Unit 01 L12 An Interdisciplinary Study

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- An Interdisciplinary Study
  - Different disciplines study the mind using different approaches and methodologies based on the established concepts and theories.
  - Cognitive Science attempts to find the intersections of these studies and validate the findings using computational means.
- Interdisciplinary Approaches
  - Philosophy
  - Psychology
    - Emotion
  - Neuroscience
    - Network
  - Linguistics
  - Anthropology
    - Evolutionary
    - Social
  - Artificial Intelligence
    - Robotics
- Philosophy
  - Philosopher: Called the big thinkers
  - Approach: Raise questions, collect facts and data, and try to answer using logic and reasoning.
    - What is mind?
    - Is mind separate from the body (the mind-body problem)?
      - Is the mind created with the same matter as the body?
      - Is cognition influenced by the body? How?
        - Embodied Cognition
        - Situational Cognition
    - How can mind be used to explain mind?
    - What is consciousness?
      - Differences between conscious and unconscious thoughts and behaviours.
- Psychology
  - Psychologist: More practical and experimental
    - Let's identify and study the process of mind, but how?
    - What stimuli results in what observable behaviour?
      - No other way to explore what is happening in the mind.
  - Approach: Design experiments focused on a specific aspect of the mental proces which are performed by multiple subjects.
    - Must use definitive methodology for the study that is guided by a hypothesis.
- Neuroscience
  - Neuroscientists: Focus on the hardware, the brain instead of the more abstract mind.

        - How does the brain work and dictate the processes of the mind?
    - Approach: Experiment with the brain regions
        - Imaging & Lesion technology
            - EMR
            - fMRI
- Linguistics
    - Linguists: Study human ability to learn and communicate using language and grammar.
        - Sign of intelligence as no other animal uses such structured language.
            - How do we acquire language skill?
            - Do we learn all of it after birth or us some of it innate?
            - How can we understand vague of scrambled writing but machine cannot?
            - What does the common aspect of various languages?
            - How does the knowledge of multiple languages affect language processing skill?
    - Approach: Study with different culture and experiment with subjects.
- Anthropology
    - Anthropologist: Study how social and cultural upbringings affect our minds work -- theories of evolution and survival of the fittest.
        - Why are men exploring good in exploring new routes but women are good in remembering routes?
        - Why are we good at solving logic problems that are related to real life and survival compared to general logic problems?
        - Why do we remember some things better than the others?
        - Why do we sometimes value sharing over personal benefits?
    - Approach: Study different cultures and experiment with subjects.
- Artificial Intelligence (AI)
    - AI: Can machines be programmed to be intelligent like humans?
    - Approach: Program the machines to think, learn solve problems and produce human like response by building computational models of the various process of the mind.
        - Use computers as these have the computational powers to understand and execute instructions contained in computer programs.
        - The instructions apply different process execution strategy known as algorithms.
- Sub-Categories
    - Emotions
    - Network
    - Evolution
    - Social
    - Robotics
- Machine Intelligence
    - Cognitive Science is the search for an operational explanation of the intelligence of the human mind.

        - The word "operational" insists that our explanations are rooted in formal systems of representation and computation to the extent that they may, in part, be tested out on a computer.
    - When such tests are successful, the result is often referred to as machine intelligence. Which falls under he umbrella of Artificial Intelligence.
        - Machine intelligence can also be achieved with methods that do not act as explanations of human cognition.