Schema for Motor Control Utilizing a Network Model of the Cerebellum

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Abstract:

This paper outlines a schema for movement control based on two stages of signal processing. The higher stage is a neural network model that treats the cerebellum as an array of adjustable motor pattern generators. This network uses sensory input
to preset and to trigger elemental pattern generators and to evaluate their performance. The actual patterned outputs, however, are produced
by intrin(cid:173) sic circuitry that includes recurrent loops and is thus capable of self-sustained activity. These patterned outputs are sent
as motor commands to local feedback systems called motor servos. The latter control the forces and lengths of individual muscles.
Overall control is thus achieved in two stages: (1) an adaptive cerebellar network generates an array of feedforward motor commands
and (2) a set of local feedback systems translates these commands into actual movements.