

## Task Support Using Marks with QR Code for Service Robot

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An expectation for service robot that executes various tasks is increasing. However, common robot cannot execute the tasks due to difficulties in recognizing objects and understanding the tasks. To deal with these problems, we have proposed a method that marks support robot's recognition and understanding like fig. 1.

As elemental technologies demanded the above concept, we have proposed three items: i. design of a mark with four circles and a QR code, ii. marks' calculation method with robustness regarding various objects' location, iii. reliability based design method for both marks' attached location and kinds of sensor to find an object's pose. In last year, we proposed a method to make up teaching data in the database(fig. 2). First, a robot reasons a kind of path that it executes ordered task such as "open the door." Second, the robot decides items to make teaching data from the reasoned path, and then, it asks the items to a user. The user replies them with key in or partial demonstration. This interaction makes the teaching data.

*Keywords:* Service Robotics, Environmental support, Manipulation, Teaching, Reasoning

### References

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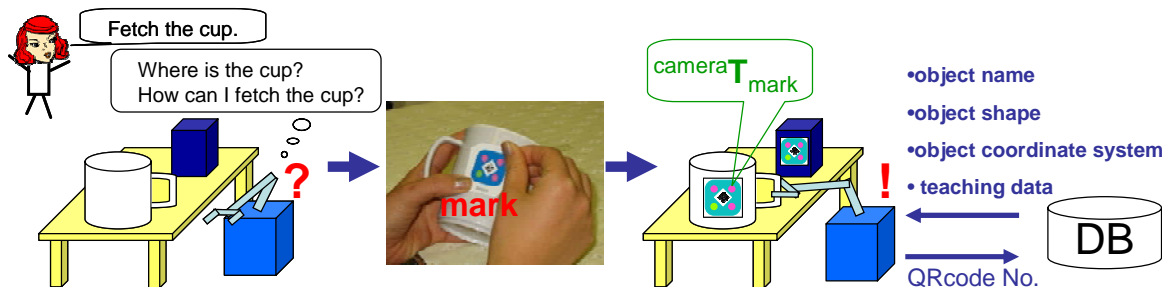


Fig. 1 Concept of task realization with marks

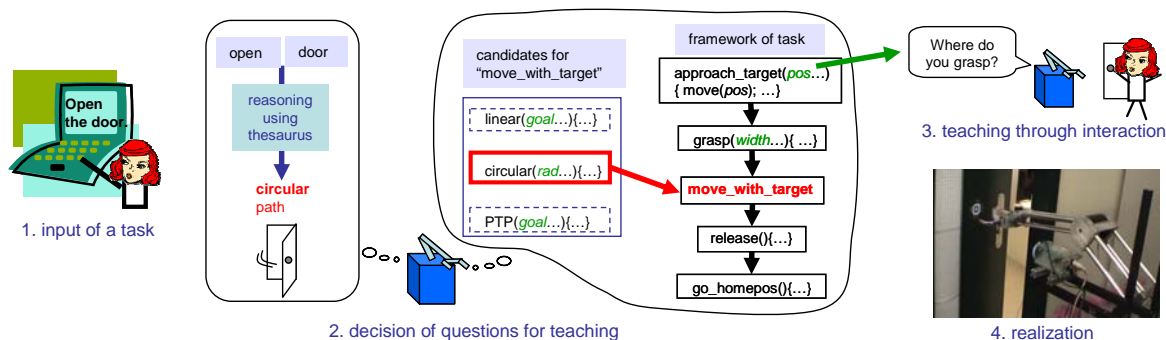


Fig. 2 Overview of teaching through interaction