

Human-Robot Interaction

Elective in Artificial Intelligence

Teamwork

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Readings

Teamwork

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Overview

- Introduction
- Approach
- A Convoy Example
- Individual Commitment and Intentions
- Joint Commitments
- Joint Intentions
- Conclusions

Inspired by the slide hierarchy of Prof.Iocchi

Introduction

- What is involved when a group of agents is decide to work together ?
- Is it simple union of simultaneous individual actions ? If not the what ?
- What motivates the agents to form the teams and act together ?
- Some times task can't be performed alone e.g. playing tennis.
- What benefits the agent can get from the participation in a group effort ?
- This paper argues that joint activity is only performed when agents share the common belief.
- Although the team work has over head but makes robust to certain failures and mis understandings.

Approach

- The Paper explains the joint actions which are not regarded as descriptive but specifications.
- The specifications on the activities which are too weak are too strong are excluded.
- It is developed over the previous “belief–goal–mental model” which drives to some intention.
- How the joint commitment developed and acts as glue to team.
- The realism example is were the belief and goals not need to know by others but this makes work tough.
- Here we consider the situations where the agents share the mental state to each other.

Convey Example

- Joint Intentions leads to individual ones.
- The functional role of the joint intentions
- Communication required.
- The team behaviour is more than coordinated individual behaviour, right sort of joint intention.

Example:

1. Bob wants to go home but doesn't know his home
2. He knows Alice knows the way there also
3. May be simple following can solve the problem but

Outcome of the Example

Proposal 1:

x and y jointly intend to do some collective action iff it is mutually known between x and y and each of them intend to complete it.

Proposal 2:

x and y jointly intended to do some action iff it is mutually known between x and y that they each intend that the collective action occur and also every keep doing there share until other does like wise and can be persists until mutually known that the activity is over (success, unachievable, irrelevant).

Individual Commitment and Intentions

- **Events:** Each world is consists of number of primitives or events, of different type.
- **Belief :** The state of which the agent is sure after wishful thinking are eliminated.
- **Accessible world:** the world which agent is capable to change or rule.
- **Goal:** the formulation of the accessible world which is desirable to agent.
- **Mutual Belief :** It is conjunction of the belief among the members and also to know the belief of each agent

Individual Commitment and Intentions

- Based primitives we defined the individual commitment called persistent goal.
- Agent has persistent goal of p to achieve relative to q iff:
 1. p is currently false.
 2. wants p to be true eventually.
 3. If it is true and holds true till she believes it will remain true or it will never be true and q is false.
- All commitments should be persistent and consistent.
- An intention is the commitment to act in a certain mental state.
- An agents intends to relative to some condition to do an action only if the agent has the persistent goal.

Joint Commitments and Intentions

- Joint is not simple version of individual commitments.
- If any agent finds out the goal is impossible to achieve it should communicate to other agents to have same mental state
- The agent has weak achievement of p relative to q w.r.t **team**
 1. The agent has normal achievement goal to bring p that the agent yet believe to be true
 2. The agent believes p is true , will be true , will be false or irrelevant.
 3. It always has goal that status p is mutually believed.
 4. The agents doesn't foil each other action - formation
 5. If agent comes to know the goal is finished , should let others know that goal is achieved .

Conclusions

- A team jointly intends to do actions if they mutually believe.
- Actions can be concurrently or sequentially as long as mental state is same with common belief.
- As the teams works towards joint commitment there is the divergence of the individual commitments.
- The actions are performed in deliberate way.
- Once adopted to the commitment the agents should be able to build the forms of interaction.
- The implicit and explicit agreement to reach to common mental state.
- In future there will be undoubtedly many agents present in our social environment and if they don't know team work world will be mess.