

Title:

Cooking Behavior with Handling General Cooking Tools based on a System Integration for a Life-sized Humanoid Robot

Abstract:

I talk about system integration for a life-sized robot working in the kitchen. On cooking tasks, there should be various tools and foods, and cooking table may have reflective surface with blots and scratch. Recognition functions should be robust to noises derived from them. As other problems, cooking behaviors impose motion sequences by using whole body of the robot. For instance, while cutting a vegetable, the robot has to hold one hand against the vegetable even if another hand with a knife should be moved for the cutting. This motion requires considering full articulation of the robot simultaneously. That is, there are difficulties against both recognition and motion generation. I propose recognition functions that are to detect kitchen tools such as containers and cutting boards. These functions can overcome the influence of reflective surface. I also propose the combination of shape model and knowledge about tasks. On the other hand, I pointed out the importance of the use of torso joints while dual arm manipulation. Our approach enables the robot to keep manipulability of both arms and viewing field of a head. Based on these products, I also introduce an integrated system incorporating recognition modules and motion generation modules. The effectiveness of the system was proven through some cooking applications.

Short bio:

Yoshiaki Watanabe received B.Eng. degree in mechanical engineering from Yokohama National University, Kanagawa, Japan in 2008, M.A.Sc. degree in Information Studies from the University of Tokyo, Tokyo, Japan in 2010. He started to work as a software engineer in Mitsubishi Electric Corp, Japan from 2010 to 2016. He is currently a researcher with Takenaka R & D Institute, Chiba, Japan and a visiting researcher at Chair of Building Realization and Robotics, TUM. His current research interests include navigation, SLAM and object recognition for construction robot and service robot.