

~~Assumptions~~ Computer Metaphor - Acc. to this our cognitive processes work like a computer, that is a complex, multipurpose machine that processes information quickly & accurately.

ARTIFICIAL INTELLIGENCE [John Mc Carthy.]

Human Approach

System that think like human

System that act like human

Ideal Approach.

System that think rationally

System that act rationally

Imp topics related to AI - computer metaphors - Pure AI
- computer stimulation - PDP.

AI is intelligence demonstrated by the machine

AI is the stimulation of human intelligence process by machine especially computer & system.

Abilities of AI

- Vision
- Memory
- ~~Listening~~ hear.
- Ability to reason, discover meaning, generalize and learn from experiences.

1956 - 7 ± 2 Miller

1957 - Chomsky

1958 - ~~Review of Skinner~~ John Mc Carthy

1959 - Review of ^{B.F.} Skinner's verbal language

1967 - Cognitive Psychology.

Pure artificial Intelligence ^{It is an approach that} designs a program to accomplish ^{or superior} a cognitive task as efficiently as possible, even if the computers processes are completely different from the processes used by humans.

Computers ~~simulate~~ ^{take human} simulations into account. The goal of computer simulation is to program a computer to perform a specific cognitive task ^{in the same way the humans actually perform} to

"AI is the science and engineering of making intelligent machines, especially computer programs."

It is related to simulate task of using computers to understand intelligent but AI doesn't have to confine itself to method that are biologically observable."

- John McCarthy
2003

Applications of AI

- Expert System -
- Natural language process - ^{enables} human language
- Speech recognition - ^{enable} google
- Computer/Machine vision - ^{compute} recognition ^{obj}
- Customer Service.

TMS - Transcranial Magnetic Stimulation. (Dr. Anthony Barker)

* Cognitive Neuro Ergonomics machine works as per human cognition

Modulation of Mind Model - theory by Pinker

- ↳ localisation of brain

Idea was that specific area of brain is responsible for specific functions.

Metacognition

In the late 1970's John Flavell originally coined the word "metacognition". He defined the word as "cognition about cognitive phenomena" which means thinking about thinking.

Cross and Paris

"the knowledge and control children have over their own thinking and learning activities".

Although term have been known for a long time, especially in the field of educational psychology, defining metacognition can be difficult. Until now there are still debates as to what the term exactly means.

Components of Metacognition

- Metacognitive knowledge
- Metacognitive regulations
- Metacognitive experiences.

① Metacognitive knowledge.
refers to the ^{awareness} knowledge
individuals possess about themselves
and other people as cognitive
processors.

These are of 3 types.

→ Declarative knowledge - refers to
the ^{the} factual knowledge info.
that we know, that can be
both spoken or written.

→ Procedural knowledge. refers to the
info we know on how to do
something or how to perform
the ~~procedural~~ procedural steps that
make up to the task.

→ Conditional knowledge. refers to the
knowledge about when to use
a procedure, skill or strategy
and when not to.

② Metacognitive Regulations has to do
with people's controls over cognitive
and learning experiences through
set of methods that help people
regulate their learning.

2 Important skills are:

- Planning - involves suitable selection of strategies and the assignment of resources
- Monitoring - includes awareness of understanding and task performance.
- Evaluation - refers to the assessment of the final result of a task and the efficiency ~~can~~ carried out during the task performance.

③ Metacognitive experiences involves cognitive effects that are current taking place.

Donders' Pioneering experiment

Donders was interested in determining how long it takes for a person to make a decision.

He determined this by measuring reaction time - how long does it take to respond to presentation of a stimulus.

He used 2 measures of reaction time.

He measured simple reaction time by asking his subjects to push a button as rapidly as possible when they saw a light go on.

He measured choice reaction time by using 2 lights and asking his subjects to push two lights and asking his subjects to push the left button when they saw the left light go on and the right button when they saw the right light go on.

The step that occurs in the simple reaction times shows =

presenting the stimulus (the light) causes a mental response (perceiving the light), which leads to a behavioural response (pushing the button). The reaction time (dashed line) is the time between the presentation of the stimulus and the behavioural response.

But ~~some~~ remembers that Donders was interested in determining how long it took for a person to make a decision.

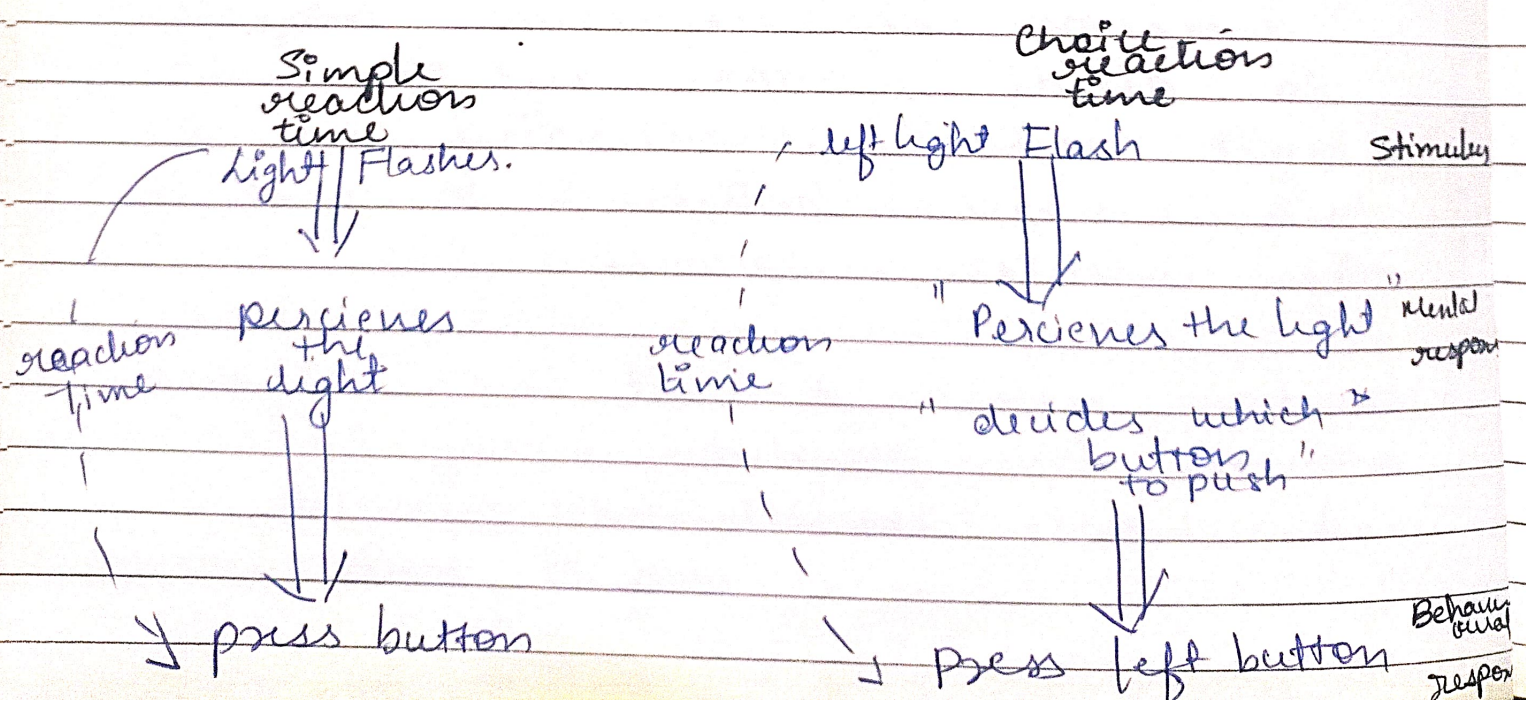
The choice reaction time added decision by requiring subjects to decide whether left or right light was illuminated and then which button to push to the mental response.

Donders reasoned that the difference between in reaction time in simple and choice conditions would indicate how long it took to make the decision that led to pushing the correct button.

Because the choice reaction time took one-tenth of a second longer than simple reaction time.

Donders concluded decision making processes took ~~a~~ one-tenth of a second.

Donders's experiment was important both because it was one of the first cognitive psychology experiments and because it illustrates something extremely significant about studying the mind: Mental responses (perceiving light and deciding which button to push, in example) cannot be measured directly, but must be inferred from behaviour.



Cognitive Neuroscience

It refers to the ~~field~~ a subfield of neuroscience that studies biological processes that underlie human cognition. This field studies the neural connections within the human brain. It helps in determining how the brain achieves the functions it performs.

It is considered cross disciplinary as it combines the field of biological sciences and behavioural sciences.

Cognitive Science

It is the interdisciplinary, scientific study of the mind and its processes with input from linguistic, psychology, neuroscience, philosophy, computer science / AI and anthropology. It examines the nature the task and the functions of cognition. Cognitive scientists study intelligence and behaviour, with focus on how nervous systems represent, process and transform information.

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Diff b/w Cognitive Science, Cog. Psy.
and Cog. neuroscience.

- Cognitive science is the study of the mind, and mental processes, and incorporates different fields like philosophy, psychology, AI, technology, neuroscience and anthropology.
- Cognitive psychology is more focused on information processing and behaviour.
- Cognitive neuroscience studies the underlying biology of information processing and behaviour.

See it like a circle.

