

SC42050 Literature Assignment

Learning Physical Collaborative Robot Behaviors from Human Demonstrations

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Robots have the potential to become partners in daily life, supplementing our physically limited human capabilities. If they lend us their strength, we could move heavy objects with ease and without destroying our backs. If they lend us their machine precision, we could work much more precisely. Robot learning by demonstration has been shown to be one effective way of teaching robots new skills. However the problem gets much harder if the skill requires force interactions with the environment, especially if the ‘environment’ is responding actively and autonomously. In order to physically collaborate with humans, robots need to be able to cope with the interaction forces the human exerts in the interaction. After reading (Rozo et al., 2016) answer the following questions:

1. Compare the method of the paper to the methods mentioned in the section on related work. Briefly discuss the performance criteria and give an overview (for example a table) pointing out advantages and disadvantages.
2. Generalization over tasks is achieved by parameterizing the task as part of the model. Briefly summarize how the tasks are parameterized and how this is incorporated in the model. Discuss the scope and limits of the generalizability to different tasks.
3. Next to the task parameters, there are also model parameters. What is the difference and how are they chosen? Discuss two alternative ways to choose the model parameters which might be more meaningful than the current approach.
4. Find two things in the experiments to be critical about and discuss them.

References

Rozo, L., Calinon, S., Caldwell, D. G., Jimenez, P., and Torras, C. (2016). Learning physical collaborative robot behaviors from human demonstrations. *IEEE Transactions on Robotics*, 32(3):513–527.