

A Robot Succeeds in 100% Mirror Image Cognition

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Abstract - Humans are capable of identifying their own image when reflected in a mirror. This mechanism is a mystery that has never been solved. I created a program that achieved such awareness on a robot and conducted three experiments. The first was an experiment on a self robot that imitates its own self-image reflected in a mirror. The second experiment had a robot imitating another robot of the same type which was made to perform the same behavior. The last was an experiment using two robots of the same type and the same functions to imitate each other. In these experiments, the program calculated the coincidence rate of behavior between the self robot and the other robot. I found that compared with the case in which the robot performed a behavior according to its own judgment, the coincidence rate was always higher in the case of the mirror image. At this time, when the target moved according to its own judgment in the second experiment, this can be considered as a part of the self, similar to the use of “human hands and feet.” From this result, the mirror image can be judged to “exist closer to the self than a part of the self” and can in fact be considered a “self.” I thought that the result of these experiments indicated that mirror image cognition of the robot succeeded completely and that this would be the “first example toward explaining physically the mirror image cognition capability of humans.” This paper details logical and physical explanations for achieving the results, and in addition, presents several considerations and prospects derived from the experiment results.

Index terms: Conscious system, robot demonstration, mirror test, mirror image cognition, behavior and cognition, self awareness, human consciousness, cognitivism.