Master Thesis Proposal

Compliant Manipulation with Reinforcement Learning Guided by Task Specification

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Introduction

Compliant Manipulation

- Most of the real world robotic manipulation tasks present the need for compliant manipulation.
- Robot needs to respond to the contact forces while executing the task.
- Classical planning and control algorithm fail to perform satisfactorily due to the lack of precise model of contact forces and high computational complexity.

Problem Statement

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- We propose to do use reinforcement learning along with task frame formalism in order to reduce the number of interactions with the environment.
- We will evaluate our approach based by learning the task of opening door and cutting vegetables.

Task Specification by Meson et. al. [6]

Listing 1: Task Specification using TFF: Open Door

```
move compliantly {
    with task frame directions
    xt: force 0 N
    yt: force 0 N
    zt: velocity v mm/sec
    axt: force 0 Nmm
    ayt: force 0 Nmm
    azt: force 0 Nmm
} until distance > d mm
```

Composition

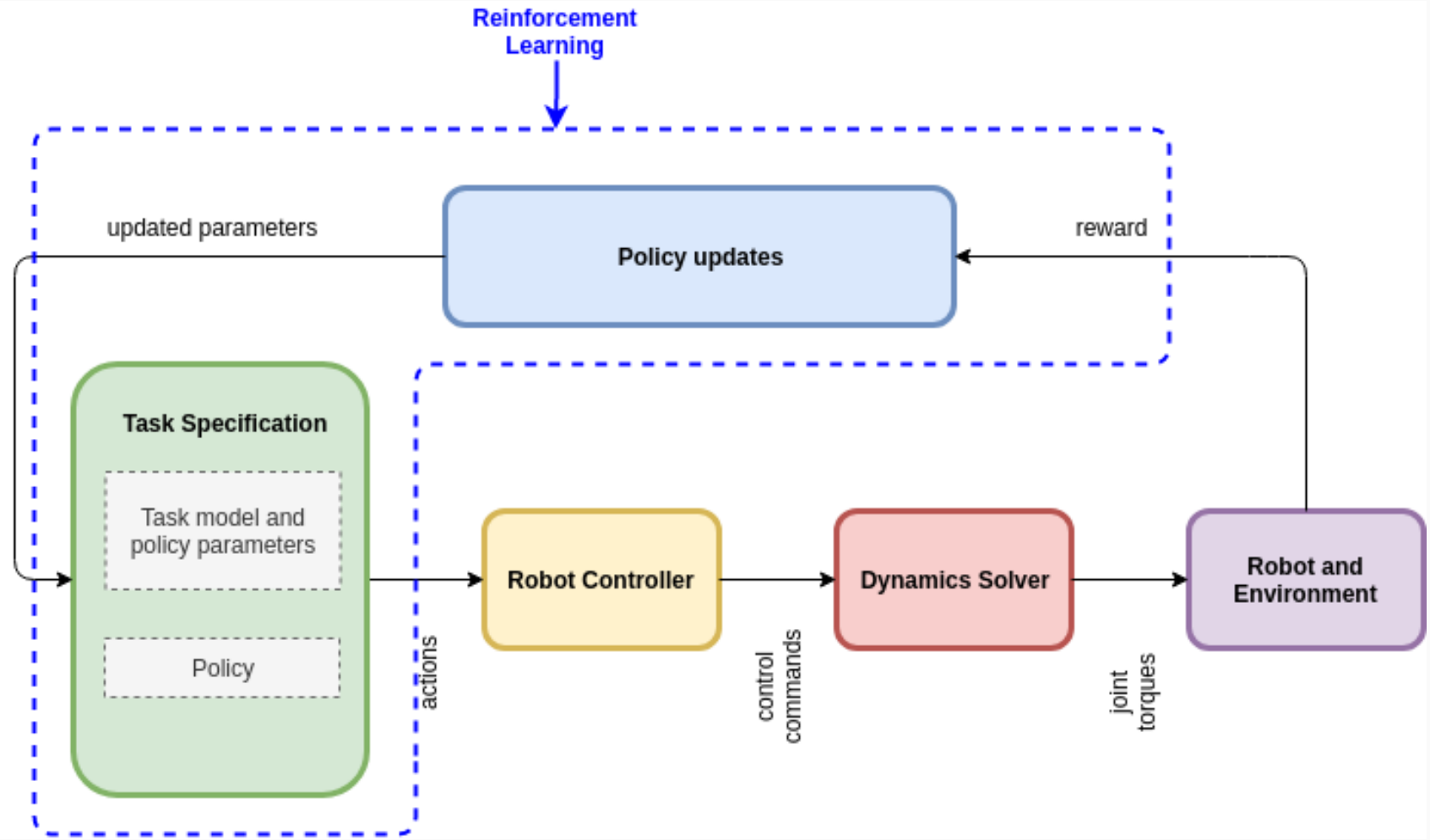

Figure 1: Composition

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