NRI: FND: Assistive Child-Robot Interventions for Infants with Motor Disabilities

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Central Research Question

How do we enable a mobile assistive robot to encourage children with motor disabilities to practice motor (and other developmental) skills?

Motivation

- 7% of children experience developmental disabilities
- Intervention is often delayed until post-infancy
- Early robot-mediated interventions are a potential solution
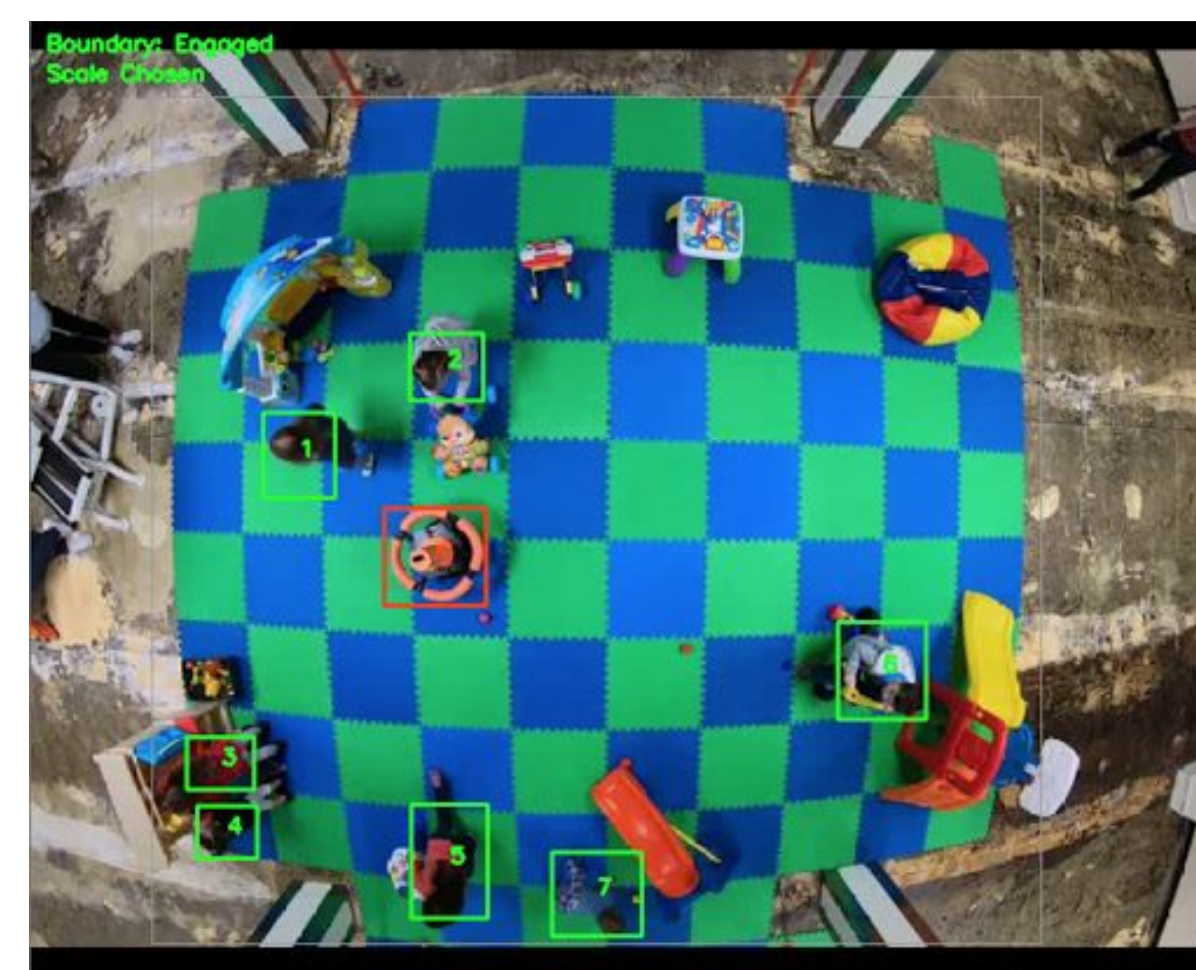
Key Problems to Address

- Design of an appropriate robot with engaging rewards
- Tracking states of interest during infant-robot intervention
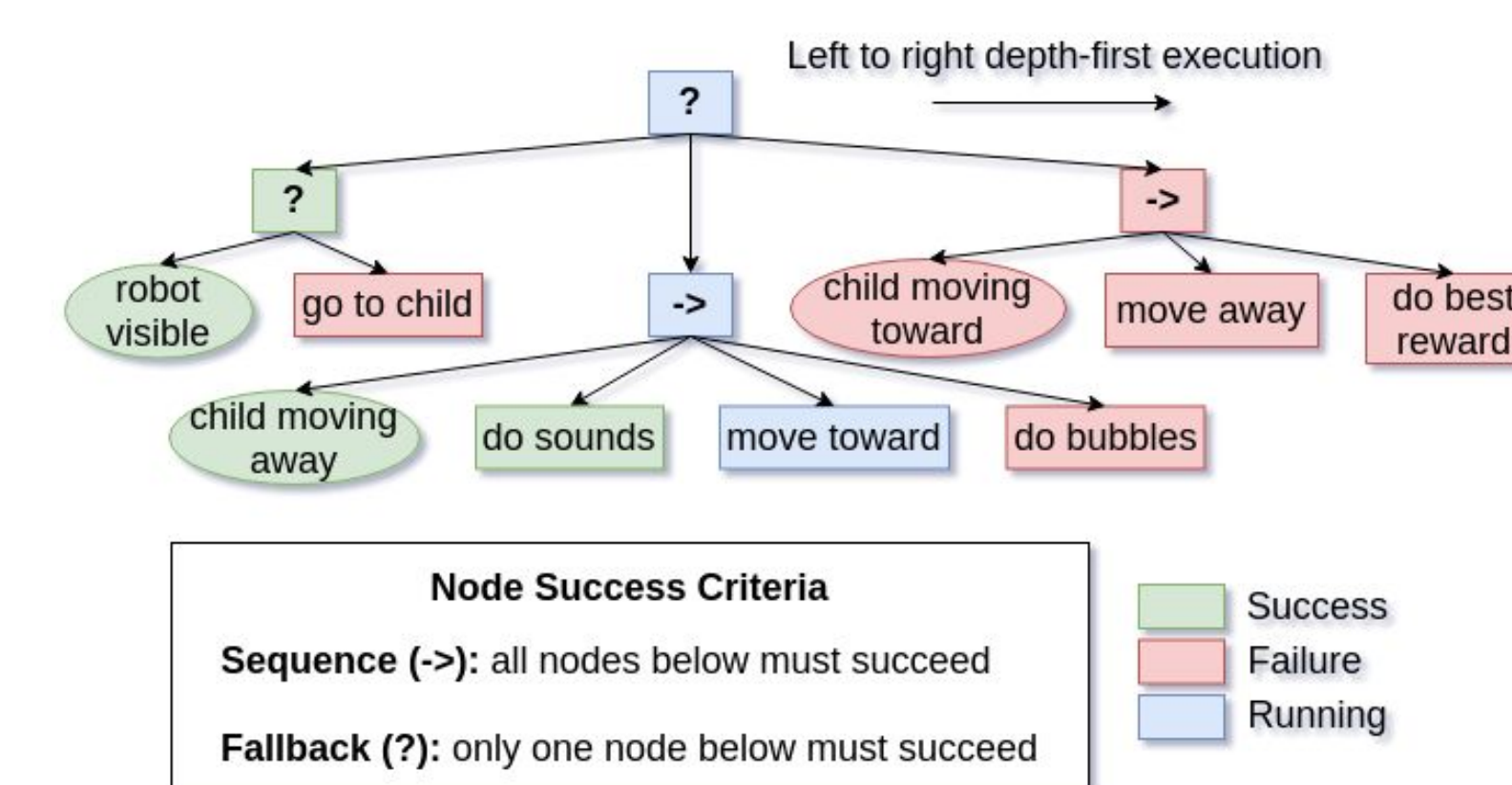- Automatic behavior tree generation to maximize motion

Current robot prototype

Exploratory robot test in a playgroup

Example markerless tracking output

Illustrative behavior tree mock-up

Robot Design Details

- Current robots/toys for infants do not fit the proposed intervention needs
- We are working with child motion and rehabilitation experts to design a robot

Learning (State-Tracking) Details

- Current practices for tracking relevant states are for adults or require markers
- We are finalizing markerless alternatives for tracking intervention states of interest

Planning (Behavior Tree) Details

- Manual tree generation is time-intensive
- Thus, we propose an automatically generated belief behavior tree