Understanding the Brain – A Complex Combination of Algorithms

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Abstract:

The mind is an indispensable asset for every human movement, thought, or behavior. For this reason, the study's focus and problem is to model the basic functions of the brain: sorting, storing, and recalling information. For this study, a Java program was developed to represent such functions. In this program a random set of memories were generated for this study on a scale from 1 to 50. These values were sorted into Binary Search Trees. These trees were predetermined to only contain permanent memories therefore the memories cannot be replaced, only shifted. New memories were then added with random values occupying a temporary tree first in which the values can be swapped and deleted. Afterwards, a retrieval program, based on the Shortest Path Method and Critical Path Method, runs to find the selected nodes of the trees. If the memory is found its value slightly increases. On the other hand, if it is not found the memory is considered to be out of range and must be brought within range. This is done by slightly decreasing the values of the nodes closer to the root than the selected memory. If the memory being recalled is part of the temporary tree it must be called a certain number of times before it can be pushed into a permanent tree. Its value in the permanent tree is the percentage of times it was called within 50 calls times 50. If the memory does not get called enough times it will be deleted from the temporary tree

Although this program does not take every factor into consideration, it describes the basic processes of the brain. It also helps to explain some phenomena such as temporarily forgetting, sudden remembrance, instinctual reactions and much. The acquired data suggests that there is strong correlations between the amount of times a memory is recalled and its retrieval rates.