Model of linguistic activities as ad hoc interactive activities in an impulse driven multi-agents system

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[Extended abstract]

The conscious activity as an example of brain mechanisms is widely viewed as a feeling, and it has been investigated in the field of psychology. The circuits for conscious activities in a brain will be massively parallel, filled with bi-directional flow of communications. Such brain mechanism will explain affective aspects of language. It is becoming a subject of engineering on intelligent systems.

In this report, the model of brain mechanisms based on the concept of activity is proposed, where existence of impulse is considered as an activity. The activity exists in the circuit and it is able to connect the lines. The activity is able to communicate each other. We consider that a neuron decodes a subset of activities, for the connections of inputs on a post-synaptic neuron are formed by means of a pattern of outputs on pre-synaptic neuron, and the resting potential in a neuron is -80mV and a narrow peak of positive impulse is +40mV. The subset of impulses is decoded by a neuron formed through the same pattern of activities.

We perceive our environment through sight, sound and touch. An element that recognizes things and affairs is a neuron. The meaning of impulse that comes from a sensor is able to understand as a reaction of sensor under the situation. The activity of an actuator is able to understand from the effect that exerts on surroundings. Since a brain is made of neuron, the brain mechanism is composed of decoders. A subset of subsets is decoded by means of layered decoders. An intelligent circuit system mode of decoders accommodates control theory, image understanding, and signal processing.

Intermittent real-time operations of impulses make possible to carry out time-sharing of operations. A circulating impulse in a loop is able to keep the activity, and a subset of rotating impulses in a network is available to generate impulses to various directions. Paralleling activities by means of transmitting of impulses along one flowchart make possible to operate plural functions concurrently.

Impulses in distributed paralleling circuits are able to operate distributed activities. The interactions between excited area of the central nervous system and excited area of linguistic activities makes possible to explain the affective aspects of language. This realistic model has a good visibility. The model close to a biological brain has a potentiality to emulate the human intelligence.

Many computational models were considered in order to achieve the brain mechanism. The computational theory of brain mechanism is a solution when the phenomenon is understood. But the computational solution is poor visibility on the whole phenomenon. The definition of working memory (WM) is difficult within concept of information processing, but we can define the function of WM as the function of a neuron within the concept of activity. The impulsive activity of a decoder is not analytical. But it is able to be computational by using operations of if-then-rule. The function of WM is able to translate to software. LISP for AI programming language is used as a production system interpreter.

Most of traditional models of brain mechanism have been heavily influenced by the concept of information processing where the information on a state is dealt. The intelligence is not information, but it is an ability of activity. It is not restricted to processing of information. There will be many computational tasks of processing for activities. The tasks will be achieved by means of a method of systematic description of the activities.

An output of an impulse driven WM is expressed by means of a Dirac delta function $\delta(t)$. A flowchart as a diagrammatic model for the unmanned operation through transmission of a subset of impulses is useful in order to design a highly developed intelligent system. The usefulness of the model will be verified through good visibility. The concept of activity will help to construct a semantic network, for a semantic structure is the causal chain of activities.

A program on a brain mechanism is processed by means of a pattern match. But the large size of pattern match will be needed in a brain mechanism. If a pattern of inputs is divided into pieces in order to computerize, the segmentation of signal processing causes the difficulty that processing to seek segmentation on an object becomes a kind of jigsaw puzzle. An adoption of segmentation on each WM as the segmentation of signal processing in the first stage is a solution. It will be achieved by the interface that is made of WM for the recognition on things and affairs.

Another solution is a device to refer a large size of pattern. Liquid crystal display (LCD) is used as an element of the device. The pattern of points in LCD activated by means of a RAM can be referred to the images on the other LCD those are inputted one after another successively. The result of AND operation is detected by CCD detector. Since the common part of two images is able to use as a focused attention, this device is able to carry out the operation of a control center in a brain.