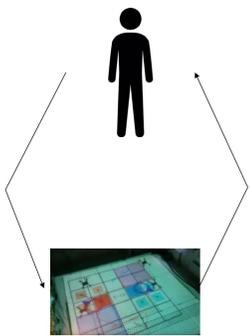


Description:

The project aims to include humans in a multi-agent robotic system where humans and robots converse and adapt to each other. The adaption can consist of the robots performing tasks given by a human, the robots abiding by safety rules considering the humans, the humans changing request according to feedback given by the robots etc.

Background & Motivation

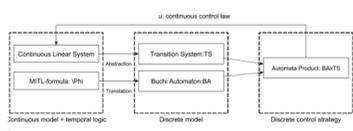


It is crucial for the future of robotics to construct safer and more easily understood systems which can be used by non-experts. To do this it is essential to consider how human and robot can converse and adapt to each other. It has previously been studied how each party can adapt for the other separately, in this project the aim is to close the loop and allow feedback to flow in both directions.

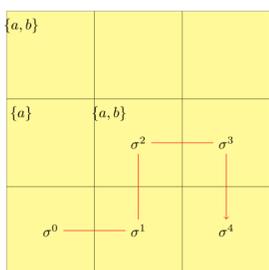
Research Goal & Questions

- How can the violation of a specification be quantified? (How should the metric be defined?)
- How can a specification be minimally relaxed?
- What type of robotic behavior is considered socially acceptable by humans? (What hard constraints should be implemented on the system?)

Methods & Preliminary Results



In my previous work I have considered control synthesis for multi-agent systems based on temporal logic specifications (MITL). Both individual tasks and collaborative tasks have been implemented. I am currently considering the cases when no solution that satisfies the specification can be found. Specifically, I am investigating methods to find solutions which are close to satisfy the specification in order to give the human suggestions which might be acceptable. The considered method involves using a novel metric – a hybrid metric.



Roadmap & Milestones

$$d_H = (1 - c)d_d + cd_c$$

d: discrete (with respect to specification)

c: continuous (with respect to social acceptability)

- Define and implement a metric which quantifies how much a specification is violated.
- Construct a robotic framework which implements feedback from the human and produces useful, easily understood feedback to the human

Which path is best with respect to specifications and social acceptability?

