A SURVEY ON SOME NEUROSCIENCE RESULTS APPLICABILITY IN ROBOTICS

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EXTENDED ABSTRACT

Keywords : robotics, neuroscience, arm movement.

To generate simple movements of the arm, the brain must solve a complex problem of dynamics. The relation between the forces generated by the muscles of the arm and the ensuing movement is expressed by a system of complex nonlinear differential equations. A number of studies have suggested that the brain maintains an internal representation of this dynamical relation, not in the form of a mathematical expression but in the form of a transformation from desired movement to corresponding command. This type of representation has been called an "internal model". We wish to pursue this analysis to understand what are the mechanisms and the limitations of our ability to adapt to changes in limb dynamics.[1]

Studies of arm movements have shown that subjects learn to compensate predictable mechanical perturbations by developing a representation of the relation between the state of motion of the arm and the perturbing forces. Studies suggests that the central nervous system has a strong tendency to employ a single internal model when dealing with a sequence of perturbations [7]

Neuroscience studies regarding motor functions of the brain can offer insight on complex dynamic controll laws which were not investigated yet. This results have to be studied in order to be able to develope new and optimized controll laws for compliant robots

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