History of Artificial Intelligence

- The contributions of other fields to the development of AI is seen by many as so important that they consider the history of AI can’t be recounted without including the discussion of history of knowledge that dates back to Aristotle.

History of Artificial Intelligence

- **The gestation of artificial intelligence (1943-1955)**
- **The birth of artificial intelligence (1956)**
- **Early enthusiasm, great expectations (1952-1969)**
- **A dose of reality (1966-1973)**
- **Knowledge-based systems: The key to power? (1969-1979)**
- **AI becomes an industry (1980-present)**
- **The return of neural networks (1986-present)**
- **AI becomes a science (1987-present)**
- **The emergence of intelligent agents (1995-present)**

Gestation of AI

- Warren McCulloch and Walter Pitts (1943) gave the concept of artificial neural networks. They suggested that suitably defined networks could learn. Donald Hebb (1949) demonstrated a simple learning rule, now called **Hebbian learning,** for modifying the connection strengths between neurons.
- Alan Turing was the first to put forward a complete vision of AI in his 1950 article "Computing Machinery and Intelligence." Therein, he introduced the Turing test, machine learning. genetic algorithms, and reinforcement learning.

Gestation of AI

•Two graduate students in the Princeton mathematics department, Marvin Minsky and Dean Edmonds, built the first neural network computer in 1951 called SNARC.

The birth of artificial intelligence (1956)

- U.S. researchers interested in automata theory, neural nets, and the study of intelligence were brought together in a workshop at Dartmouth in the summer of 1956 where John McCarthy proposed the name for the field as "**artificial intelligence.**"

Early enthusiasm, great expectations (1952-1969)

- Starting in 1952. Arthur Samuel wrote a series of programs for checkers (draughts) that eventually learned to play at a strong amateur level.
- McCarthy in 1958 defined a high level language LISP, a dominant AI programming language. In the same year McCarthy and others at MIT invented time sharing. Also in 1958, McCarthy published a paper entitled *Programs with Common Sense*, in which he described the Advice Taker, a hypothetical program that can be seen as the first complete AI system.

Early enthusiasm, great expectations (1952-1969)

•At IBM. Nathaniel Rochester and his colleagues produced some of the first AI programs. Herbert Gelernter (1959) constructed the Geometry Theorem Prover.

•Newell and Simon developed Logic Theorist (1963a) and General Problem Solver (1963b).

•James Slagle's SAINT program (1963a) solved integration problems.

•Tom Evans's ANALOGY program (1968) solved geometric analogy problems.

• Daniel Bobrow's STUDENT program (1967) solved algebra story problems.

Early enthusiasm, great expectations (1952-1969)

- Hebb's learning methods were enhanced by Bemie Widrow (Widrow and Hoff, 1960; Widrow. 1962), who called his networks **adalines,** and by Frank Rosenblatt (1962) with his **perceptrons.** Rosenblatt proved the **perceptron convergence theorem.**

A Dose of Reality

- In 1966 the failure of machine translation project brought an end to the US government's funding of the project.
- Minsky and Papert's book: *'Pcrceptrons'* (1969) proved that. although perceptrons (a simple form of neural network) could be shown to learn anything they were capable of representing, they could represent very little.
- In 1973 Lighthill report entailed cutting of British funding to AI research in all but two universities in the Great Britain.

Knowledge-based Systems (1969-1979)

- The DENDRAL program (1969) solved the problem of inferring molecular structure from the information provided by a mass spectrometer.
- MYCIN was developed in mid 1970s at Stanford that diagnosed blood infections.

AI becomes an industry (1980-present)

- The first successful commercial expert system R1 began operation at the Digital Equipment Corporation (McDermott, 1982)
- Nearly every major U.S. corporation had its own AI group and was either using or investigating expert systems.
- In 1981, the Japanese announced the "Fifth Generation" project, a 10-year plan to build intelligent computers running Prolog.
- United States formed the Microelectronics and Computer Technology Corporation (MCC) as a research consortium

AI becomes an industry (1980-present)

- Alvey report reinstated the funding that was cut by the Lighthill report.
- The AI industry boomed from a few million dollars in 1980 to billions of dollars in 1988. Soon after that came a period called the "AI Winter." in which many companies suffered as they failed to deliver on extravagant promises.

The return of neural networks (1986-present)

- In the mid-1980s at least four different groups reinvented the back-propagation learning algorithm first found in 1969 by Bryson and Ho.

AI becomes a Science (1987-present)

- Judea Pearl's (1988) *Probabilistic Reasoning in Intelligent Systems* led to a new acceptance of probability and decision theory in AI.

The emergence of intelligent agents (1995-present)

- The work of Allen Newell, John Laird, and Paul Rosenbloom on SOAR (Newell. 1990: Laird el al., 1987) is the best-known example of a complete agent architecture.
- AI technologies underlie many Internet tools, such as search engines, recommender systems, chatbots, and website construction systems
- We find AI in action in driverless cars, data analysis tools, routing and scheduling jobs, etc.