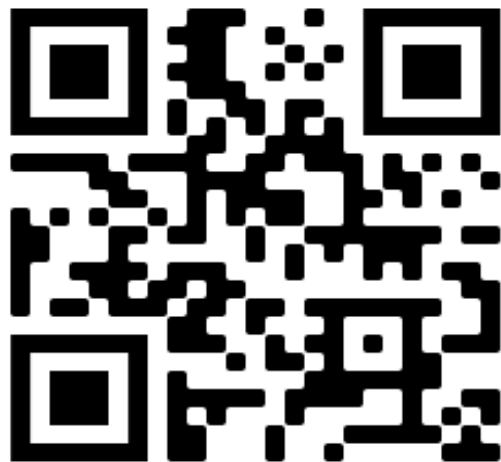


# AWS and Machine Learning

**By** Peang Ratana, founder of STEM Club Cambodia

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- Peang Ratana completed a Master Degree in Science in Mathematics from Royal University of Phnom Penh & CIMPA. After completing Master's degree in Cambodia, I taught at Pannasastra University of Cambodia, International University, University of Management and Economics and University of Puthisastra. Here, I also attended Summer School at NIMS, Daejeon, South Korea about "Symplectic Embeddings systolic inequalities and celestial mechanics". Attended ASEAN Science Assembly Diplomats held at Davao City ,Philippine, and attended Common Purpose ASEAN Young Leaders Program at Singapore Institute of Technology, Singapore. In 2019 I published my research paper on STEM Education at Royal University of Agriculture, 2021 publish my research paper on Learning in Digital Era at TCI/MOC Asia Conference at CamEd Business School. In 2022, presentation NLP at Cambodia ICT Camp 2022 in Siem Reap.
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# Abstract

**Amazon Web Services, Inc. (AWS)** is a subsidiary of [Amazon](#) that provides [on-demand cloud computing platforms](#) and [APIs](#) to individuals, companies, and governments, on a metered pay-as-you-go basis. These cloud computing [web services](#) provide [distributed computing](#) processing capacity and software tools via AWS [server farms](#). Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it. Many researchers also think it is the best way to make progress towards human-level AI. Machine learning is a field of inquiry devoted to understanding and building methods that 'learn', that is, methods that leverage data to improve performance on some set of tasks. It is seen as a part of artificial intelligence.

# AWS

Amazon Web Services

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
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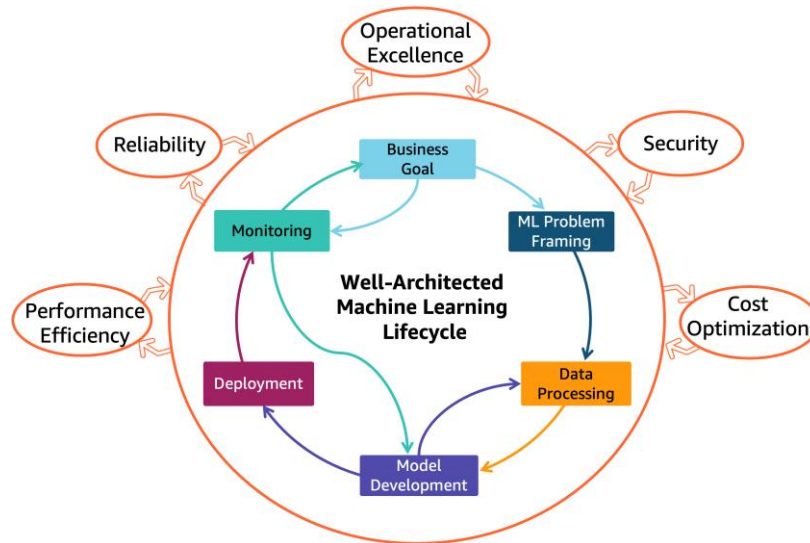
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- Machine Learning is the study of computer algorithms that improves automatically through experience and by the use of data. (Wikipedia)
- The goal of ML is to program computers to use example data or past experience to solve a given problem.
- ML is a subset of Artificial Intelligence (AI). AI suggest that machines can mimic humans in talking, thinking, learning, planning, understanding.



**Human**



I can learn everything  
automatically from  
experiences.  
Can u learn?

**Machine**



Yes, I can also learn  
from past data with the  
help of Machine learning

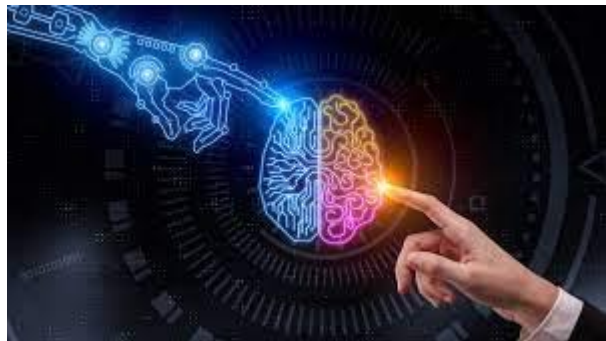
# Artificial Intelligence (AI)

Studying AI raises many interesting questions:

- Can computers think like humans?
- Can computers be smarter than humans?
- Can computers take over the world?

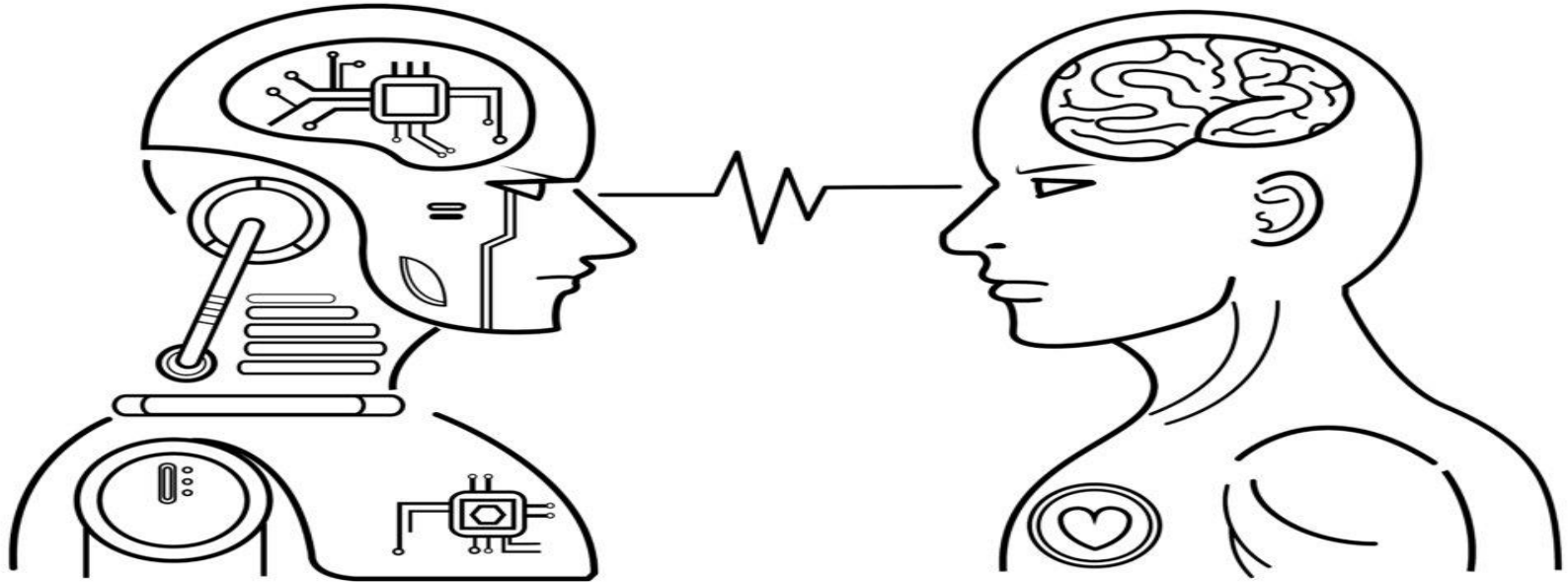
Machines can understand verbal commands, recognize faces, drive cars, and play games better than us.

- How long will it take before they walk among us?



# Human Intelligence

Artificial vs HUMAN  
Intelligence



# Human vs artificial intelligence: language

- Human languages contain a limited set of words put together in Sentences:

E.g: I'm going on holiday in my new car.

- Computer languages are programmed with a limited set of words put together in computer Statements.

E.g: points = [1,4,8,2]

About 70000 years ago, something happened to the human brain.

Humans started to develop “Cognitive Intelligence”:

- Being able to understand a language
- Being able to understand numbers
- Being able to understand abstract thinking

The challenge of AI is to understand what intelligence is, and how intelligence works.

- What is the difference between human knowledge and artificial intelligence?

# Intelligence Needs Data

- Human Intelligence needs data:

A real estate company needs data about land to estimate prices.

- Artificial intelligence needs data:

A computer program also needs data to estimate prices.

# What is Data?

Data can be many things.

Position	Personality
Ideas	Intellect
Communicate	Connect
Invest	Reward

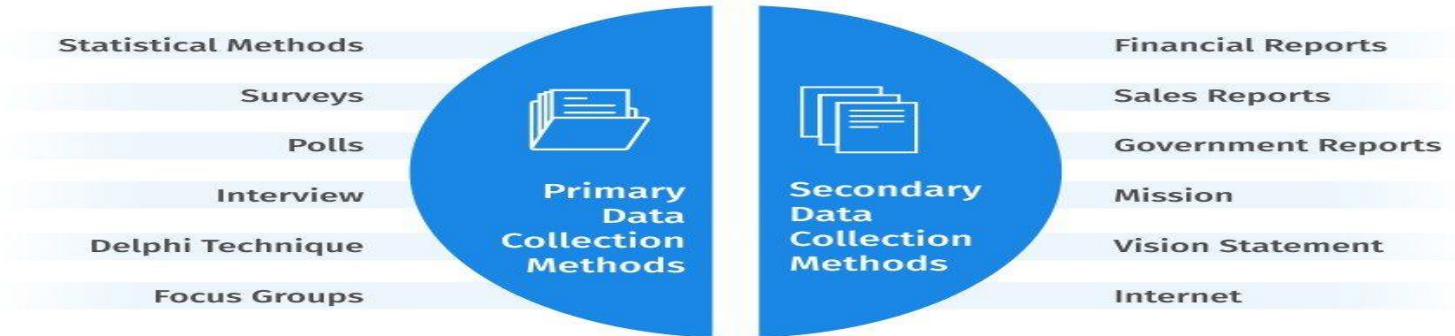


# Data Collection

- Collecting data is the most important part of any ML projects..
- The most common data to collect are numbers and measurements.
- Often data are stored in arrays representing the relationship between values
- This table contains house prices vs size:



## DATA COLLECTION



# Example of Machine Learning



# Application of ML

- Self driving cars
- Face detection
- Robots
- Apple Siri
- Amazon Alexa
- Make recommendation on E-commerce websites
- Text Autocorrect
- Automated Translation
- Flying Drones , etc...

# Give example of what machine learning can do

Scan here:



Use this code: **1302589**

# Approaches

Machine Learning approaches are traditionally divided into three broad categories:

- Supervised learning
- Unsupervised learning
- Reinforcement learning

# Supervised Learning

- Supervised learning uses labeled data ( data with known answers) to train algorithms to: classify data, predict outcomes.
- Supervised learning can classify data like “what is spam in an e-mail”, based on known spam examples.
- Supervised learning can predict outcomes like predicting what kind of video you like, based on videos you have played.

# Supervised learning models

- Decision Tree
- Linear Regression
- Logistic Regression
- Support Vector machines
- Bayesian learning
- K-nearest neighbor

# Unsupervised Learning

Unsupervised learning is used to predict undefined relationships like meaningful patterns in data. E.g grouping customers by purchasing behavior.

Unsupervise: all data is unlabeled and the algorithms learn to inherent structure from the input data.

Some popular examples of unsupervised learning algorithms are:

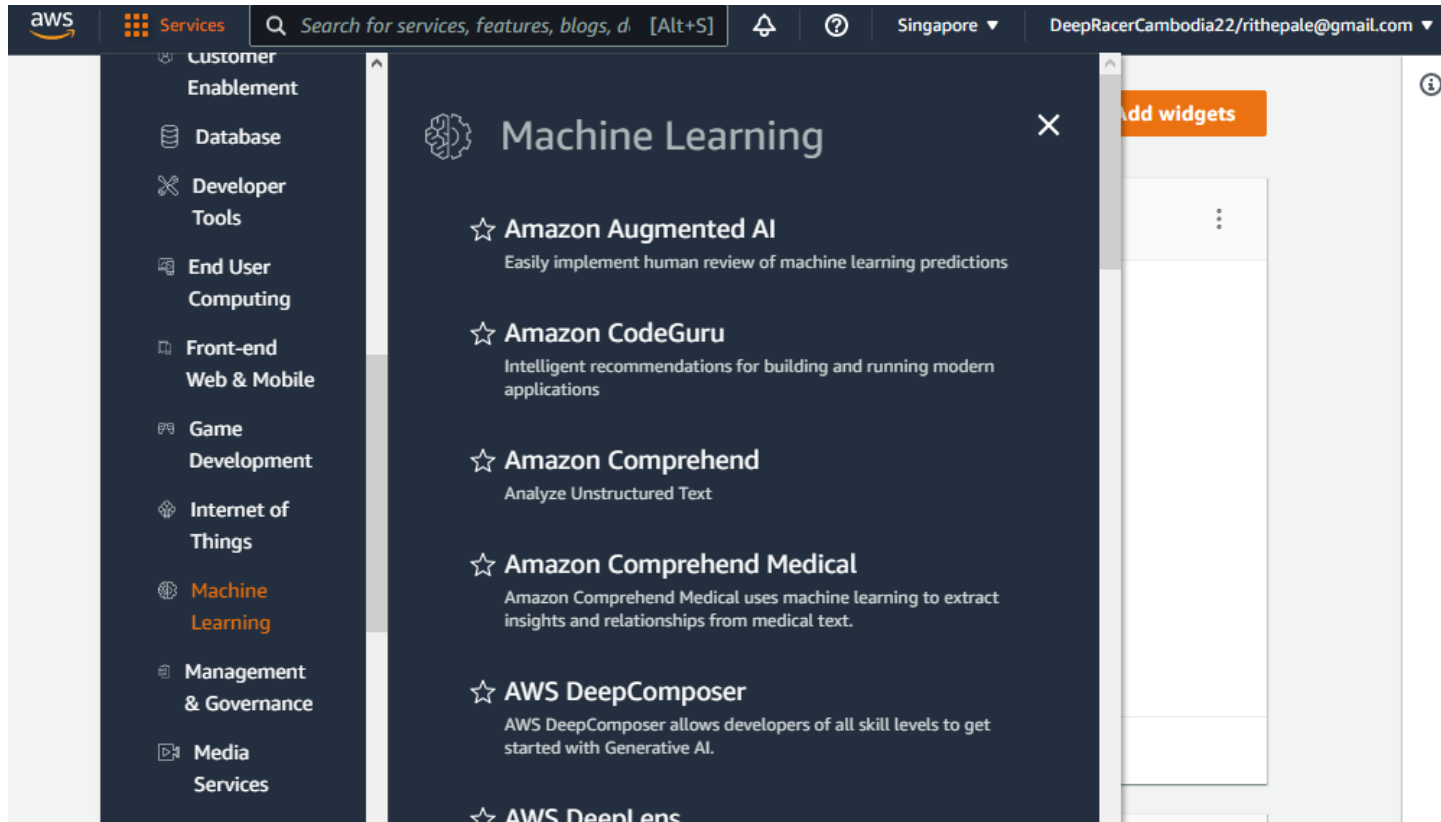
K-means for clustering problems.



# Reinforcement learning

In this approach, an AI is given a goal, and in response to a range of inputs, learns through trial and error what to do to reach that goal.

Eg. Train AI to do as assistant in restaurant.




Amazon SageMaker provides machine learning (ML) capabilities that are purpose-built for data scientists and developers to prepare, build, train, and deploy high-quality ML models efficiently.

## Amazon SageMaker X

## Getting started

## Control panel

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## SageMaker dashboard

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## Amazon SageMaker &gt; Human review workflows

## ▼ How it works

Amazon A2I provides built-in human review workflows for common machine learning use cases, such as content moderation and text extraction from documents, which enables you to review predictions from Amazon Rekognition and Amazon Textract. You can also create your own human review workflows for ML models built using Amazon SageMaker or other tools. [Learn more](#) 




## Step 1: Create human review workflow

You can use a human review workflow, or flow definition, to configure the conditions that trigger a human review (such as confidence thresholds or random sampling), specify the worker task UI, and choose your workflow. After this step, you will have a



## Step 2: Create and start a human loop

A human loop starts your human review workflow and sends data review tasks to human workers. To start a human loop, copy the workflow ARN value and use it as the FlowDefinitionArn in your API call when you create a human loop. [Learn more](#) 




## Amazon SageMaker ✕

Getting started

Control panel

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SageMaker dashboard


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# Create human review workflow


Configure your human workforce and provide information about how to accomplish the review task. For built-in task types, you also use the human review workflow to identify the conditions under which a human loop is triggered. To learn more, see [Create a Flow Definition](#) 

## Workflow settings

### Name



The name must be lowercase, unique within the Region in your account, and can have up to 63 characters. Valid characters: a-z, 0-9, and - (hyphen)

### S3 bucket

Enter the path to the Amazon S3 bucket where you want to store the output of the human review. [Open Amazon S3 console](#) 

The path must have the following format: s3://bucket name/folder name.

### IAM role

This IAM role is used to grant Augmented AI permission to call other services on your behalf. If you want to use this role to start and manage human loops using Augmented AI Runtime, Amazon Rekognition or Amazon Textract API operations, you can attach the AmazonAugmentedAIIntegratedAPIAccess policy to the role in the [IAM console](#)  [Learn more](#) 

Thank for your attention !