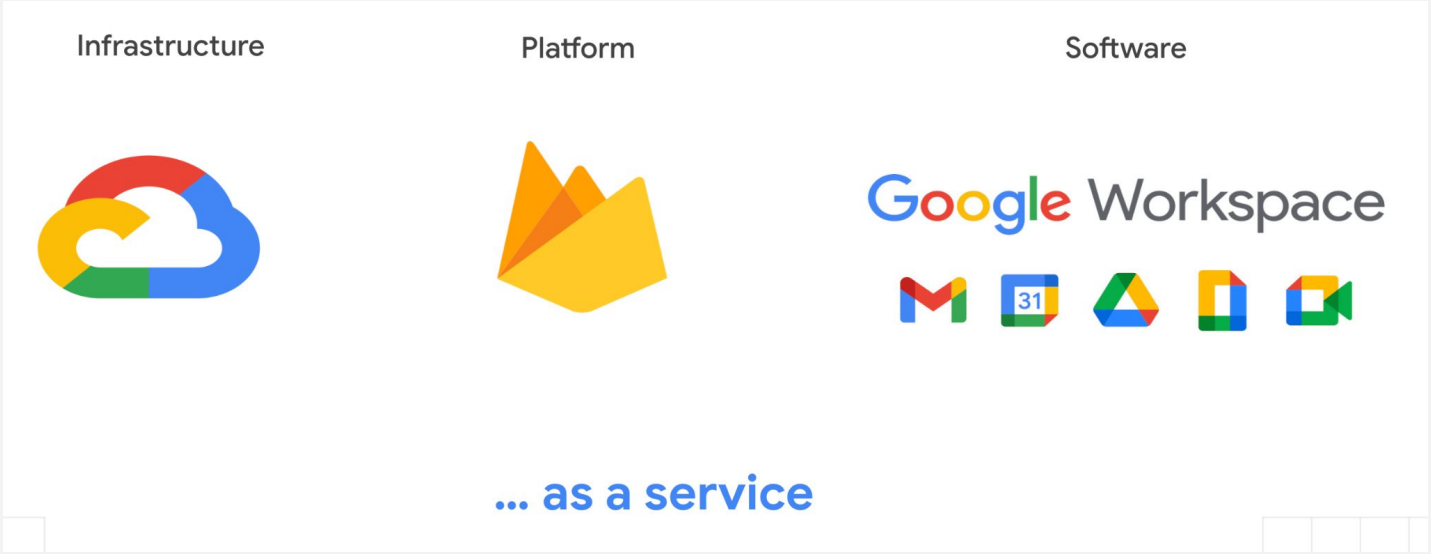
Jakarta region



Cloud Model


Responsibility
On-premises
IaaS
PaaS
Managed services
Content
Access policies
Usage
Deployment
Web app security
Identity
Operations
Access and authentication
Network security
OS, data, and content
Audit logging
Network
Storage and encryption
Hardware
Customer Managed
Google Managed

Cloud Model


Infrastructure
Platform
Software
Google Workspace
31
... as a service

Cloud Benefits

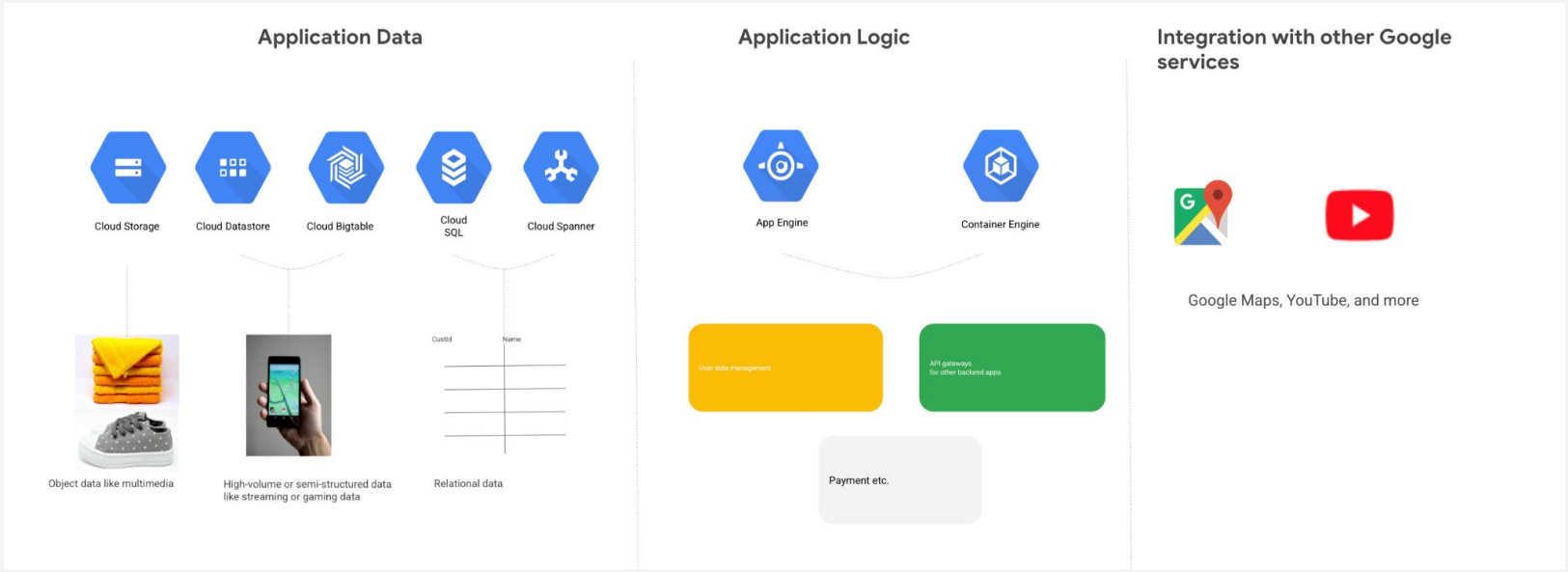
Cost savings

Scalability

Security

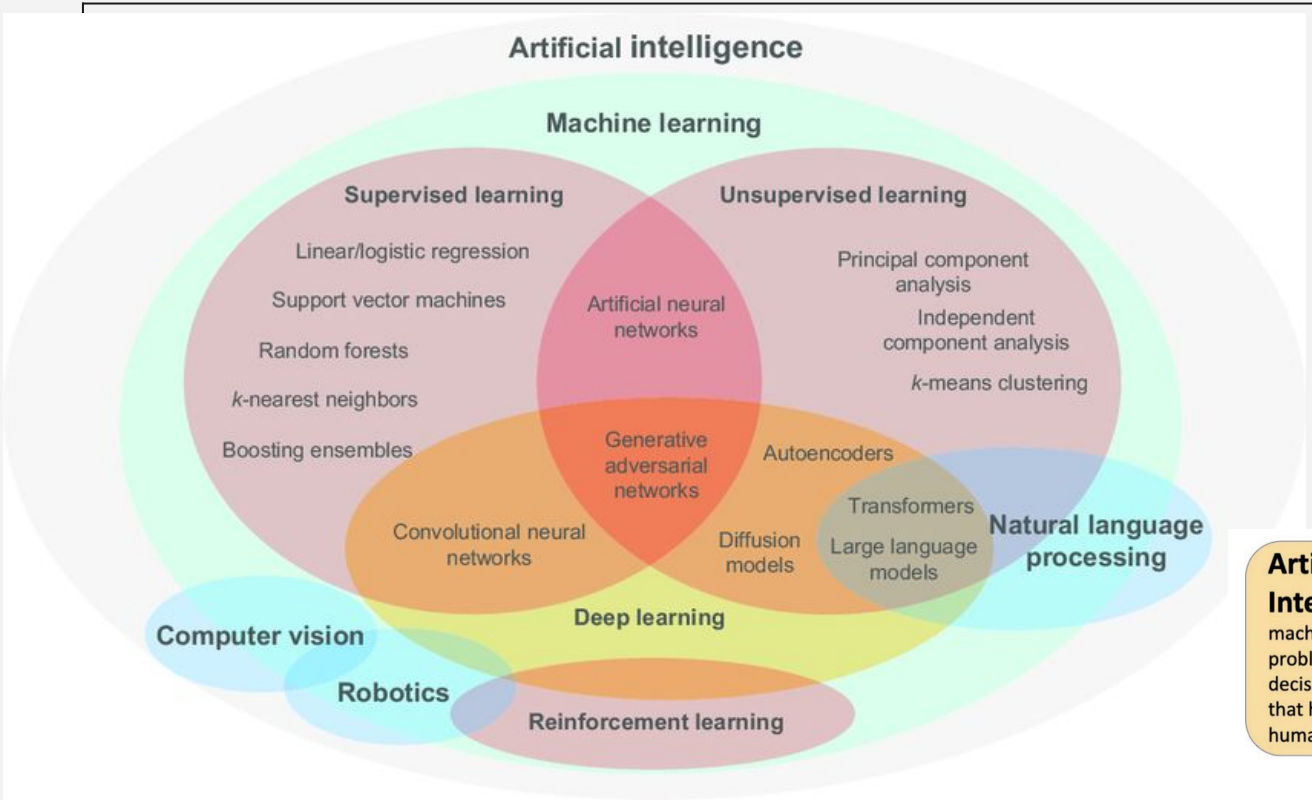
Reliability

No need to managed your own infrastructure. Use managed service instead



AI/ML Landscape Overview

- AI/ML adoption across industries such as **finance, healthcare, retail, cybersecurity, and automation**.
- Evolution of AI:
  - **Narrow AI:** Task-specific AI applications (chatbots, recommendation engines).
  - **Generative AI**: LLMs (GPT, Llama, Claude), image generation (Stable Diffusion, DALL-E).
  - **Autonomous AI:** AI-driven decision-making, reinforcement learning, robotics.
- AI/ML platforms by cloud providers:
  - **AWS SageMaker** for ML model training and deployment.
  - **GCP Vertex AI** for end-to-end ML workflow automation.
  - **Azure ML for enterprise** AI applications and deep learning models.



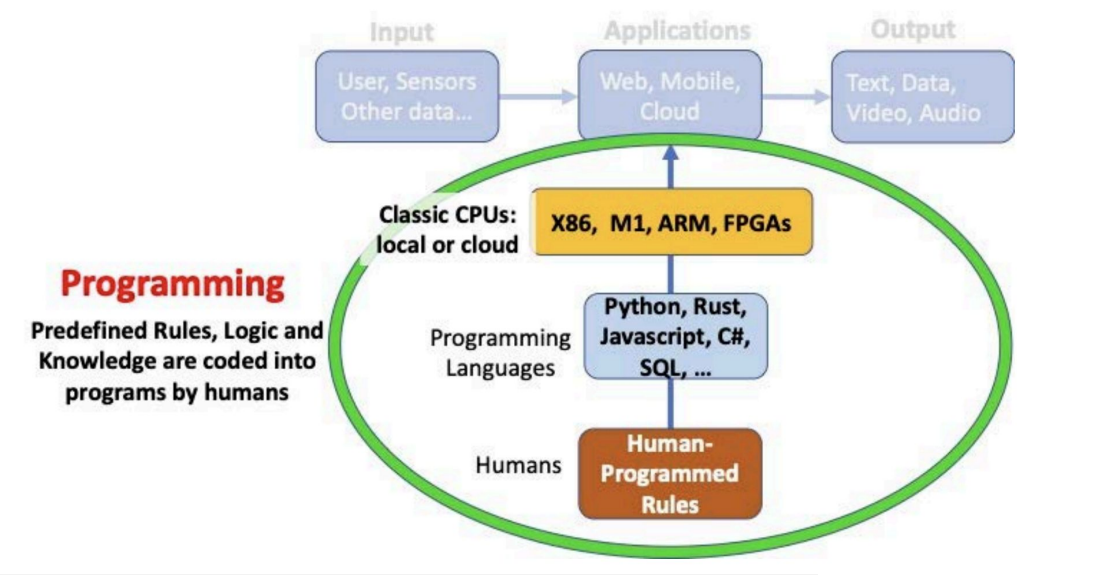
Artificial Intelligence Intelligent machines" which can solve problems, make/suggest decisions and perform tasks that have traditionally required humans to solve

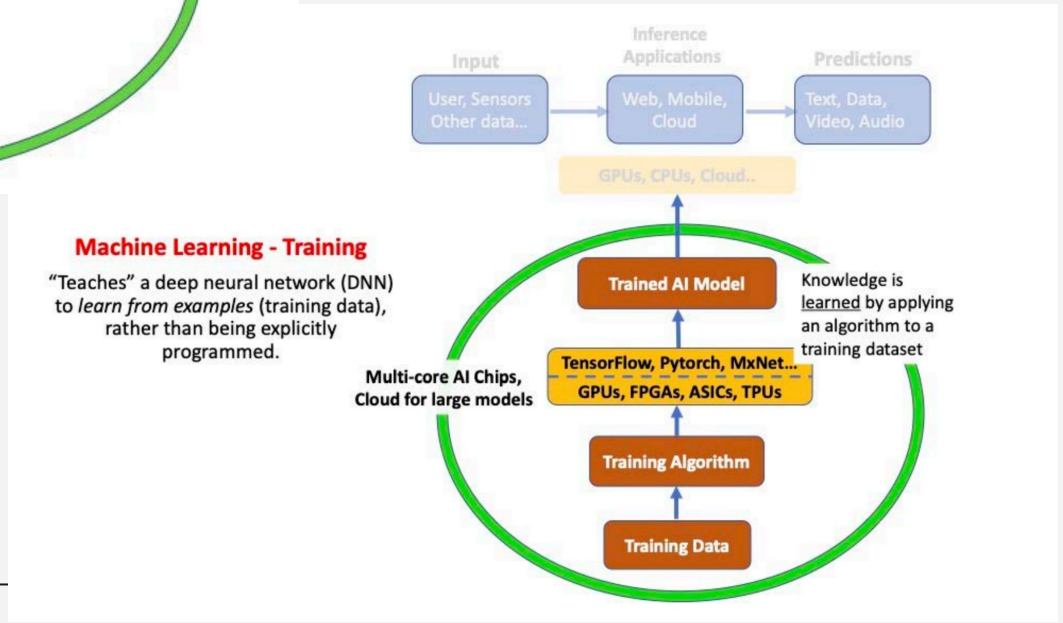
Machine Learning

A subset of Artificial Intelligence Algorithms which learn without being explicitly programmed with rules. Use data to *learn and match patterns*

Deep Learning/Neural Nets

A subset of machine learning
Uses a *Deep Neural Network (DNN)* effective at a variety of tasks (*e.g.*, image classification, speech recognition)


Input
Applications
Output
User, Sensors
Other data...
Web, Mobile,
Cloud
Text, Data,
Video, Audio
Classic CPUs:
local or cloud
X86, M1, ARM, FPGAs
Programming
Predefined Rules, Logic and
Knowledge are coded into
programs by humans
Programming
Languages
Python, Rust,
Javascript, C#,
SQL, ...
Humans
Human-
Programmed
Rules


Machine Learning - Training
"Teaches" a deep neural network (DNN)
to learn from examples (training data),
rather than being explicitly
programmed.
Input
Inference
Applications
Predictions
User, Sensors
Other data...
Web, Mobile,
Cloud
Text, Data,
Video, Audio
GPUs, CPUs, Cloud..
Trained AI Model
Knowledge is
learned by applying
an algorithm to a
training dataset
Multi-core AI Chips,
Cloud for large models
TensorFlow, Pytorch, MxNet...
GPUs, FPGAs, ASICs, TPUs
Training Algorithm
Training Data

Technical strategy: Address diverse DoD user types

Explainable AI system development-to-use timeline

Notional

Conceptual System → Prototype System → System V&V → System Acceptance Testing → Operational System → After Action Reviews → Regulatory Reviews

Explainable AI system users

Developers

AI Expert
Design, develop, and debug

Task SME
Test and evaluate

- Explanations expose finer details of the system
- Explanations are used to modify/refine the system

End Users

- DoD/Military
- Legal
- Transportation
- Security
- Finance
- Medical

- Explanations aid decision making/recommendations
- Explanations justify actions taken and decisions

Policymakers/Regulators

Commander

Policymaker Regulator

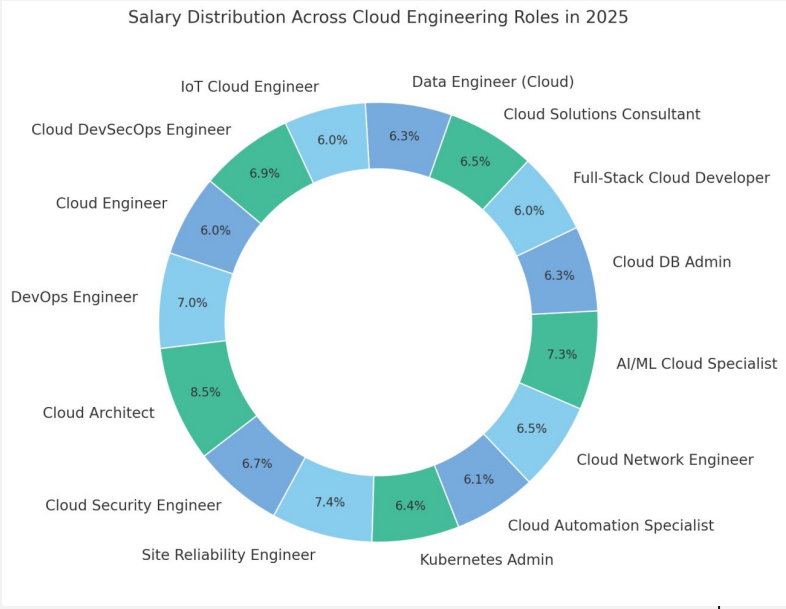
- Decision patterns are defensible
- Decisions meet policy/regulatory requirements

A good explanation incorporates context about the user's knowledge, task, and concept of operations

So What Can Machine Learning Do?

- Recognize and Understand Text/Natural Language Processing
- Write Human-like Answers to Questions and Assist in Writing Computer Code
- Recognize and Understand Images and video streams
- Detect Changes in Patterns/Recognize Anomalies
- Power Recommendation Engines
- Recognize and Understand Your Voice
- Create Artificial Images
- Generative Design of Physical Products
- Sentiment Analysis
- And more!

Recruitment Trends



Market Insights

- **Rising Cloud Adoption**: Over 85% of businesses will migrate workloads to cloud infrastructure by 2025, emphasizing multi-cloud and hybrid strategies.
- **Demand Surge for Specializations**: Roles like Cloud Security Engineers and DevOps Specialists are growing by 15-20% annually, with AI/ML integration driving demand further.
- **Salary Increases**: Certifications and advanced skills can boost salaries by 10-20%, with Cloud Architects and AI/ML Specialists topping the pay scale.

Top In-Demand Skills

- **Infrastructure as Code (IaC)**: Terraform, Ansible, AWS CloudFormation.
- **Containerization**: Kubernetes, Docker.
- **Cloud Security**: IAM, encryption, compliance frameworks.
- **Multi-Cloud Expertise**: AWS, Azure, Google Cloud.
- **AI/ML Integration**: SageMaker, Azure ML, Google AI Platform.

Essential Tools

- Cloud Platforms: AWS, Azure, Google Cloud.
- IaC & Orchestration: Terraform, Kubernetes, Docker.
- CI/CD Tools: Jenkins, GitHub Actions.
- Security: HashiCorp Vault, AWS IAM.

Top Certifications for 2025

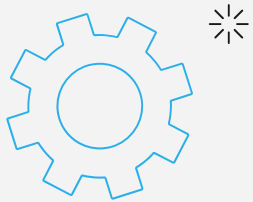
- AWS Certified Solutions Architect – Professional
- Microsoft Certified: Azure Solutions Architect Expert
- Google Professional Cloud Architect
- Certified Kubernetes Administrator (CKA)
- AWS Certified DevOps Engineer – Professional

Hiring Strategies for Recruiters in Cloud & AI/ML

- Building Talent Pipelines:
  - Partner with **universities** and **tech bootcamps.**
  - Engage in open-source and hackathon communities.
- Assessment Techniques:
  - **Coding tests** for cloud infrastructure and AI models.
  - Hands-on assignments using cloud platforms.
  - Behavioral interviews focused on problem-solving.

Retaining Top Talent in AI/ML & Cloud

- Competitive Compensation & Benefits:
  - Stock options, flexible work arrangements.
  - Training budgets for cloud and AI certifications.
- Career Growth Opportunities:
  - Internal mobility programs for role transitions.
  - Leadership development in tech-driven companies.



Resources

- https://gordianknot.stanford.edu/sites/g/files/sbiybj22971/files/media/file/Artificial%20Intelligence-Machine%20Learning%20Explained.pdf
- https://trainingmag.com/navigating-the-future-of-recruitment-ai-and-ml-at-the-forefront/
- https://roadmap.sh/
- https://tutorialsdojo.com/fundamentals-of-cloud-computing/
- https://coursera.org/

Thanks! Do you have any questions?

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