BRAIN – HAND BRIDGING IN NEUROMOTOR CONTROL TOWARDS ARTIFICIAL ROBOTIC INTELLIGENCE

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ABSTRACT
The big differences between the human life and the robotic artificial motions and knowledge are given by the generation of motion. Robotics follows some laws written in a computer, with some symbolic languages, according to the willing and experience of one or more programmers. The digital value is transformed and moves, one by one or in parallel, and actuates the motors, usually with the control of the electric current and voltage. Human life performs the motion with the rules of billions of actuators in different part of the body, and each component and connection has its life and activity. For the robot, every computer program line is processed and has its singular action. In human body, it is impossible to localize one single factor for one single action.
The bridge from the hand and hand and finger tip and the brain is full of infinite parallel ways, but the repetition of some sequences has different characters for every person, with a statistic similarity and common property for everyone.
The objective is to start from the hand and from the finger and to recognize characters of the motion, in a precise, definitive quantitative way. The conceptual model prepares the mind and the criticisms in front of possible new discoveries.
In neuromotorsequences the model is simple. Starting point is the finger: thumb. The stimulus actuates by the person vision the brain which decides to move the finger in a softly controlled way, by checking in the preceptors the motion itself.
The motion must follow the willing of the person..
His control is a soft control, which asks to close the finger, to touch a button, to pres the button which moves a virtual object on screen and to control the virtual object to avoid obstacles and to stop. The motion must follow the rules of a “softly and smoothly controlled motion”.
This is the conceptual scheme:
Finger > muscles > spinal cord > circuits > brain
From the finger motion we measure the response delay, the motion of the finger versus time, and we calculate the derivatives as velocity and acceleration of the finger, and we measure the force between the finger and the button. These values may be connected by multivariate analysis to the single person, and we calculate a value called “index of performance” which, by means of fuzzy logics, interprets the bridge between the finger motion and the brain motion control.
Results and reality show that every person repeats his neuromotorsequence in similar environmental conditions, and also when the environment changes, it is fascinating to note that the shape of the imprinting of the “finger motion” of a person remains invariable, even if the top and the length change scale. Everyone has his life embedded in the motion of his thumb, in his neuromotorsequence, like a dynamic DNA.