



Artificial Intelligence

Daud Khan Khalil
School of Computer Sciences
INU Peshawar



Recommended Books

- **Artificial Intelligence** by Stuart Russell and Peter Norvig
- **Artificial Intelligence: Structures and Strategies for Complex Problem Solving** by George F Luger
- **Artificial Intelligence** by Elaine Rich, Kevin Knight



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Intelligence???

- If you were asked a simple question; how can we define Intelligence, many of you would exactly know what it is but most of you won't exactly be able to define it.
- Is it something tangible? We all know that it does exist but what actually it is.
- Some of us will attribute intelligence to living beings and would be of the view that all living species are intelligent.
- But how about these plants and trees, they are living species but are they also intelligent? So can we say that Intelligence is a trait (characteristics) of some living species?

Continued...

- Consider the puzzle game where a mouse is trying to search a maze in order to find its way from the bottom left to the piece of cheese in the top right corner.
- This problem can be considered as a common real life problem which we deal with many times in our life, i.e. finding a path, may be to a university, to a friends house, to a market, or in this case to the piece of cheese.
- The mouse tries various paths as shown by arrows and can reach the cheese by more than one path.
- In other words the mouse can find more than one solutions to this problem. The mouse was intelligent enough to find a solution to the problem at hand.

Continued...

- Let us consider another problem. Consider the sequence of numbers below:
1,3,7,13,21.....
- If you were asked to find the next number in the sequence what would be your answer?
- Just to help you out in the answer let us solve it for you “adding the next even number to the numbers” i.e. if we add 2 to 1 we get 3, then we add 4 to 3 we get 7, then we get 6 to 7 we get 13, then we add 8 to 13 we get 21 and finally if we’ll add 10 to 21 we’ll get 31 as the answer



Continued...

- Again answering the question requires a little bit intelligence.
- The characteristic of intelligence comes in when we try to solve something,
- We check various ways to solve it, we check different combinations, and many other things to solve different problems
- All this thinking, this memory manipulation capability, this numerical processing ability and a lot of other things add to ones intelligence.



Intelligent Machines

What if

- A machine searches through a mesh and finds a path?
- A machine solves problems like the next number in the sequence?
- A machine develops plans?
- A machine diagnoses and prescribes?
- A machine answers ambiguous questions?
- A machine recognizes fingerprints?
- A machine understands?
- A machine perceives?
- A machine does **MANY MORE SUCH THINGS!**
- A machine behaves as **HUMANS** do? **HUMANOID!!!**



Continued...

- We will have to call such a machine Intelligent. Is this real or natural intelligence?

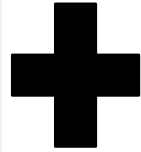
NO!

- This is Artificial Intelligence



What is AI

Artificial



Intelligence



***Artificial
Intelligence***





Artificial Intelligence

Artificial Intelligence

- Artificial intelligence (AI) is the simulation of human intelligence by machines.
 - The ability to solve problems
 - The ability to act rationally (logically)
 - The ability to act like humans

Continued...

- To make computers think like humans we first need to devise ways to determine that how humans think.
- This is not that easy. For this we need to get inside the actual functioning of the human brain.
- There are two ways to do this

Introspection

- That is trying to catch out own thoughts as they go by.

Psychological Experiments

- That concern with the study of science of mental life.



Continued...

- Once we accomplish in developing some sort of comprehensive theory that how humans think, only then can we come up with computer programs that follow the same rules.
- The interdisciplinary field of cognitive science brings together computer models from AI and experimental techniques from psychology to try to construct precise and testable theories of the working of human mind.



Continued...

- The computer would need to possess the following capabilities:

Natural language processing

- To enable it to communicate successfully in English

Knowledge representation

- To store what it knows or hears

Automated reasoning

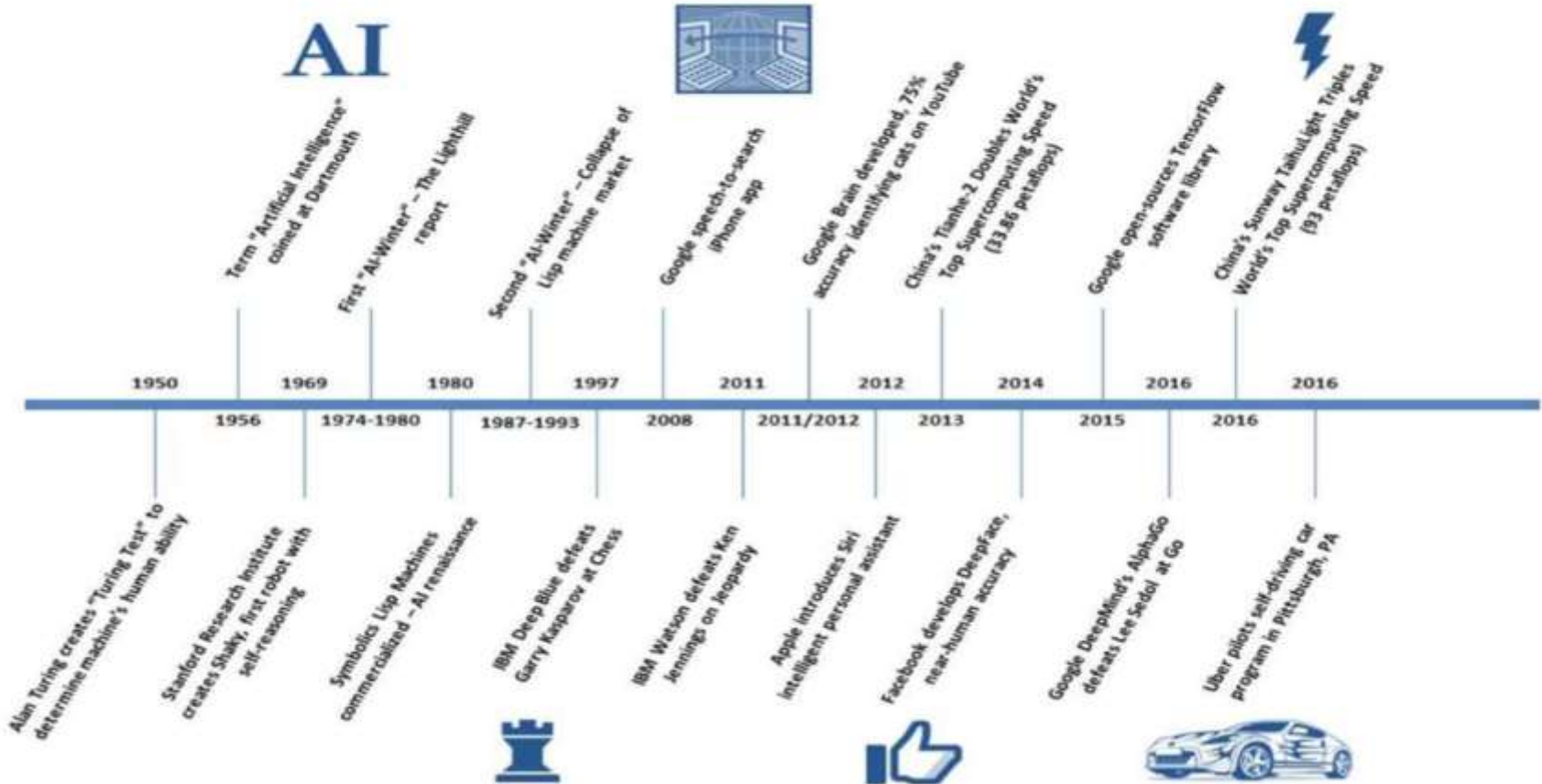
- To use the stored information to answer questions and to draw new conclusions

Machine learning

- To adapt to new circumstances and to detect and extrapolate patterns.

A.I. Timeline

A.I. TIMELINE



CURRENT STATUS OF A.I.

A.I. For Good



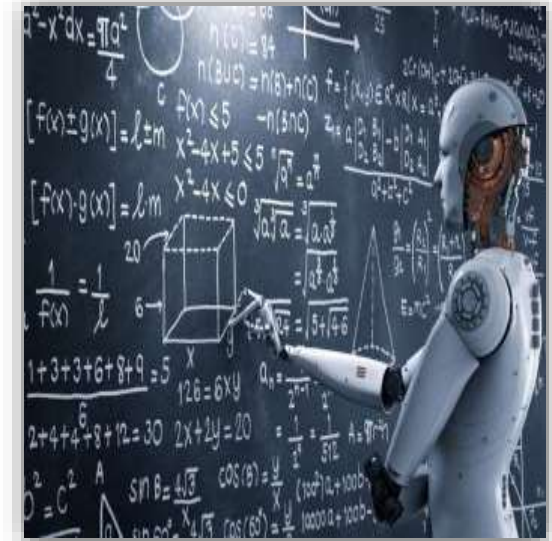
- Analyse Satellite Images to identify which areas have the highest poverty level

Aviation



- Gate allocation for plane while landing
- Ticket price determination

Education



- Companies are creating robots to teach subjects

CURRENT STATUS OF A.I.

Healthcare



- Solving a variety of problems of patients, hospitals & healthcare industry overall.
- Using Avatars in place of patients.

Heavy Industry



- Robots have become very common in many industries
- Can do repetitive laborious tasks

Finance



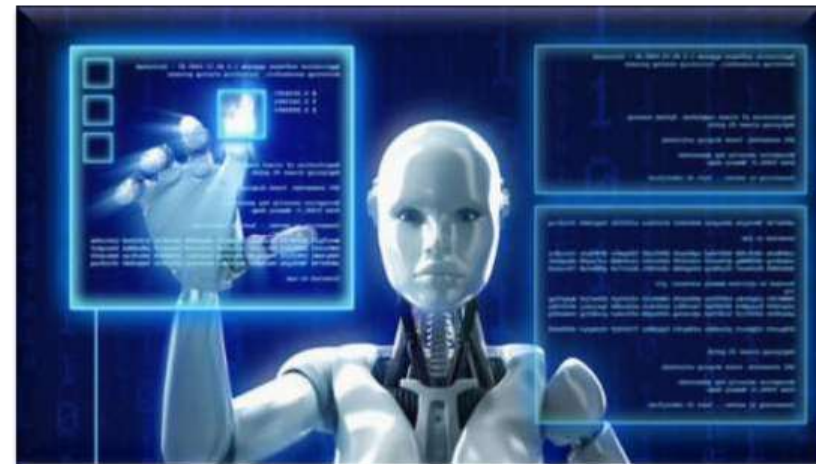
- Algorithmic Trading
- Market analysis & data mining
- Personal Finance
- Portfolio management

ADVANTAGES OF A.I.



- **The chances of error are almost nil**
- **It can be used to explore space, depths of ocean**
- **Smartphones are greatest example of A.I.**

- **It can be used in time consuming tasks efficiently**
- **Algorithms can help the doctors asses patients and their health risks**
- **Machines do not require sleep or break and are able to function without stopping**



DISADVANTAGES OF A.I.

- **High cost**
- **Decrease in demand for human labour**
- **AI may be programmed to do something devastating (demolish)**

- **Machine Ethics**

- **The storage and access are not as effective as human brains**
- **No improvement with experience**

