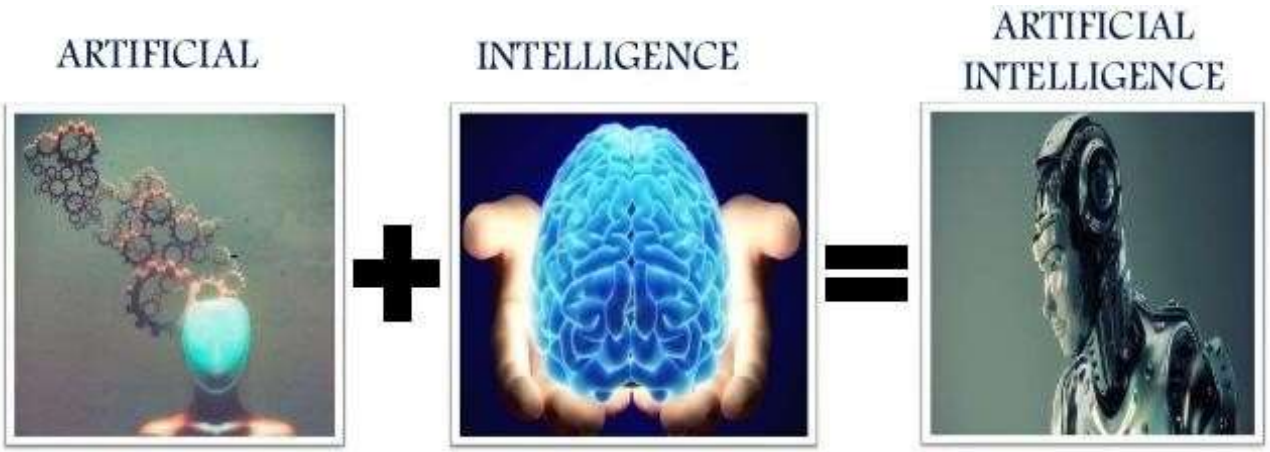
Artificial Intelligence

Applications Of Artificial Intelligence

Artificial Intelligence



- Intelligence: "The capacity to learn and solve problems"
- Artificial Intelligence: Artificial Intelligence(AI) is the simulation of human intelligence by machines.
  - The ability to solve problems
  - The ability to act rationally
  - The ability to act like humans

AI Applications

- Many thousands of AI applications are deeply embedded in the infrastructure of every industry

Applications Of AI

- Game playing
- Medical Diagnosis
- Autonomous Control
- Autonomous planning and scheduling
- Expert Systems
- Robotics
- Natural Language Processing
- Language understanding and problem solving
- Machine Translation
- Computer Vision
- E-commerce
- Heuristic Classification

Game playing

- Nowadays there are different gaming bots are introduced. Bot are developed who will play with you, such as checkers, chess, and the 15-puzzle.
- IBM's Deep Blue became the first computer program to defeat the world champion in a chess match when it beated Garry Kasparov by a score of 3.5 to 2.5 in an exhibition match in 1997.
- To beat world champion by brute force and known reliable heuristics requires being able to look at 200 million positions per second.

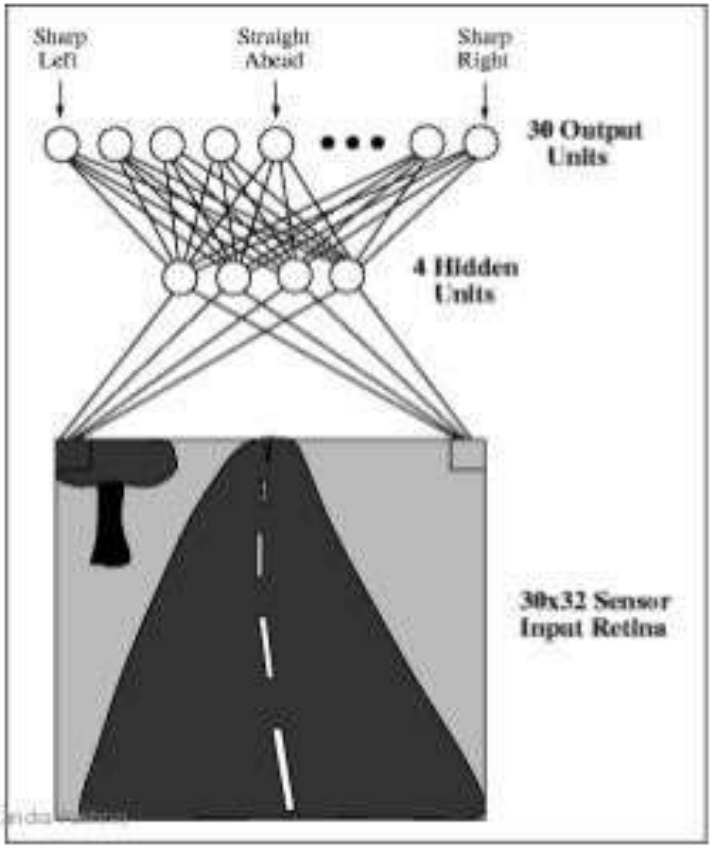
Medical Diagnosis

- In Medical Science AI is used to create virtual personal health care assistant.
- A medical clinic can use artificial intelligence systems to organize bed schedules, make a staff rotation, and provide medical information and other important tasks.
- AI has also applications in field of cardiology(CRG), Neurology(MRI), Embryology(sonography), complex operations of internal organs etc.
- **MYCIN** expert systems which diagnosed bacterial infections of the blood and suggested treatments.

Autonomous Control

Autonomous Land Vehicle In a Neural Network

- 1989 – Dean Pomerleau at CMU created ALVINN
- The system drove a car coast-to-coast under computer control for all but about 50 of the 2850 miles.



Autonomous planning and scheduling

- Also denoted as AI planning, is a branch of AI that concerns the realization of strategies or action sequences, typically for execution by intelligent agents, autonomous robots and unmanned vehicles.
  - Telescope scheduling

Expert Systems

- It is a computer system that emulates the decision making ability of a human expert in a specific domain.
- First expert systems was MYCIN in 1974, which diagnosed bacterial infections of the blood and suggested treatments.
- It did better than medical students or practicing doctors, provided its limitations were observed.

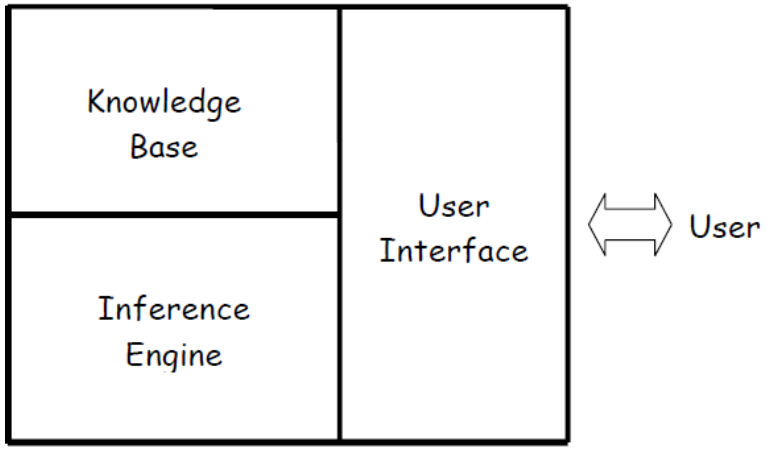


Fig: Block Diagram of expert system

Robotics

- Robotics is a branch of engineering devoted to the creation and training of robots.
- Roboticists works within a wide range of fields, such as mechanical and electronic engineering, cybernetics, bionics and AI.
- Generally a robot consists of 5 basic components:
  1. Controller 2. Arm 3. Drive 4. End-Effector 5. Sensor

Natural Language Processing

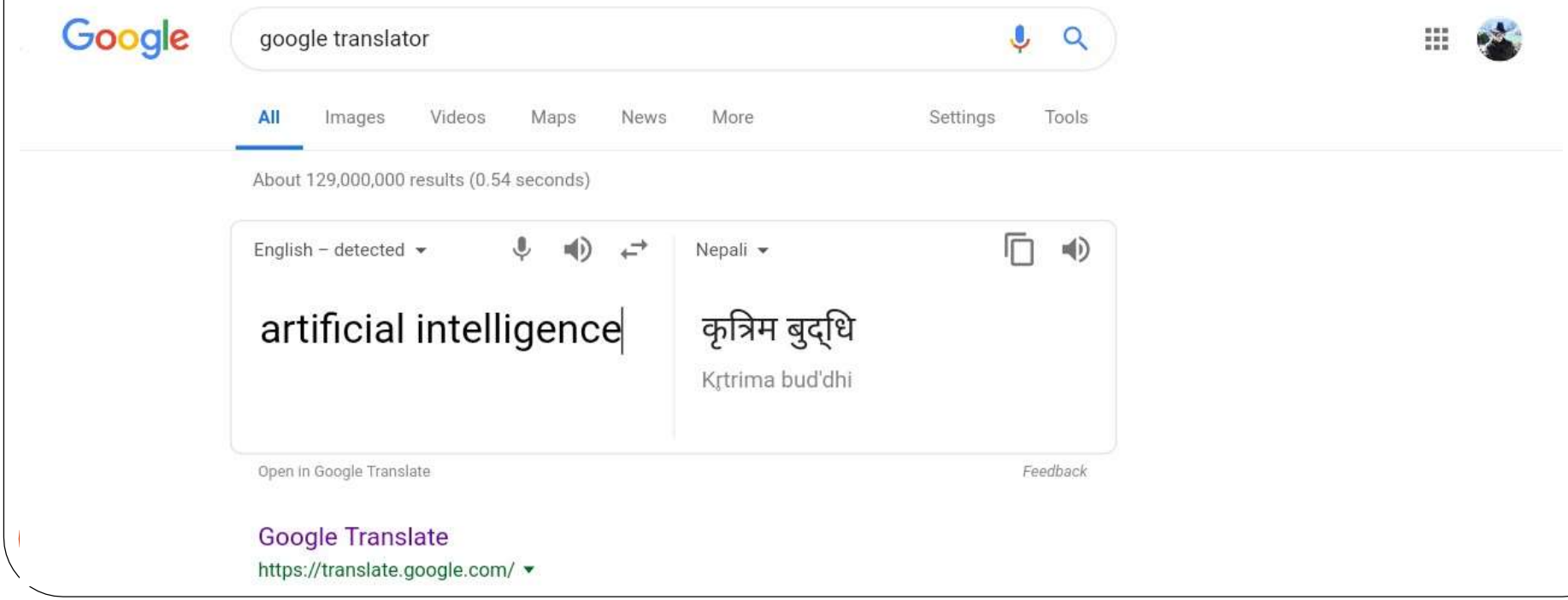
- Natural Language Processing(NLP) is a technology which involves converting spoken or written human language into a form which can be processed by computers, and vice versa.
- Some of the better-known applications of NLP includes:
  - **Voice recognition software** which translates speech into input for word processors or other applications. eg Google assistant, window speech recognition etc.;
  - **Text-to-speech synthesizers** which read text aloud for users such as the hearing-impaired. eg reads document by Microsoft Edge browser;
  - **Grammar and style checkers** which analyze text in an attempt to highlight errors of grammar or usage. eg used in documenting computer;
  - **Machine translation systems** which automatically render a document such as web page in another language. eg google translator

Language understanding and problem solving

- The AI helps the computer to understand our natural language like English, Nepali etc.
- So that we can communicate with computer like a human being.
- Three major issues involved in understanding language:
  - A large amount of human knowledge is assumed.
  - Language is pattern based, phonemes are components of the words and words make phrases and sentences.
  - Language acts are the product of agents(human or machine).

Machine Translation

- The term *machine translation* (MT) is used in the sense of translation of one language to another.
- The ideal aim of machine translation systems is to produce the best possible translation without human assistance.



Computer Vision

- AI can be used to improve the vision of the real world object on computer so that we can view it with 3-Dimension.

Computer vision is a field that includes methods for acquiring, processing, analyzing, and understanding images and, in general, high-dimensional data from the real world in order to produce numerical or symbolic information

Artist's Concept of Rover on Mars

E-commerce

- E-commerce business is a bustling segment of the retail industry, of late.
- Major e-commerce companies have been using the advanced technology like AI or machine learning
- Companies are using the AI as **Chabot's, AI assistants, Smart logistics,** using algorithms to predict and analyze customer's behaviors.
- The ultimate aim is to reduce shipping costs.
- Machine learning helps companies in demand forecasting, product search ranking, product and deals recommendations, merchandising placements, fraud detection, translations and much more.

Heuristic Classification

- Given knowledge of AI is to put some information in one of a fixed set of categories using several sources of information.
- Example information is available about the owner of the credit card, his record of payment
- Also about the item he is buying and about the establishment form which he is buying it(e.g., about whether there have been previous credit card frauds at this establishment).

The Application of AI can be shown as follows: