

## Executive System

The executive system runs state machine collecting all the inputs from each module and returning outputs that are to be used by proper module components.

**Inputs** Commands from user interface, information from human intent module of which discrete mode is taken, base/joint angle velocities from motion planner, suggested position and normal vector from perception module

**Outputs** Giving feedback to user interface, commanding motion planner, overseeing all the transitions of each mode

**Challenges** The problems that executive will tackle:

- Overseeing overall modules exchanging inputs and outputs
- Unifying languages from each module
- Hybrid automaton design and execution
- LTLMoP implementation of verifying and synthesizing system

The system consists of  $Q$  (set of discrete modes),  $X$  (space of continuous state from motion planner),  $Init$  ( $Q \times X$ ),  $f(Q \times X \rightarrow TX$ : vector field),  $Inv$  (invariant set of each mode),  $E$  (discrete transitions),  $G$  (guards of each transition),  $R$  (reset map of transition), semantic for user. The purpose of executive system is to be responsible for all the transitions. The six defined modes (BaseMove, Stop, ArmMove, Hold, Grasp, Adjust) are to be synthesized via LTLMoP implementation and successful hybrid automaton without failure is desired.

## Proposed Plan

1. Identify exact input needed and output produced from each module
2. Create library combining gathered information and decide on priority
3. Testing on ROS simulation
4. Check for LTLMoP implementation
5. Scrutinize failure of robot behavior and improve problematic task

## References

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