Introduction to Artificial Intelligence

The Future Is Here

Sophia was granted citizenship in October 2017

Sophia uses artificial intelligence, visual data processing, and voice and facial recognition

The algorithm stores and analyzes all conversations and uses the data to improve future responses

The Future Is Here

Virtual Assistants

- Siri, Google Assistant
- Microsoft's Cortana
- Amazon Echo

Intelligent Cars

- Tesla Autopilot
- Google Waymo
- Ford's Argo AI

AI in Gaming

- Google DeepMind's AlphaGo, AI in Chess

Definition of Artificial Intelligence

"According to the dictionary, artificial intelligence is the capability of a machine to imitate human behavior."

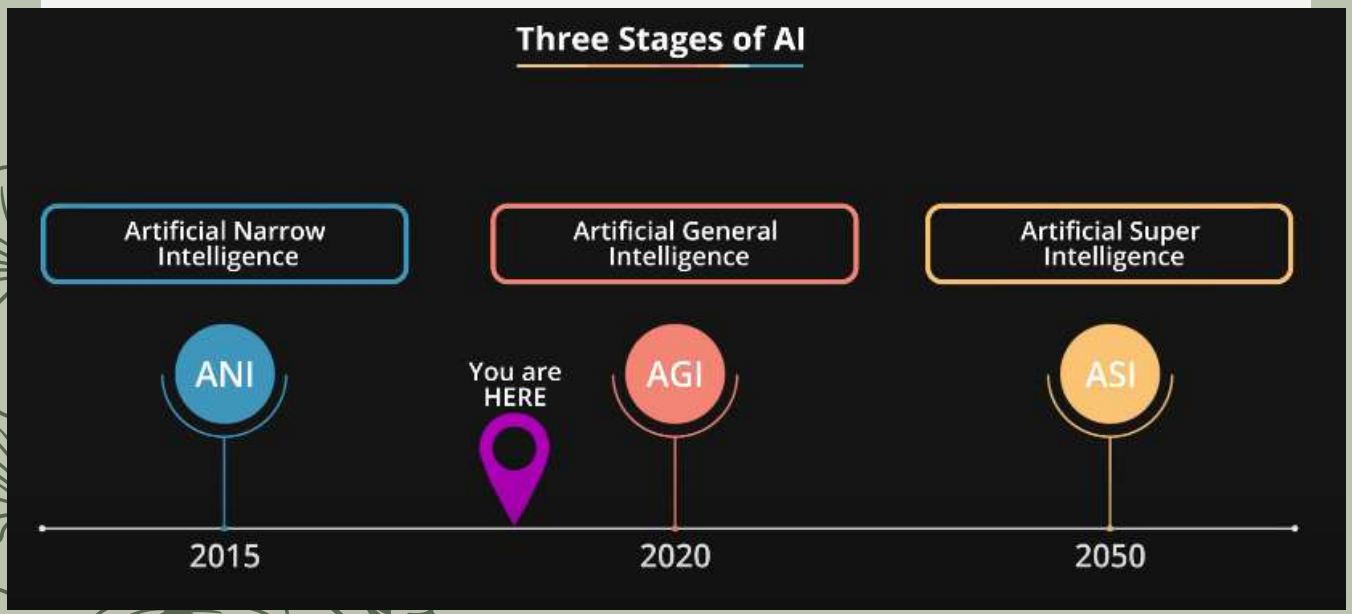
Meaning of Artificial Intelligence (AI)

- Is the intelligence exhibited by machines

- Is based on the premise that intelligence is not "real" or "human"

- Mimics cognitive functions exhibited by humans

Three Stages of AI



Artificial Narrow Intelligence (ANI)

Artificial Narrow Intelligence

ANI

2015

- Are limited to one or two functional areas
- Are not self-aware or self-conscious
- Appear to be making decisions; but it is the statistic/math in action

Examples of ANI

- Smartphone apps

- Chess and AlphaGo

- Image identification tools

- Speech recognition tools

- Self-driving systems

- Google Translate

- Spam filters

Artificial General Intelligence (AGI)

Artificial General Intelligence

AGI

2020

- Covers more than one functional area, such as

Examples of AGI

- Multipurpose systems
- Systems with human-level intelligence, reasoning, thinking, and decision-making
- Systems that synthesize diverse information and decide actions

Artificial Super Intelligence (ASI)

Artificial Super Intelligence

ASI

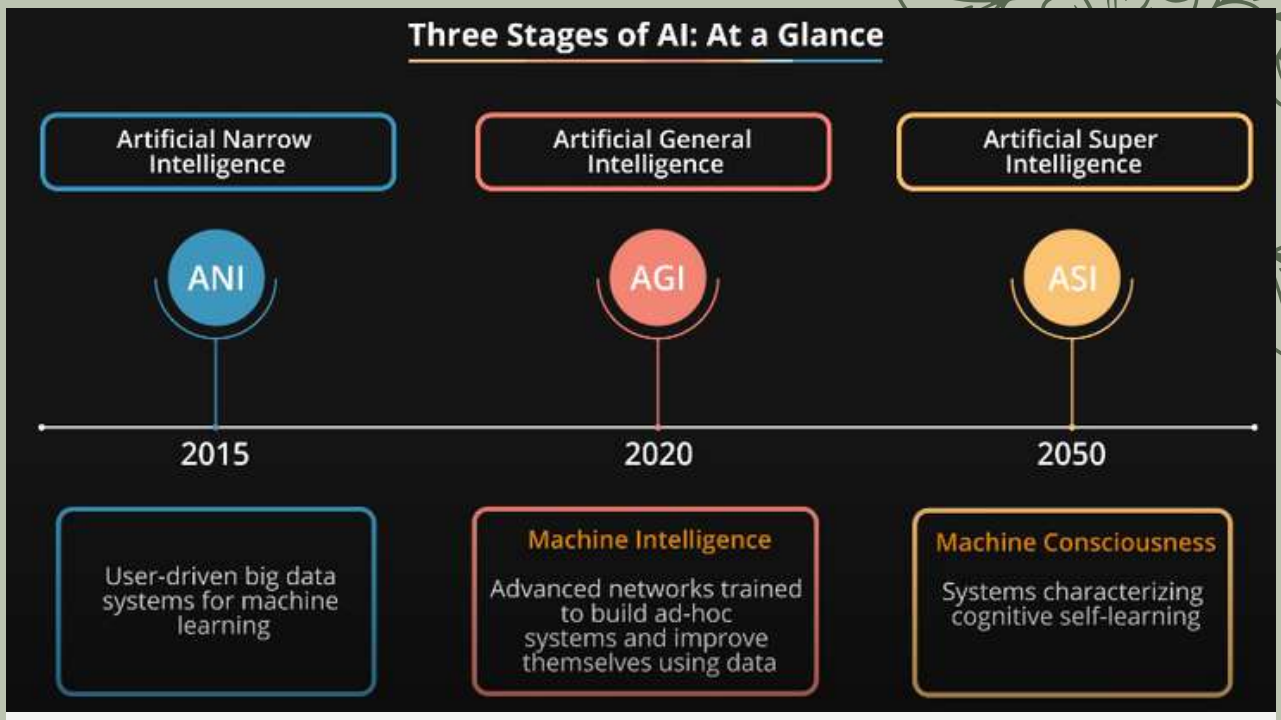
2050

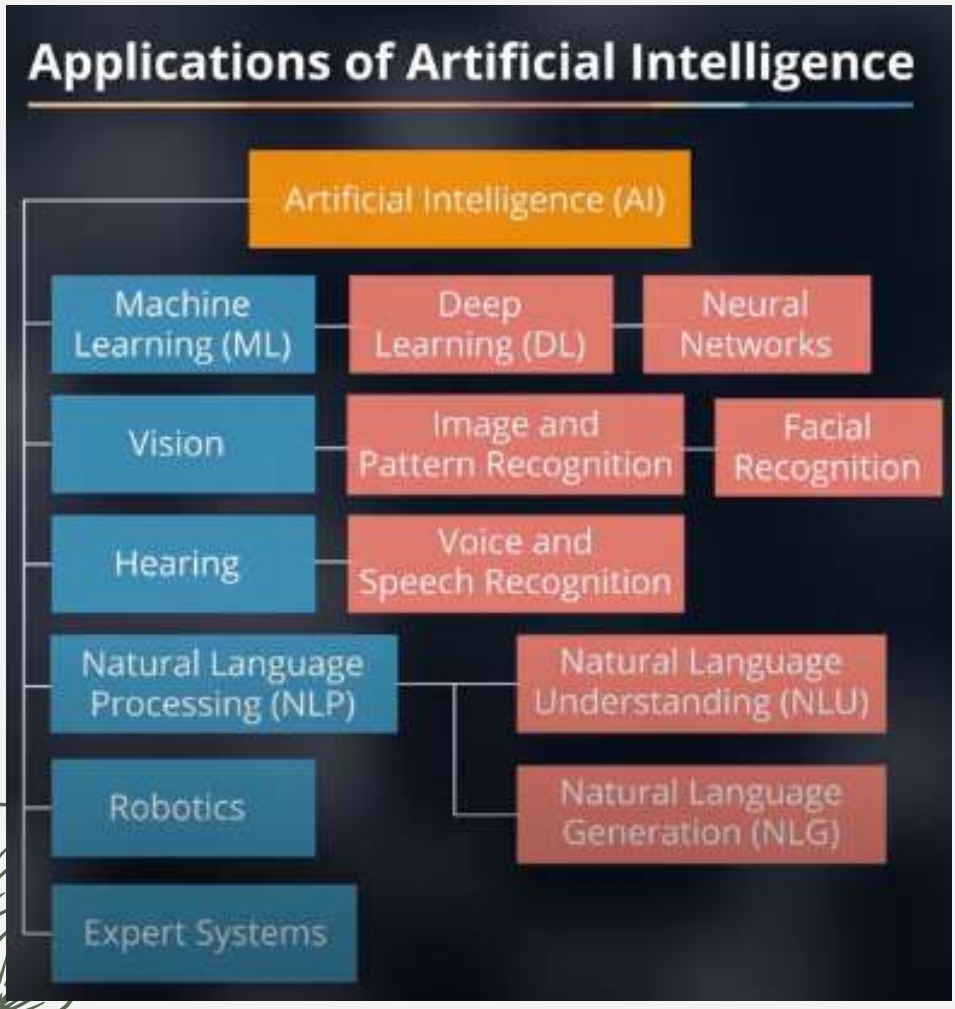
- Surpasses human intelligence

Examples of ASI

- Super intelligent AI agents

- Systems that are masters at every skill, subject, or discipline and are faster than the smartest humans

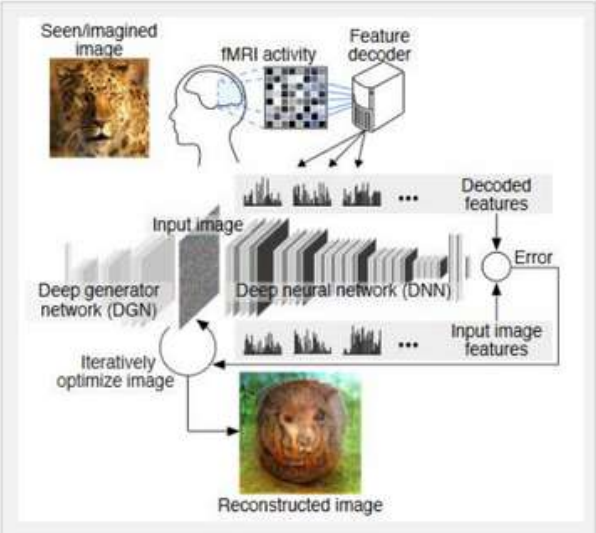

Three Stages of AI: At a Glance
Artificial Narrow Intelligence
Artificial General Intelligence
Artificial Super Intelligence
ANI
AGI
ASI
2015
2020
2050
User-driven big data systems for machine learning
Machine Intelligence
Advanced networks trained to build ad-hoc systems and improve themselves using data
Machine Consciousness
Systems characterizing cognitive self-learning


Applications of Artificial Intelligence
Artificial Intelligence (AI)
Machine Learning (ML)
Deep Learning (DL)
Neural Networks
Vision
Image and Pattern Recognition
Facial Recognition
Hearing
Voice and Speech Recognition
Natural Language Processing (NLP)
Natural Language Understanding (NLU)
Natural Language Generation (NLG)
Robotics
Expert Systems

Applications of Artificial Intelligence

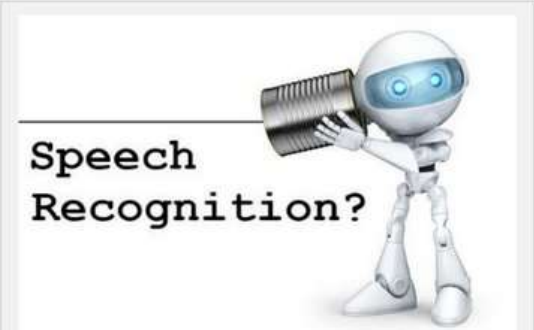
- Image Recognition
- Product Analytics
- A/B Testing
- Speech Recognition
- Language Translation
- Sentiment Analysis

Image Recognition



- Image recognition is the ability of a software to recognize the objects, places, people, and actions in an image.

Speech Recognition



- Speech recognition is the ability of a machine or program to allow humans to use their voice to communicate with the software.

Language Translation

- Language translation is the process of translating a word or sentence from one language into another.
- It also ensures that the translated word is culturally and linguistically correct.

Product Analytics

- Product analytics enables companies to leverage data to reveal user engagement with their products or services.
- It can be used to track the activities, likes, and dislikes of users.

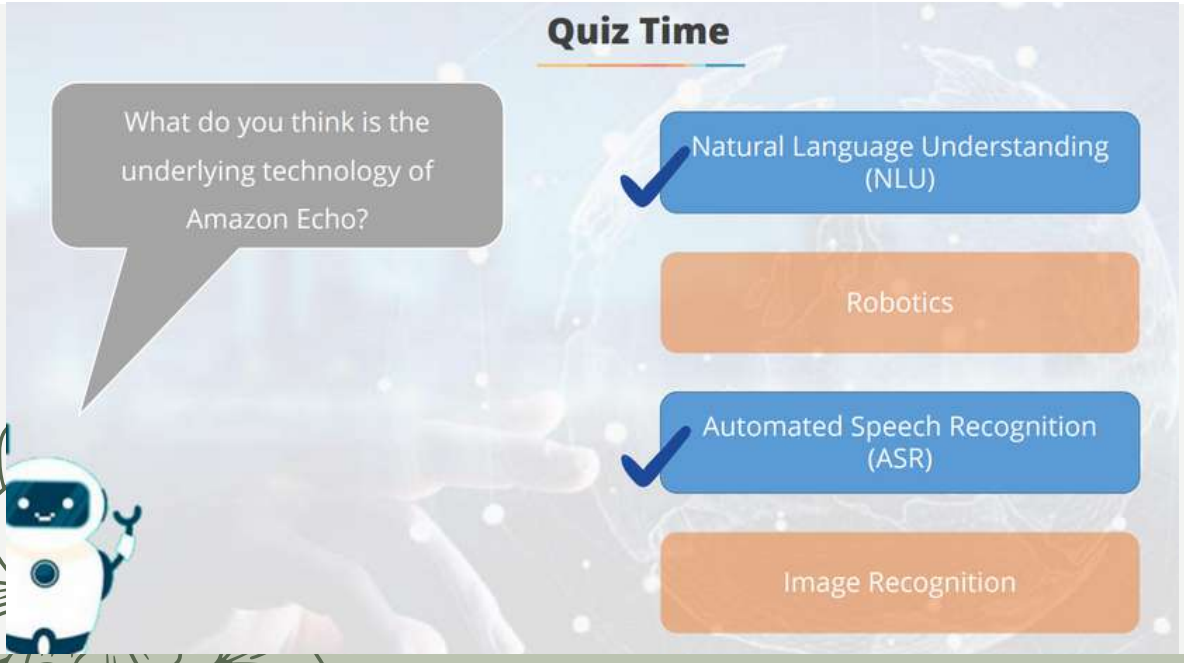
A/B Testing

- A/B testing, also called split testing, is the process of comparing two versions.
- It is used to see which version of a web page delivers a better performance.

Sentiment Analysis

- Sentiment analysis is the process of analyzing a piece of text to determine the writer's attitude.
- It can be categorized as positive, negative, or neutral.

Quiz Time



Application of AI: Examples

- Is a popular personal assistant offered by Apple
- Uses machine learning and voice recognition

Application of AI: Examples

- Improves intelligence of customer support representatives
- Analyzes human voice and provides real-time guidance

Application of AI: Examples

- Uses predictive technology to offer movie recommendations based on previous user choices

Enhances Throughput and Efficiency

datmo

Anand Sampat from Datmo says,

"Artificial intelligence is a huge benefit to society because it enhances the efficiency and throughput, while creating new opportunities for revenue generation, cost savings, and job creation."

Enhances Throughput and Efficiency

- Self-driving cars have a combination of sensors, cameras, radar, and artificial intelligence technology.
- They are capable of sensing the environment and navigating without any human intervention.

Adds Jobs and Strengthens the Economy

- You see headlines like "Robots and AI will destroy jobs." This is fiction rather than a fact.
- AI encourages a gradual evolution in the job market which, with the right preparation, will be positive.
- People will work better with the help of AI.

Adds Jobs and Strengthens the Economy

Matthew Lieberman from PwC says,

"The unparalleled combination of human and machine will become the new normal in the workforce of the future."

Adds Jobs and Strengthens the Economy

- Artificial intelligence improves overall productivity and economic growth.
- It addresses changing market demands, which include an increased need for advanced technical skills.

Increases Human Efficiency

DUE COMPANY

Chalmers Brown from Due says,
"Machines allow humans to do the more interpersonal and creative aspects of work."

Increases Human Efficiency

Microsoft is a pioneering AI designed to monitor specific areas and situations. The system alerts relevant personnel to potential hazards or safety incidents that can be controlled by immediate human intervention.

This technology is built using Microsoft Azure Stack, Azure functions, Cognitive services, and commodity cameras.

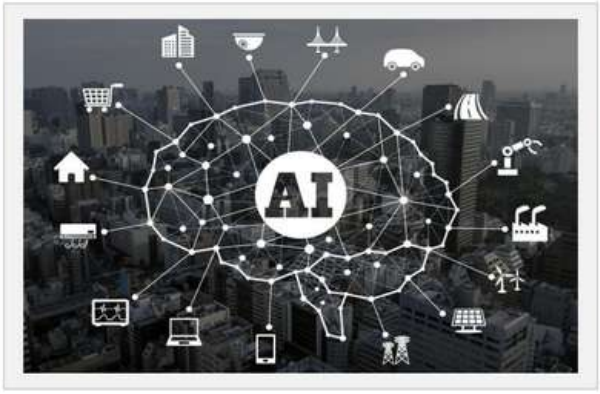
It has the potential to revolutionize occupational safety and incident prevention worldwide.

Enhances Lifestyle

Naresh Soni from Tsunami ARVR says,

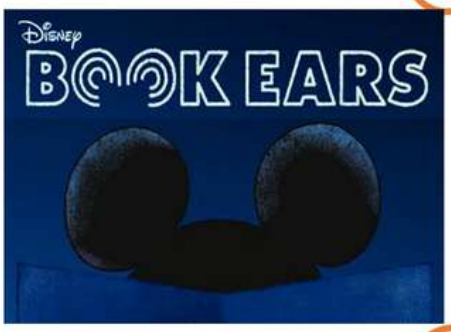
"Smart homes will reduce the energy usage and provide better security for humans. Marketing will be more targeted and health care will become more effective with smart devices."

Enhances Lifestyle



- The artificial intelligence platform provides real-time insights, combined with the explosion of computing power.
- Healthcare professionals can diagnose patients faster and more accurately after machines interpret the required data.
- Smart homes provide improved comfort, convenience, efficiency, and security.

AI at Home: Disney Book Ears

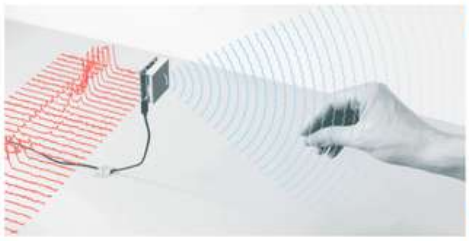


Disney Book Ears is an application that augments the experience of reading books by playing sounds for specific cues.

It is powered by Google's Cloud Speech API. The app listens for specific words and phrases. It then triggers sounds from a database of sound effects that play through the phone's speakers.

The app is designed to understand different accents, intonations, and expressions.

AI at Home: Soli



Soli is a small chip developed by Google that can be embedded into wearables, phones, computers, cars, IoT devices. It is a miniature radar that detects touchless gesture interactions.

The Soli chip incorporates the entire sensor and antenna array into a compact 8mm x 10mm package. Soli uses the concept of virtual tools, which are gestures that mimic physical interactions with devices.

Supervises Learning for Telemedicine

cooper | perkins

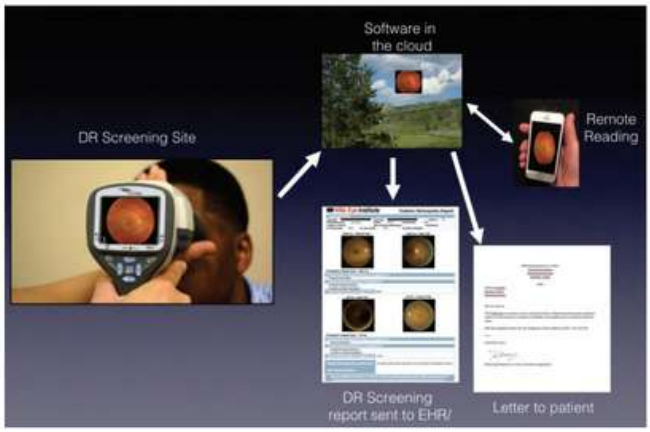
Harald Quintus-Bosz, Cooper Perkins Inc. says,

"Artificial intelligence has the potential to extend knowledge and understanding to a broader population. Image-based AI diagnoses of medical conditions could allow for a more comprehensive deployment of telemedicine."

AI in Healthcare: Google DeepMind

- The machine learning algorithm that Google uses to label web images can diagnose diabetic retinopathy as well as a highly trained ophthalmologist.
- With retinal images, clinicians can diagnose, monitor, and treat diabetic retinopathy remotely via telemedicine.

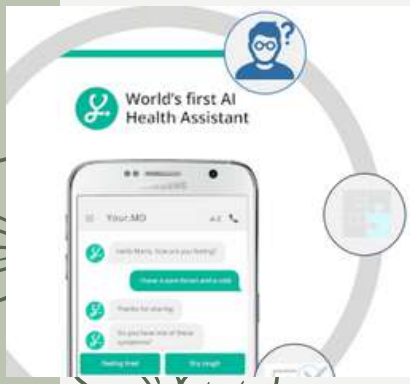
AI in Healthcare: DR Screening Software



- DR or Diabetic Retinopathy can be diagnosed using AI.
- DR screening software uses a portable fundus camera, which is deployed to the screening site.
- The captured images are securely transmitted to the cloud software platform for analysis.
- The software automatically generates a report for the referral source and, in some cases, for the patient. This facilitates compliance with follow-up examinations.

Case Study: Your.MD

Problem



- In UK, the general practitioners and primary care surgeons are always overburdened. This is a common complaint of the patients.
- The waiting times for their appointments are too long.

- Your.MD is a free service that uses AI techniques to provide users' with personalized advice about their medical complaints.
- The app records users' symptoms and matches these with a map of clinical data about illnesses. This is compiled from public sources with the help of contributing doctors.
- Your.MD engages about 30 doctors to conduct research on illnesses and to input data in the AI system.

- Your.MD has created a preprimary care market.
- It eases the burdens of medical staff and helps improve their work since initial screening of non-acute conditions could be done digitally.
- Users of the service benefit from the information and suggestions they receive from the app.

Solves Complex Social Problems

Litterati

- Litterati is building a global database for litter.
- They have crowdsourced litter clean-up app that identifies litter type, distribution, and location.
- This information is important to cities, NGOs, and schools all over the world.
- They have been featured on CNN, BBC, National Geographic, and TED.

Improves Demand Side Management

CLEAResult®

Greg Sarich from CLEAResult says,

"From an energy standpoint, artificial intelligence can be used to analyze and research historical data to determine how to most efficiently distribute energy loads from a grid perspective."

Improves Demand Side Management

PG & E

- Pacific Gas and Electric Company (PG&E) announced that it has connected 200,000 solar customers, accounting for one in every four rooftop solar households in America.
- It is among the fastest in the nation at connecting solar customers to the grid with an average of a five-day turnaround time.

Extends and Expands Creativity

CognitiveScale™

Ganesh Padmanabhan from CognitiveScale Inc. says,

"AI intelligence is the biggest opportunity of our lifetime to extend and expand human creativity and ingenuity."

1 Which of the following is NOT an example of artificial narrow intelligence?

SELECT THE CORRECT ANSWER

- A. Super-intelligent AI agents ✓
- B. Spam Filter
- C. AlphaGo
- D. Google Translate

Correct Option: A

EXPLANATION

Super intelligent AI agents are an example of Artificial Super Intelligence.

2 Which of the following uses machine-learning technology to become smarter and more capable of understanding natural language questions and requests?

SELECT THE CORRECT ANSWER

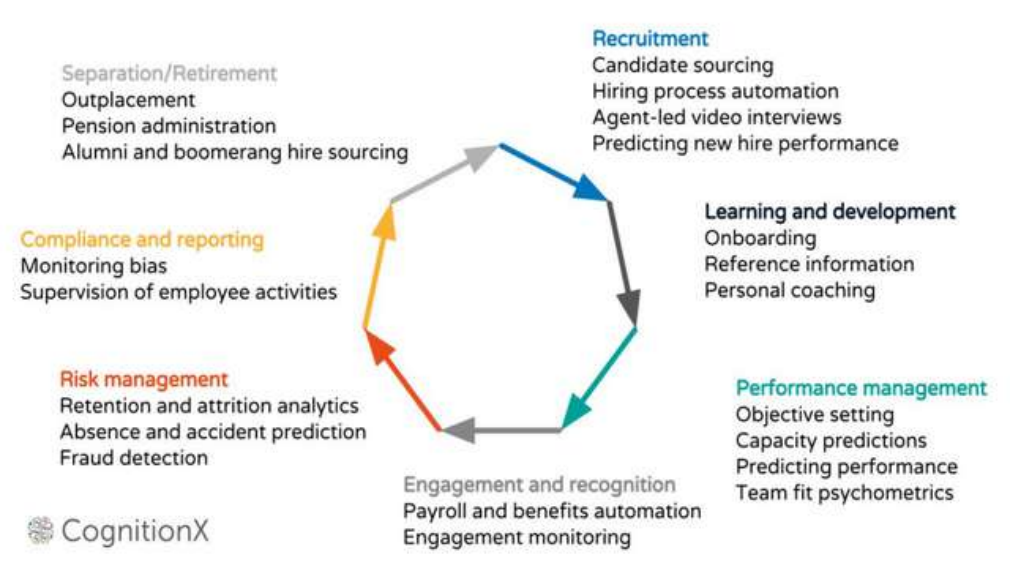
- A. Litterati
- B. Netflix
- C. Siri ✓
- D. Cogito

Correct Option: C

EXPLANATION

Siri, one of the most popular personal assistants offered by Apple, uses machine-learning technology to become smarter and capable of understanding natural language questions and requests.

Extends and Expands Creativity



- The two main concerns that the fearmongers raise:
  - AI will lead to job losses in the society
  - AI will take control of the human race
- This can be proved wrong by how AI is being leveraged in Human Resources and recruitment.

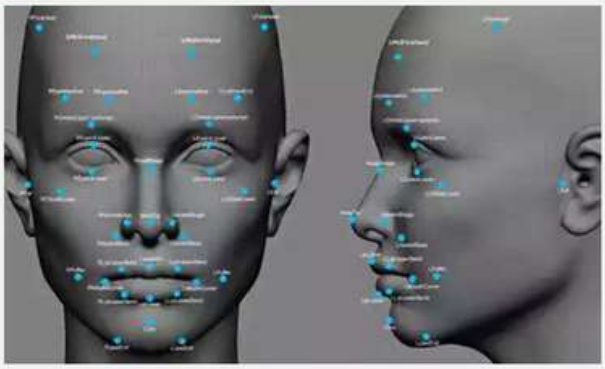
Qualys.

Mark Butler from qualys.com says,

AI risks are real if we don't understand the quality of the incoming data and set AI rules which are making granular trade-off decisions at increasing computing speeds.

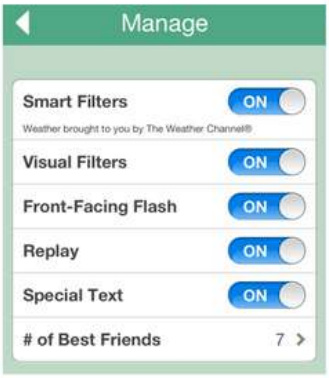
Benefits Multiple Industries

Facial Recognition



- Facial recognition is a biometric technology used to identify human faces.
- It is used in the security systems and is popular as a commercial identification and marketing tool.

Image Recognition: Snapchat

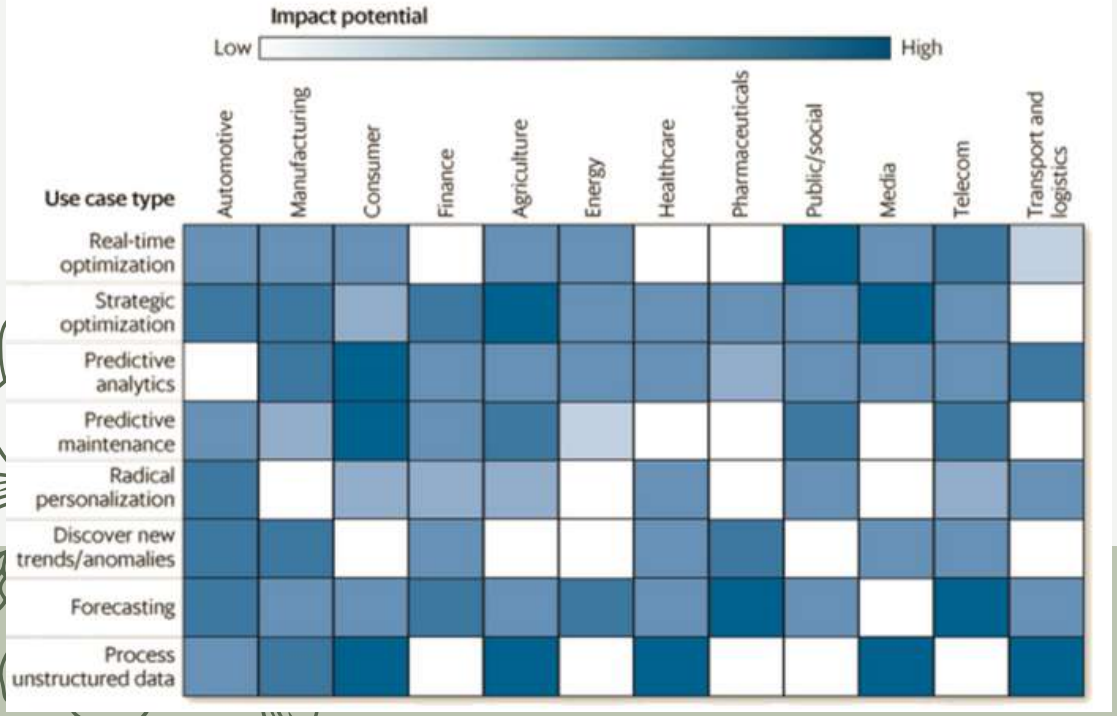


Snapchat's smart filters can differentiate between the images of objects, pets, sports, and food. It can suggest relevant borders and stickers. Geofilters identify your location and suggest location-based filters.

Snapchat filters use machine learning and an image classification technique called Convolutional Neural Networks (CNN).

These filters also generate revenue from brands that sponsor them based on users' locations.

Industry-Wise Impact of AI and Use Cases



Key Takeaways

- Artificial intelligence is the intelligence exhibited by machines and is the capability of a machine to imitate human behavior.
- The three stages of AI include Artificial Narrow Intelligence, Artificial General Intelligence, and Artificial Super Intelligence.
- Various applications of AI include image recognition, speech recognition, natural language processing, translation, product analytics, A/B testing, and sentiment analysis.
- AI enhances throughput and efficiency, adds jobs, strengthens economy, increases human efficiency, enhances lifestyle, solves complex social problems, and benefits multiple industries.

QUIZ 1

How does Google, Amazon, and LinkedIn use artificial intelligence in their ecosystems?

a. Google, Amazon, LinkedIn do not use artificial intelligence.

b. Google and LinkedIn use AI through their offerings, but Amazon does not use AI.

c. Google and Amazon use AI, and LinkedIn is in the process of incorporating AI.

d. Amazon uses AI in Alexa and AI Everywhere, Google uses AI in Vision API and Google Translate, whereas LinkedIn uses AI in the entire job application process.

The correct answer is **D**

In case of LinkedIn, machine learning helps the platform and enhances the reach of jobs to the right people. Also, it helps in keeping track of the talent pool. Google uses AI in Vision API and Google Translate. Amazon uses AI in Alexa, Brainier Cloud, and AI Everywhere.