where X(t) is the output of the activation node at a time t, $y^+(t)$ is the value of the positive reinforcement signal at terminal y^+ at time t, and $y^-(t)$ is the value of the negative reinforcement signal at terminal y^- at time t.

[0026] It will be seen that motor centre output is a simple primary response which is affected by the values of the positive and negative reinforcement signals. These positive and negative reinforcement signals are generated by the associative memory 2 as will now be explained referring to Fig.3 which illustrates that portion of the associative memory 2 which corresponds to the primary response network 1 of Fig.2.

[0027] The associative memory 2 has a matrix structure and includes a plurality of input signal lines 4_1, 4_2, .., 4_N receiving inputs from respective sensors S_1 to S_N, and a pair of output signal lines 5, 6 for each motor centre M. In the preferred embodiment of the invention, all of the input signal lines 4_1, 4_2, .., 4_N are connected to the pair of output signal lines 5, 6 supplying a particular motor centre and each signal line 4_1 to 4_N generates a weighted contribution to the output on the respective signal line 5, 6. The output signal lines 5, 6 are respectively connected to the positive and negative reinforcement terminals y^+ and y^- of the motor centre M and feed positive and negative reinforcement signals thereto.

[0028] In theory, a pre-selection could be made of a sub-set of sensors whose outputs are expected to be relevant to the functioning of the primary response network, and only this sub-set of sensors would be connected to the signal lines 5 and 6 connected to the primary response network. However, it is preferred to connect all of the sensors S_1 to S_N to all of the signal lines 5 and 6 and to allow conditioning to determine which sensors are relevant.

[0029] Considering Fig.3 in more detail, it will be seen that the signal $x_i(t)$ output by sensor S_i at a time t contributes a weighted component $w_i^+(t)x_i(t)$ to the output on signal line 5, where $w_i^+(t)$ is the value of the weight applicable to the signal from sensor S_i at time t when contributing to the positive reinforcement signal. Similarly, the signal $x_i(t)$ output by sensor S_i at time t contributes a weighted component $w_i^-(t)x_i(t)$ to the output on signal line 6, where $w_i^-(t)$ is the value of the weight applicable to the signal from sensor S_i at time t when contributing to the negative reinforcement signal.

[0030] The positive reinforcement signal output on line 5 is the sum of the components contributed from all of the applicable sensors and may be expressed:

$$y^+(t) = \sum_{i=1}^{N} w_i^{\,+}(t)x_i(t) \qquad (2)$$

[0031] Similarly, the negative reinforcement signal output on line 6 is the sum of the components contributed from all of the applicable sensors and may be expressed:

$$y^-(t) = \sum_{i=1}^{N} w_i^{\,-}(t)x_i(t) \qquad (3)$$

[0032] The positive reinforcement and negative reinforcement weights applied to the signals on the different signal lines 4_1 to 4_N, are modified at times when a respective update signal PR+ or PR- is generated. These update signals are generated selectively depending upon the values of the signals O_1, O_2 and O_3 output by the activation node X, expectation node Y and motor centre M of the corresponding primary response network. More particularly, as will be explained in greater detail below, in this example the weight update signals PR+ and PR-are generated at times when the outputs O_1 and O_3 from the activation node X and motor centre M are not consistent with "expected" behaviour as indicated by the value of the output O_2 from the expectation node Y.

[0033] It will be understood from the above equations (2) and (3) that the positive and negative reinforcement signals affect the behaviour of the primary response network by introducing a dependence upon signals received from sensors other than those directly connected to the primary response network. In other words, the innate function of the primary response network 1 tending to activate the actuator C_1 upon reception of a signal from sensor S_A, is inhibited or promoted depending upon signals received from sensors other than S_A. The way in which the signals received from the "other" sensors inhibit or promote the primary response of the primary response network represents the conditioning which the architecture has experienced. This conditioning is developed by the system itself, dependent upon O_1 to O_3, in the manner described below.

[0034] Initially, when operation of the architecture begins, the primary response of the primary response network is un-specialised, that is, there are no positive and negative reinforcement signals applied to the motor centre M and all of the weights applied in the associative memory take values which are zero or negligibly low (for example, 0.01).

[0035] When the activation node X receives an input signal I_1 (or set of input signals) apt to trigger the primary response, it outputs a trigger signal (O_1 = +1.0 in this embodiment) to the motor centre M which responds by outputting a signal (O_3 = +1.0 in this embodiment) adapted for activating the actuator C_1. The activation node X also activates the