



# Animal and Human Brain Work with Treatment Its Malfunction

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**Abstract**—Performance and implementation of animal's and human's brain memory with brain processors (chips) are clearly explained in a new dimension in this paper. Animal's brain memory including human one consists of two parts- One is volatile nature working or running memory, named Short Term Memory (STM) which is Random Access Memory (RAM) type and the other is nonvolatile permanent memory, called Long Term Memory (LTM) like Programmable Read Only Memory (PROM) type. These memories STM and LTM are connected with brain processors (chips) which are located in the middle portion of the brain. Animal peripherals like eye, ear, nose, skin, tongue etc. code the intelligence or the information in binary bits 0s and 1s, and store these coded bits into permanent memory LTM after manipulating by brain processors via working memory STM. Total size of a STM in human brain is 7 locations or bytes like characters (8 bits X 7) with the storage capacity per location 8 bits. Sleeping with dream is described in a scientific innovative technique in this paper. This paper also identifies the cause of brain malfunctioning or diseases and their treatment procedures. Thus this study shows how the memories STM and LTM along with the brain processors in animal brain including human one is planned and working.

**Index Terms**— Artificial brain processors (chips), Bit storage: STM (8 bits X D) and LTM (8 bits X K), Brain malfunctioning, Brain processors (chips), Magical number seven, Positive Emission Tomography (PET) scan, Permanent memory LTM, Working memory STM.

## I. INTRODUCTION

Two types of memory cells construct animal brain including human brain; one is volatile nature working or running memory, called Short Term Memory (STM) [1]-[19]. STM is Random Access Memory (RAM) type in which reading or writing both is possible. The other one is non-volatile permanent type, named Long Term Memory (LTM) which is Programmable Read Only Memory (PROM) type [1]-[19]. In LTM generally reading is done, writing done very occasionally. LTM storage is fairly permanent. These memories in brain are connected to animal peripheral organs like eye, ear, nose, skin, tongue etc. via billions or trillions of

complex neurons [1]-[16], and ultimately the working memory STM are linked with the brain processors (chips) lying in the middle part of the brain in which all processing, i.e., manipulations of information (data) and decisions (logical functions) are carried on. The capacity of an animal brain processor and memory are differed animal to animal. The brain processors are having multi-chips configuration with parallel processing. These processors are interconnected with each other. Animal brain network including human one are explained by bottom up or top down neural network having several hidden layers. In this article, it emphasizes a different simple approach to explain how the memory in a brain is engineered to identify the signals or information consisting of certain energy levels or voltages or simply data in binary bits.

In a right handed person, "The right brain" is the uneducated "innocent" that has learned nothing, therefore, in matters of drawing, music and art, the right brain can see things with an innocent eye [4], [5]. One can draw the things or grasp the matter, as they really look. Thus the right brain allows a more holistic view, instead of building things up point to point. This right brain consists of Short Term Memory (STM). Perceptual information is stored directly in STM. On the other hand, "The left brain" is the "educated" part of the brain and picks up on language, symbols, mathematics, analyzing things and matter. So, in left-brain, concepts and perceptions are formed, analyzed and lodged. Thus the left brain contains Long Term Memory (LTM). LTM consists of episodic and semantic memory with production rules. Episodic memory contains information about past personal experiences such as school-college life, working experience, wedding etc., semantic memory includes facts like some particular person's way of acting, bird's fly etc.

It is possible to see which parts of the brain are working at any given moment by doing a Positive Emission Tomography (PET) scan. To be creative or inventive, one need to do is to drop the left-brain behavior and use the right brain behavior. In nature, patterns are in classic asymmetry. It is precisely this phenomenon of asymmetry which gives

rise to both humor and creativity. Humor is by far the most significant behavior of human brain. Humor indicates, better than any other mental behavior, the nature of information system that gives rise to perception. This is a self-organizing information system. With this by application of the right brain, the most creative behavior evolves. To be more creative, one has to follow “lateral thinking”, i.e., to move “sideways” for trying different perceptions, various concepts and different points of entry. It is observed that the brain processors (chips) are doing two types of functions like inventive or creative (higher logistic) and operative or manipulation type, with the help of STM (RAM type) and LTM (PROM type) for data handling and storage.

Since we all know about “The Magical Number Seven” invented by Prof. Miller [6], [7]. In this, it is stated that human beings are unable to keep in mind for a moment of time more than seven alphanumeric characters of information, i.e., 7 bytes, thus one can remind up to seven bytes for a moment of time in the working memory STM (RAM type). It means that the human brain is having a place in the working memory STM seven (7) bytes or locations storage or (8 bits X 7) memory capacity only, Every time this temporary seven bytes memory locations STM are transferred parallel to and fro our permanent memory locations LTM. Thus for a short period of time, when we are unable to transfer the data from working memory STM to permanent memory LTM, the data or information is lost or overflow if it is exceed than the working memory STM’s capacity, i.e., for human (8 bits X 7) or 56 bits. Fig. 1 shows that the working memory STM is having fixed length storage (8 bits X D), Where  $D \leq 7$ , i.e.,  $D = 7$  for human being having 56 bits storage area. For other animals the capacity of STM is either less or equal to that of human being, i.e., for them  $D \leq 7$ . Generally STM (RAM type) resides in the right side and LTM (PROM type) dwells in the left side of the brain for a right handed person or animal.

0 <sup>th</sup> bit	1 <sup>st</sup> bit	2 <sup>nd</sup> bit	3 <sup>rd</sup> bit	4 <sup>th</sup> bit	5 <sup>th</sup> bit	6 <sup>th</sup> bit	7 <sup>th</sup> bit
			1 <sup>st</sup> row				
			2 <sup>nd</sup> row				
.....	.....	.....	.....	.....	.....	.....	.....
			D <sup>th</sup> row				

Fig. 1. Working memory STM (8 bits X D) capacity.

## II. BRAIN MEMORY STM AND LTM WORKING WITH BODY PERIPHERALS

In animal eye, which is one of the peripherals, the inside of the wall’s entire posterior portion of the innermost membrane of the eye is the retina [8]-[12]. When the eye is properly focused, light from an object passing through the eye lens is imaged on the retina. There are two types of discrete light receptors over the surface of the retina, called cones and rods. Cones are located primarily in the central

portion of the retina, named as the fovea, and highly sensitive to color. Cones are energized in bright light, thus it is called photopic or bright light vision. The number of cones in each human eye is between 6 million and 7 million. The number of rods in each human eye is 75 million to 150 million, distributed over the retinal surface, but the several rods are connected to a single nerve reducing the receptors. They cannot dictate color and only sensitive to low levels of illumination. In dark or moonlight, only rod is energized, known as scotopic or dimlight vision.

We can take the fovea as a square sensor array of size 1.5 mm X 1.5 mm. The density of the cones in the human retina is 1,50,000 elements per mm<sup>2</sup> approximately. In bright light vision, the image is focused on the fovea, which is considered as a grid of size 1.5 mm X 1.5 mm. Every pixel indicates the light energy as received. This fovea size can be assumed 8 pixel X 8 pixel square array grid. Thus when an image focused on fovea of size 8 pixel X 8 pixel, every pixel consists of some energy in terms of voltage according to gray value or color of the image. Then the charges or the voltages of higher energy pixels in the grid (matrix) of the retina, which are imaged at fovea in bright light vision and in the whole retina in dark light vision, are transferred sequentially to the brain working memory STM (RAM type) via neuron nerves.

Also any sensation or signal or information, e.g., hearing by ear, smell by nose, touching by skin, taste by tongue etc. are transferred to voltages by the corresponding peripherals like ear, nose, skin and tongue respectively, which are further transmitted to the brain working memory STM for processing by the brain processors (chips) via neural nerves as bits 0s and 1s according to the voltage level.

## III. SIGNAL CODING - DECODING TECHNIQUE DONE BY BRAIN MEMORIES STM AND LTM WITH BRAIN PROCESSORS CONNECTING BY NEURAL NERVES

Energy or voltages from body peripherals like eye, ear, nose, skin, tongue etc. are coded in binary bits 0s and 1s after thresholding by the connecting neuron nerves and transferred to the working memory STM of 8 bits length in a location sequentially. After getting serially one full block of 8 bits in the working memory STM, data (bits) is transferred parallel either to the permanent memory LTM or to keep in the STM upto D bytes as a block shown in Fig. 2. Here, the size of a permanent memory LTM for storage block K bytes which varies animal to animal and the total storage capacity is (8 bits X K) or (8 X K) bits. It is noteworthy mentioned that in animal including human, K is very much greater than D, i.e.,  $K > D$ .

A nerve consists of many parallel independent signal paths, each of which has a nerve cell or fibre [9]-[18]. Each cell transmits signals only in one direction, i.e., it is

unidirectional, separate cells carry signals to or from the brain. Each cell has an input end (dendrites), a cell body, a long conducting portion or axon and an output end. The input end (dendrites) may be a junction with another cell or a transducer (threshold voltage) which is converting these voltages to binary bits 0s and 1s. There is a threshold mechanism, i.e., converting minimum level of energy or voltage to bits, which activates the input end. When an input signal exceeding a certain threshold is received, the nerve fires.

An impulse or action potential of fixed size and duration travels down the axons of the nerve. The axon transmits the impulses without change of shape. The axon can be more than a meter in length, constitute a nerve. The properties of axons are similar to electrical line or cable; its diameter  $1\ \mu\text{m}$  to  $500\ \mu\text{m}$  and pulses speed are  $0.6\ \text{ms}^{-1}$  to  $100\ \text{ms}^{-1}$ . Electrical potential is about  $-70\ \text{mv}$  less than outside the cell in a resting axon. As the impulse passes by the electrode, the potential rises in a millisecond or less time to about  $+40\ \text{mv}$ , and then it falls back to about  $-90\ \text{mv}$  and then recovers slowly to its resting value of  $-70\ \text{mv}$ . The membrane is said to depolarize and then repolarize.

In this way, the energy or charge (voltage) is passed through the axon of the nerve from one point to other point in the body. Likewise the charges or the voltages of higher energy pixels in the grid or the array of the body peripherals is transferred sequentially to the brain working memory STM (RAM type) via neuron nerves.

The eight bits in the working memory STM constituting one information (character) are parallel connected to the corresponding bits in the first block of the permanent memory LTM (PROM type) and the brain processor (chip) as shown in Fig. 2. This working memory STM is volatile in nature, i.e., in sleeping condition or unconscious moment, data (bits) in the working memory STM are lost or erased or overwritten, but in the permanent memory LTM, the information or the data remains for a particular interval of time depending on the total storage capacity in the particular LTM, the amount of data for a specific information, i.e., blocks contained etc.

Any information or intelligence or image or sensation are first converted in electrical voltages by the corresponding transducers or the peripherals like eye, ear, nose, skin, tongue etc., the voltages are coded in binary bits by the connecting nerves. Then the connecting nerves transfer the bits serially to the temporary working memory STM, having seven blocks or locations for a human one (or less than 7 bytes/blocks for other animals) in which eight bits storing in each location, i.e., total  $(8 \times 7)$  bits or 56 bits capacity for a human one.

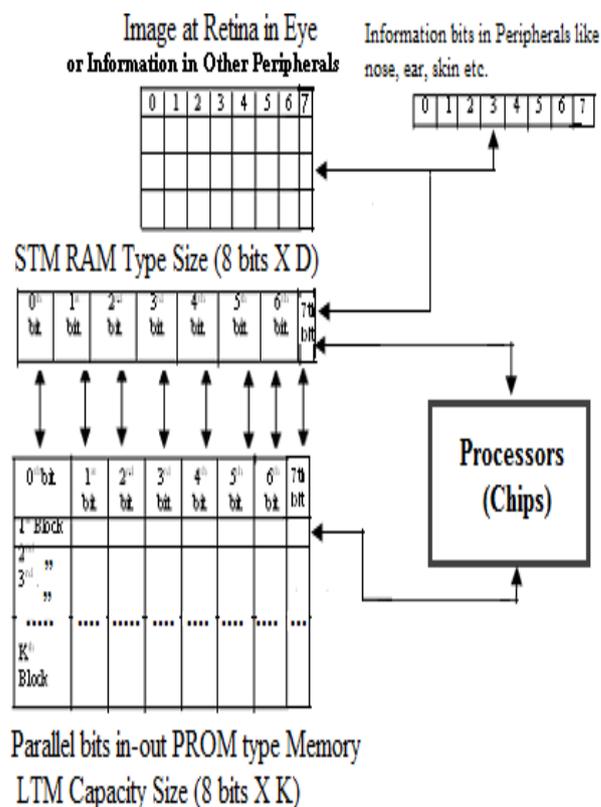


Fig. 2. Brain Memory with Processor planning and working

After filling up data (received from the connecting nerves) one block (8 bits) in the working memory STM, these data bytes (8 bits in each location) from the STM are pushed parallel either on the top (beginning) of the permanent memory LTM stack or the brain processors (chips) or keep it in own memory (for human one maximum upto 7 bytes or blocks) and vice versa. It means that the first block (byte) of a permanent memory LTM is always vacant or empty which is ready to accept data either from the STM or the brain processors. After depositing data in the first block or byte of a LTM, the data is pushed downwards to the second block of the LTM and the first block of the LTM becomes vacant again to accept next data. Likewise data is gradually pushed downwards in the LTM following First-in-First-Out (FIFO) principle.

Hence all bit positions in the first block of the working memory STM are parallel connected either to the same bit positions of the first block (byte) in the permanent memory LTM or the brain chips. In a LTM, the first block is connected with parallel corresponding bit positions to its all other blocks or locations and also each block is connected parallel corresponding bit positions to the next block to slide data or information. When this first block in the permanent memory LTM transmits or receives any 8 bits data to and from the working memory STM or the brain chips, the data containing in the first block (byte) of the LTM are transferred to its second block immediately, and the second block data of the LTM is pushed to the third block of the LTM and so on. Thus the first block of the permanent

memory LTM becomes empty again and it is ready to accept incoming or outgoing data. The last received data in the LTM is available from the second block of the permanent memory LTM stack, i.e., First-In-First-Out (FIFO) principle is adopted in the LTM. When the information or data (bits) are retrieved or read from the permanent memory LTM, first of all the data is placed at the empty first block of the LTM (8 bits) by parallel connection with its other blocks. Thereafter these 8 bits from first block of the LTM is parallel transferred to the working memory STM or the brain processors (chips). Lastly this data contained in the STM (maximum 7 bytes for a human) are transferred either serially to the peripheral organs like eye, ear, nose, skin, tongue etc. via neural nerves in form of the voltage (energy) or parallel to the brain chips.

After reading operation of data done by the STM, the read out data is pushed to the second block onwards in the stack of the permanent memory LTM via the first block of the LTM and the first block of the LTM becomes empty or vacant again. When we are seeing any picture, hearing sound, feeling any sense etc., which are matching or similar to the earlier stored information or data in the permanent memory LTM, and then the present coded data or information in bits are matched or manipulated with the earlier similar stored data by the brain processors with the help of semantic, production and logical rules, the result is assigned to the working memory STM via neural nerves which further conveys to the peripherals. The latest result (model) of data or information or image in bits (voltage) are stored as usual on the down from the second block of the permanent memory LTM, the earlier stored similar type data is erased or deleted, i.e., the old data is replaced by similar new data or information in the LTM.

Hence, all processing functions such as arithmetic, logical, inventive and artificial intelligence (A-IQ), are implied by the brain processors (chips) located in middle portion of the brain using parallel processing as well as pipelining processing concepts, last of all the results or the facts or the decisions are placed in the STM first which finally stores in the LTM (PROM type). Generally data or information in the LTM is rolled down and if a data is not retrieved or worked for a certain period in which lot of information (data) has been received or stored by the LTM ranging its capacity, the particular data (earlier one) will be erased or deleted from the LTM due to reaching and crossing the last block ( $K^{\text{th}}$  block).

#### IV. STM AND LTM WITH BRAIN CHIP WORK IN UNCONSCIOUS SLEEPING PERIOD FORM DREAM

In unconscious period or sleeping time, it appears that the Short Term Memory (STM) and the Long Term Memory (LTM) along with the brain processors (chips) are remaining non working condition, i.e., freezing state, but actually it

does not happen so. In this paper, sleeping condition and viewing “Dream” of an animal including human one are described in an innovative scientific technique. When an animal including human being in sleeping or unconscious condition, although his/her normal routine work is completely suspended, the brain and the heart with the body cells are doing silent work for uplifting their energy, vitality and immunity. In this time the control of the nerve is not done by the usual way as per the environmental condition and paradigm, and generally it becomes ineffective.

There are three phases of sleeping or unconscious period in an animal including human being. In the first phase of sleeping, the working memory STM remains in vacant state, i.e., having 0 bits in all locations. Then the body just starts resting stage to capture the whole energy. In this period, no information (data) is transferred to the STM by the nerves and also no data interchange takes place between the STM and the LTM or the STM and the brain processors. Therefore this is fetching the total shut down normal working condition to the brain system comprising with STM, LTM and brain processors. In this phase, no energy is wasted towards the working and the feature extraction by the brain and the total body is going to charging stage. Actually this first stage of sleeping is demanded when the whole body discharges its energy feeling tired. In this time the brain becomes completely fatigued. Then the animals including human one lay their bodies on the resting place for storing energy such that the body peripherals are not insisting on working. Slight disturbances or noise can not hamper this first phase of sleeping and the body turns to senseless or unconscious zone gradually.

In the second phase of sleeping, the animals including human being lost control over the brain function. All peripherals of the body are in resting condition, as a result the body is gradually charged to gain some potential. In this time although the brain is in idle stage, but it can start its normal function if any sort of disturbances or noise occur. This time the working memory STM remains in vacant stage and non working condition. Therefore, any signal or information can be conveyed to the STM by the nerves and the brain processors (chips) start its work, i.e., the STM, the LTM and the brain processors can resume their normal schedule if the second phase of sleeping breaks due to small disturbances occurring inwards of the body for disease, pain etc. or outwards of the body because of environmental noise. In this phase no energy is lost for doing brain function or activity, i.e., brain remains in shut down condition.

After persisting the second phase of sleeping, the body gradually turns to the third phase of sleeping provided the inside and the outside situation of the body permitting. The third phase of sleeping is also called sound sleep condition when the small disturbances or noise cannot break the sleep. Generally in this period the animal including the human being is undergone dream stage, i.e., several virtual information or stories appear to the victim. A dream is

explained in a scientific method in this paper. From the above discussion, it is clear that manipulation of data or information is done by the brain processors and the result or the output is placed to the permanent memory LTM via the working memory STM and further the result is conveyed to the retina of the eyes or any peripherals via the nerves, the person views the happenings or feeling the facts. In the dreaming situation, the body gains minimum energy which permits to turn (switch) on the brain to virtual working condition. In this case, the real information or the data are not fed (available) to the working memory STM and the permanent memory LTM by the peripherals and the nerves. As a consequence the STM creates virtual data either developed from the output end of the nerves or collected from the permanent memory LTM as well as the brain processors. Therefore, the STM does not stay in vacant state (0 bits always), it is filled with arbitrary or random data or information and further this arbitrary or random data is processed by the brain processors and the ultimate virtual results (information) are appeared either on the retina of the person or any other peripherals by the connecting nerve as "Dream". In this third phase of sleeping, dream is an unconscious or deep sleeping stage while the brain is going on working condition with arbitrary or random data.

Sometimes it happens that the dream which was viewed in past days becomes true in later period. The arbitrary data or information manipulated by the brain processor from the STM and the LTM originates either from the past experience or anxiety about the future happenings, therefore the results or the facts appeared as a dream match with the later or the incoming happenings. In dreaming condition, the sleep of a human being does not break or hamper by little disturbances or noise. In case of breaking the sleep in this phase, it takes a little time to rescue normal working condition, because the brain processors (chips) with the STM and the LTM are engaged in virtual working. Thus in third phase of sleeping, the whole body is in rest condition except the brain. It is also observed that in this third phase of sleeping the brain output (result) is sometimes whimsically controlled the peripherals of the body, e.g., some people sit, stand and even walk in undetermined or haphazard direction in the dreaming or unconscious time. Actually dream identifies that the body is passing on all phases of sleeping and going to complete its full charging step. In dreaming time, it appears to the concerned human being that virtual thing is happening just like real thing and the person is participating in virtual world as doing in real world. Thus dream may be termed as action of the brain without involvement of the peripherals.

## V. COMPARISON BETWEEN ANIMAL BRAIN AND HUMAN BRAIN

Although animal beings including human one have very less storage capacity in the working memory STM, human being is having capacity in the STM 7 bytes, i.e., (8 bits X 7) or 56 bits, but the working principle is so simple and nature oriented such that it can easily handle with large amount of

data or information in sophisticated manner. Whenever any information or data is not retrieved or read for a certain period, that data or the information is lost because push down mechanism is used in the permanent memory LTM. Hence the LTM works out by First-in-First-Out (FIFO) principle.

In course of time, i.e., being aged, these storage cells (memory blocks) are gradually decreasing in STM as well as LTM, especially in LTM. Also we know that the ratio of weight of the head to the whole body weight of a human being is much more as comparing to that of other animals and the weight of head of a man is near about 1.4% of his body weight. For this, the storage capacity of human being in the permanent memory LTM is large amount compared to that of other animals in this living world. Therefore, other animals are easily lost data or information (intelligence) within very short period and also their brain processors (chips) acquire less processing power than that of human one. Due to this, human being is capable of doing manipulation of large amount of data possessing with the highest innovative power.

Therefore human being becomes the most intelligent creature in the animal world and has established full control and development of the world as well as the universe. It is hoped that next generation human being will take control over the whole universe such as the solar system and the other star's inhabitants.

## VI. BRAIN DISEASES AND THEIR TREATMENT

Now scientists are trying to develop artificial brain processors (chips) which can be feed to activate brain functions like brain injury and brain malfunction or paralysis including cerebral haemorrhage patients, coma etc. Also in case of malfunctioning or abnormality in the brain function, i.e., treatment of madness, brain injury, coma etc., first of all the cause of the brain oriented diseases has to be diagnosis by identifying the faulty portion in the brain such as connecting nerves, STM, LTM and brain processors etc.

Sometimes it is found that the brain functions, i.e., the STM, the LTM and the brain processors, are working properly, but the mental patient is hearing or viewing unwanted sound or picture such as illusion, this happens due to malfunctioning of the connecting nerves like short circuiting done by connecting the electricity (current and voltage) carrying wires in an electrical circuit. In this case, the treatment of the nerves has to be carried out vigorously. It is also to be examined whether the connecting nerves are obstructed or deformed, and accordingly treatment of the faulty connecting nerves has to be carried on.

Therefore, in the case of brain diseases, the faulty parts or section in the brain such as nerves, STM, LTM and brain processors (chips) are to be replaced by an artificially

manufactured good one, hence the brain diseases will be cured and the function of the brain can be made in normal order.

## VII. CONCLUSION

Having good memory engineering with the brain processors (chips), human secures the best active one in the animal world. As a result human being becomes the most powerful living legend in these existing creatures. The world has gone to full fledged development stage and achieved a respective position by dint of human being. Thus human being captures the whole world and the universe in one's numerous memory storages with the help of natural brain processors.

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