Tele-robotically Negotiating Apertures Using Intentional Dynamics

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Passing through apertures

- Aperture as a spatio-temporal constraint with a specific relation to a target or a window of opportunity with respect to a goal state
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- The problem requires a physics of goal directed behavior
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- The problem requires a physics of goal directed behavior
- Intentional dynamics provides this framework
Intentional dynamics

Intention: conditionally closes the system, forming a two point boundary problem

Omega cell
Alpha steps

Conservation
Information
Control
The task

- Random starting point
- Control constraints
- Movement, steering
- Dual systems
The Operator-Robot-Environment system
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effectivity = effective action by the agent

operator robot system

control

information

operator

robot

robot environment system

control

information

environment

affordance = possibility of action
- Least action path (A)
- Choice points (B)
- Hard and soft constraints (C)
- Least action path (A)
- Choice points (B)
- Hard and soft constraints (C)

MEASURES
- Deviation from (A)
- Mapping soft constraints with choice-points
- Total generalized action
Implications

- Intentional dynamics provides measures that are not currently available in the field of human-robot interaction/robotics.

- This approach provides useful principles for design of tele-robotic systems, autonomous robots and training for operators

- fewer choice points, reducing errors, effective action-paths towards the goal, isolation of error sources.
