CGS601
Assignment-3

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There are various metaphors used to understand the functioning of the human mind. The one which is extensively discussed in lectures is provided in question i.e. “Information Processing”. There were various other metaphors such as car-engine analogy, hardware-software which was later combined with information processing itself. There were various approaches not exactly a metaphor but were used to describe the functioning of the brain such as AI approach, Neural Networks, Cognitivist approach etc.

The most descriptive and discussed in detail approach is Information Processing, so I will try to provide a more deeper insight into this approach along with what was discussed in lectures.

Information approach tries to break the entire brain function like that of I/O devices with the brain as a CPU(processing unit of information). This approach tries to accommodate many aspects such as how an individual perceives, makes a logical sense out of it, memory etc.

Information processing approach is researched with a wide variety of angles and Shannon and Weaver who introduced this theory was majorly focused on efficiency of information processing. This lead to further classification as we have described below in detail. They developed a statistical formulation to describe inter-dependability of various variables on efficiency.

Redundancy: Generally referred to as how much of the signal can be predicted from other parts of the signal. Quantitative measure of signal was attempted by Shannon and Weaver.

This information processing approach basically tries to emphasize how information entering through the sensory inputs is encoded for after use, utilised, retrieved, saved. So information processing is generally linked with computer model perspective and how computers perform action on memory. Basic analogy of communication over a telephone was provided in the lecture.

As sensory inputs pick a very large set of information, and the brain is not able to process every bit instantaneously, the initial input is stored in short term memory and if it remains unattended, it will slowly vanish. To save information to memory, it can be hypothesised that either information can be stored by constantly revising or repeating information in memory and short term memory or can be saved if we are able to associate the new information to pre-saved knowledge related to new knowledge.

There are many models and theories which are based on information processing approach. One major one is **“Level of Processing”** theory. This utilises the above that all sensory input is taken but information retained or will be discarded depends on further levels of processing. The

general proposition of levels is based on elaboration in processing of information. There are more models such as **“parallel processing”** which state that information is processed simultaneously in different parts. **‘Connectionistic”** model is a further extension of parallel processing. This states that information is saved in various locations of the brain and has networks between them. This model is highly consistent with modern research.

Cognitive Psychology has a lot of different theories and various psychologists has vastly varying opinions but their are many common terms that most of them agrees related to information processing models are the following principles:(Ref : http://www.edpsycinteractive.org/topics/cogsys/infoproc.html)

- Limited capacity of brain
- Control Mechanism for encoding, storing, retrieval for information
- Bi-directional flow of information, to understand the surrounding we use the information from sensory inputs and also the pre-existing knowledge.
- “Genetically prepared to process and organize information in specific ways”

Stage Model: Memory is one of the most important components of the information processing model and it’s most popular model is the stage model which was put forward in 1968 by Atkinson and Shiffrin. According to this, the input is processes in 3 stages, brief description is as follows:

- Sensory Memory : When the stimulus energy is transformed to a required form of energy (generally electrical), and in this case a memory is created which is a very short term varying for different inputs.
- Short term Memory : It is the instantaneous memory and is referred to as the live or working memory and refers to the thing or moment we are thinking at that time.
- Long Term Memory : Which is not actively present but can be recalled easily. One more important aspect of long term memory is how it is organised. This is generally divided as follows:
    - Declarative Memory
    - Procedural Memory
    - Imagery

Information Processing Approach is one of the fundamental models and has been studied extensively. One of the most dominant areas of research is around **“Connectionstic”** which is a model based on information processing and most of the results are consistent with this model. The Information Processing model paved a way to understand the input and how it is processed and the output. Though it is not as simple as explained by Shannon and Weaver but still the contributions made by them highly influenced the modern research in cognitive psychology. The internal structure and the in-between events of stimuli and responses were the things that can be understood as an advanced and complicated concept of prediction-statistical analysis.

References:

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