

green cell was the response action from SOM learning, so in this state the robot autonomously selected the “Catch the object” action.

4.2. Verification experiment

We let the robotic arm recognized a green ball (Liking) and a blue ball (Disliking). We observed the action of the Conbe-I until it took a green ball from the human’s hand. The transition of the motivation is shown in Fig.11. After the Conbe-I was started it recognized the green ball at T1, then the value of motivation increased steadily and the robot selected the action between looking around behavior and an interesting behavior. From T2-T3, it was selected “Approach” action and it began to approach the green ball and opened the fingers after that the robot came close enough to the green ball to catch it in a time interval (T3-T4), but on the other hand, the blue ball was shown in order to decrease the robot’s motivation and the motivation became to the negative value. In the time interval from T5 to T8 that shown the disliking behavior that consists of “Look around”, “Alertness” and “Avoidance” respectively.

5. Conclusion

In this paper, we present the sample application of Self Organizing Map (SOM) for analyzing and clustering the robotic arm’s action. From the experimental results, 9 motions of the robotic arm could be classified on the map of SOM and the robotic arm could autonomously select its behavior and adapt to its surrounding environment. In the future study, our research will continue to develop the system of Conbe-I such as it becomes possible to create an emotional system and apply the memorization system based on an artificial neural network into the robot’s system.

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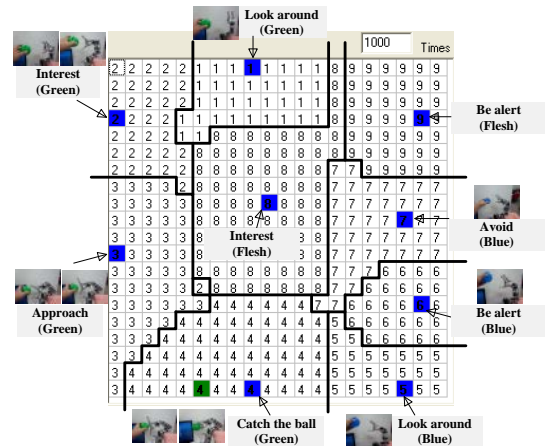


Fig.10. The classification on the map.

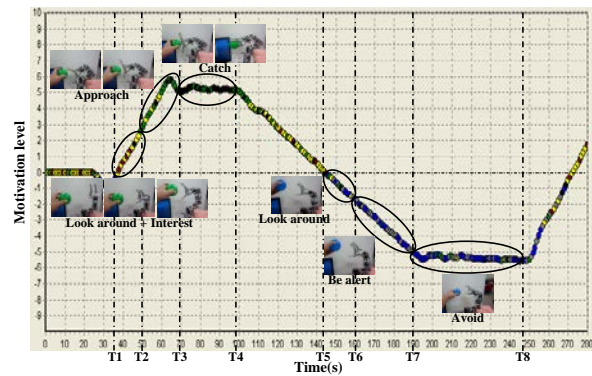


Fig.11. Transition of the motivation.

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