

SC42050 Literature Assignment

Visual and Tactile Fusion for Humanoid Robots

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The design of intelligent robots is one of the goal of the future. Giving them the capability of deciding which action to perform to increase the information they can get from the environment is a fundamental step in this direction. Imagine, for example, a robot that has to detect the shape and the consistency of an object; in this respect it has to fuse together information coming from visual devices and tactile sensors. Furthermore, the final result will depend on the actions it performed on the object itself: did it turn the object? Could it see all the pieces? etc. After reading (Mukai and Ishikawa, 1994) answer the following questions:

1. Find three appealing applications for the method proposed in the paper and try to describe why they could be useful. In your opinion, are they applicable in a short time scale (less than five years?).
2. Perform a reasonable literature survey on the Application 2 proposed in the paper, pointing out relevant results that people may have achieved in the last few years.
3. Next to the DCSC secretariat, we have a Robotic Arm, from Philips. (You may want to see it and take a look at its manual). If you could have a single camera and a tactile sensor, and if you were asked to implement Application 2 using that arm, what are the steps you would follow? Try to answer questions like:
 - Where would you put the camera? Why?
 - How should you control the arm?
 - What are the important parameters to consider?
 - ...

References

Mukai, T. and Ishikawa, M. (1994). An active sensing method using estimated errors for multisensor fusion systems. In *Proceedings of the IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems*, pages 615–622.