AS WE KEEP SEARCHING

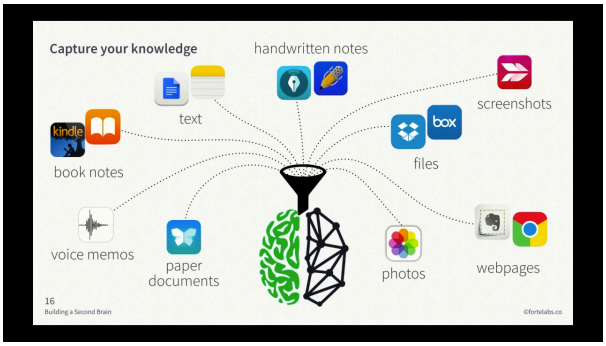
MY REFLECTIONS ON “AS WE MAY THINK”

Summary - Using observations of the first principle of our senses, the problems of information management and retrieval can be addressed. Technology is growing more accessible by the passing day, and systems can be devised to enhance or replace the processes of information capturing, organisation, searching, and recalling. Significant advancements can be brought by understanding human cognition and its impacts on how we process information.

“Those who do not remember the past are condemned to repeat it.”

The philosopher George Santayana suggested the above idea to recognise that history is cyclical in nature and will repeat itself after a finite period of time. One primary reason is that some human problems are core to our existence, and have existed since times immemorial. The problem studied by the editor, Vannevar Bush, is that of organising the process of capturing and retrieving information as efficiently as possible by a combination of feasibility and imagination. Since the ancient ages when cave paintings were drawn with inaccessible materials to the modern time when there is active funding on graph databases to imitate human memory, the capability to store and use information is an ever-developing field. **Information overload is a significant grand challenge in the modern scenario**, and I am humbled upon finding out that the scientific community from 1945 also faced this issue.

An important part of the human experience is thoughts and memories - by revisiting them, we stay more connected to our authentic roots and traits. Google Photos, which again returns to the original assertion of information management and retrieval, reminds us of our memories associated with pictures from the past. Needless to mention, these pictures are just a small snippet of our complicated lives, and we end up being most connected to the ones we are able to revisit. Similarly, the ability to recall and stay close to our findings and learnings can positively impact our memory, our long-term absorption of concepts, and our prowess with regards to recalling or applying them. According to Bush, these advances for our mind are long overdue considering the gigantic leaps made by man in the domain of the physical body. In the postmodern scenario, the paradigm of “second brain” is gaining popularity, which is essentially making a convenient and fast repository digitally so that our human brain is concerned only with cognition and not information management (shown below).



The imagination and courage of Bush is admirable, as he uses first-principle approach of our sensory systems to replace them with technology of his time. The eyes mimic the photocell and

television, while the mind is replicated by his implementation of an association-driven system of organising and retrieving information. Some inventions, like those of Babbage, were too ahead of their time and were not economically feasible, but Bush had the fortune of being in 1945 where multiple mechanical parts were easy to manufacture. This rendered cameras more accessible to the scientists, and the same applied to the Voder and Stenography machines. **Since writing and pictures were mainly used for expressing ideas, Bush remarked that the ubiquity of better photography techniques and replacement of writing with voice-dictation will drastically ease the process of creating information. It's also astounding to notice that in the modern age we are still mastering the details of this very process** - photos are being clicked and organised more easily every passing day, and dictation of text is still being perfected by voice assistants like Alexa. The most important detail to be noticed here is that Bush has successfully cracked the cognitive side of creating information, and has devised mechanisms to utilise these principles for creating a fictional machine of the future.

He acknowledged the challenge of various types of data formatting and mathematical notations/ operations that are more difficult to dictate than textual information. Thereafter, he suggests that by arranging the right circuitry, logic can also be programmed and hence application of logic also becomes easier for the future scientist. I disagree with this notion, as the applicability of such circuitry to different kinds of work is an extremely far-fetched idea. The functioning of a historian is dramatically different from that of a chemist. Fields that have any amount of subjectivity involved will fail to use this idea.

The most powerful part of the paper is the **characterisation of the human mind as an entity working on the principle of association**. While talking about one topic, we can jump to another topic that gets referred to in the explanation of it. Our thoughts can, for example, relate the Cold War era to how films in America showed the popular notions of heroes and villains. I intently agree with this model of the mind, and would like to inform the reader that this is also the basis of graph databases, a new technology emerging in the year of 2021, 76 years after Bush wrote his paper. Using principles of human cognition is also a basis for artificial intelligence. **This is hardly reflected in the traditional indexing and hierarchical system of files and data that existed**.

Another astonishing doctrine of Bush is that **users can, in his hypothesised system, tag associations between elements and make their own custom trails that can be viewed and recalled conveniently**. This principle is in active use today (2021), as our activity is used to create better recommendation systems for our content consumption. This cognitive aspect of association is also illustrated by the following network of trending topics in Wikipedia from September 2018. It's also compelling to note that using such association trails, lawyers can tag associations to other bare acts, references, and cases to be referred for a particular problem. This knowledge is transferable and usable by other rookie lawyers. Similar premise applies to chemists, historians, doctors, etc. - using association trails is useful to track patterns and meaningful insights which could not be captured by the system of indexing and hierarchy that was traditionally being used.