Internal sensation can be compared to electromagnetism

Kunjumon Vadakkan, dated September 15th 2015

Understanding simplest operational unit of a complex system from which certain properties emerge can be a challenge. They may be understood by first examining cases where the discovery has taken place from simple levels from which properties emerge followed by building of complex systems. Electromagnetism was accidentally discovered when a compass needle lying close to a cable carrying current got deflected when the current was switched on and off. This observation made at the simplest level of its emergence had led to the understanding of the properties of electro-magnetism (Figure 1) and development of complex systems.

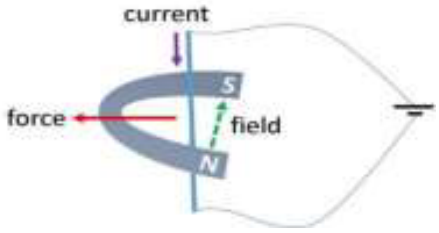

Figure 1. When a cable carrying current cuts the magnetic field in a perpendicular direction, the cable deflects in a perpendicular direction with a force (rotational force in motors). Similarly (not shown here), when a cable (not carrying current), is made to cut the magnetic field (using wind mills, water falls), electricity flows through the cable.

The emergence of internal sensation in the nervous system as a first-person property, towards which only the owner of the nervous system has access, is a systems property similar to electromagnetism. To study first-person internal sensations, it is required to replicate the mechanism in engineered systems (Ref.1) to obtain readouts for us (third-persons) to understand it. Internal sensation of intentionality to feed and reproduce present even in the lower level animal species having only few neurons makes it feasible to try replicating the mechanism in engineered systems (Ref 2). A model for induction of the mechanism and its operation is given in Fig.2 (detailed circuity in Ref 2*).*

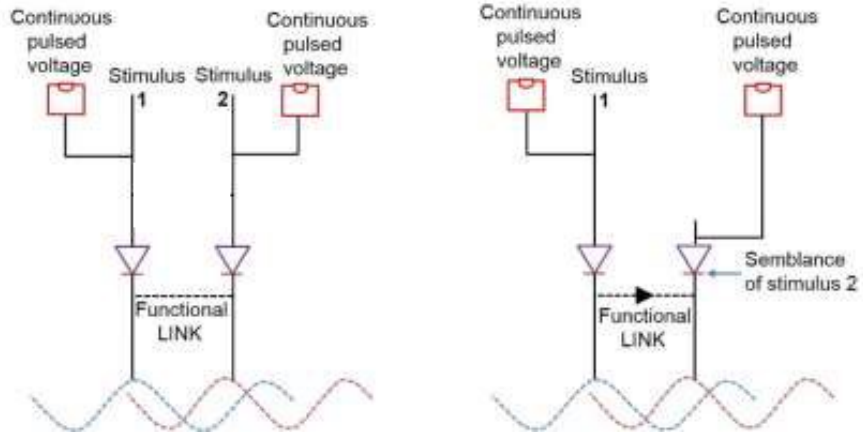

Figure 2. If a functional LINK is formed between the cathodes (left panel) when two stimuli 1&2 arrive simultaneously at the diodes, then reactivation of the LINK (right panel) by one stimulus will induce semblance of the second stimulus as a system property of systems where a) anodes continuously receive pulsed voltages, and b) functional LINK provides horizontal component for oscillating currents.

References:

1. *McDonnell et al (2014) Engineering Intelligent electronic systems based on computational neuroscience. Proceedings of the IEEE Vol.102, No. 5 (Available freely from Google).*
2. *Vadakkan K.I. (2014) An electronic circuit model of the inter-postsynaptic functional LINK designed to study the formation of internal sensation in the nervous system. Advances in Artificial Neural Systems.Vol. 2014, Article ID 318390 (Available freely from Google).*