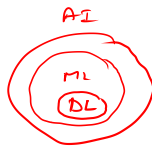# Machine Learning (ML)

- Arthur Samuel coined the term Machine Learning in year 1959.
- He was expert in AI and computer gaming.
- Machine Learning algorithms enable computers to learn from data, and even improve themselves without explicitly programmed.
- Any field that needs to interpret data and act on the data can benefit from ML techniques.
- ML is branch of AI

AI

DL - Deep Learning

Why Machine Learning?

- Recent progress in algorithms and theory
- Growing flood of online data
- Computational power is available

Features of ML:

- Automation
- improved customer experience
- Automated data visualisation
- Business Intelligence

Three <u>major domains of ML</u>:

① Data Mining:
 — using historical data
   to improve decision making

 e.g., Medical Records
              ↓
      medical Knowledge

② software Applications that we can not program by hand.
      e.g., — Autonomous driving
            — Speech Recognition

③ self customised programs
      — News Reader that learn user interests.

What is ML?

- Automating Automation
- getting computers to program themselves.

Traditional programming

data ⟶
program ⟶ [computer] ⟶ output

Machine Learning

data ⟶
output ⟶ [Computer] ⟶ program

ML is used in
- speech recognition
- Natural language processing
- Computer Vision
- Medical outcomes analysis
- Robot control
- etc

Applications of ML

- Web Search
- Finance
- E-Commerce
- Robotics
- Information extraction
- Social Networks
- Debugging. etc

- Thousands of ML Algorithms are available.
- Every ML algorithm has 3 components
    - Representation
    - evaluation
    - optimisation