Biologically Motivated Systems: a Fuzzy System for Living Neuronal Networks and Early Vision of Brain

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Abstract: We introduce Biologically Motivated Systems as a fuzzy computational system for living neuronal networks and early vision of brain. We discuss here three kinds of the concepts for examples, "analyzing psychological data" using Aperture problems, "biomodeling system" for connecting a living neuronal network with Khepera II robot, and "TAM Network" as a visual neural network. Aperture problem is an experiment for analyzing the early vision processing. We argue the perception depends on the display time, and discuss the processing of visual computation tasks in the brain, using Electroencephalograms(EEG). Next, we explain biomodeling system for connecting Khepera II robot with living neuronal network inspired fuzzy logic. The system has a loop procedure, the top-down bio-processing for sending actuator signals to robot from living neuronal network, and the bottom-up robot-processing for electrical stimulation to living neuronal network from robot. To process "thinking" in the brain machine interface, we discuss here reconstruction and learning mechanism of living neuronal network for connecting with robots. Lastly, TAM network is discussed as a biologically-motivated visual neural network. TAM network is constructed in seven layers imitate retina with orientation selectivity to frontal lobe for drawing attention. Fuzzy knowledge is acquired from the network structure after supervised learning. Our goal for the Biologically Motivated Systems is a construction for a new fuzzy system combined with the neuroscience and psychology.