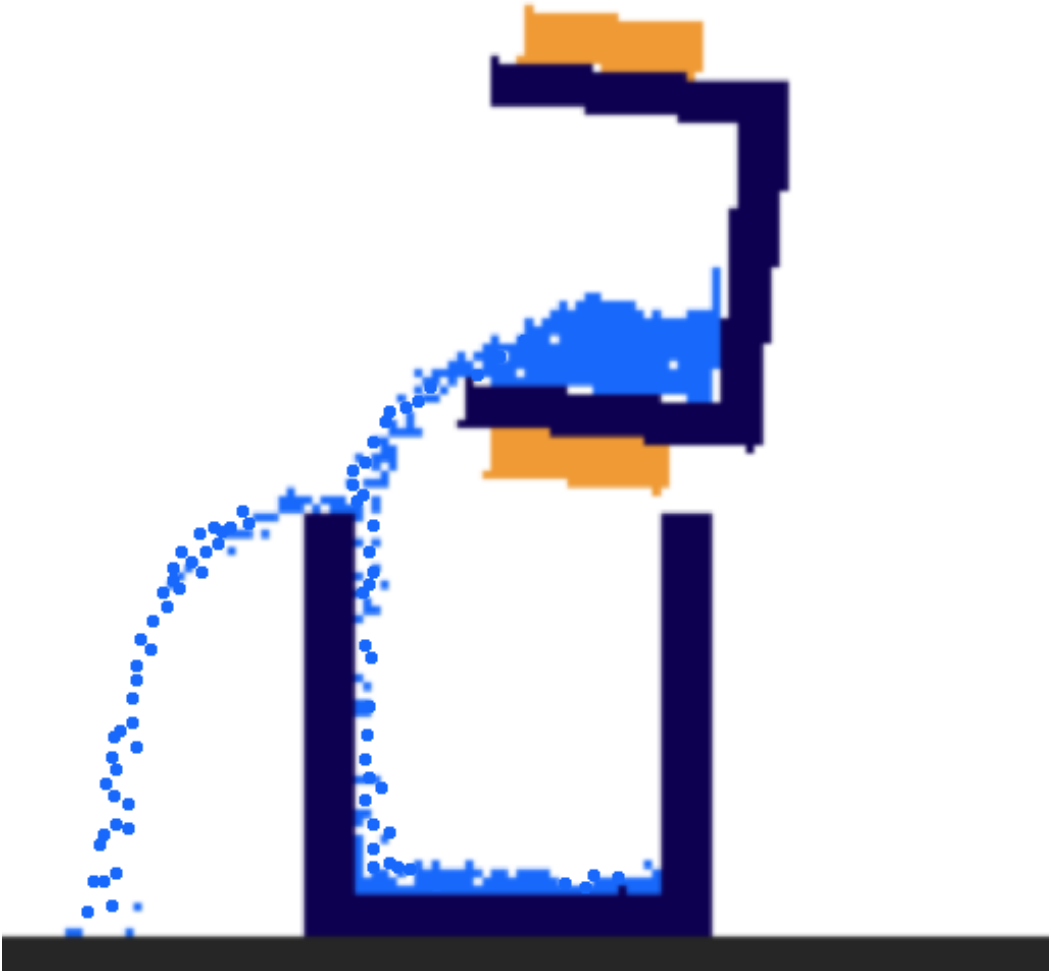
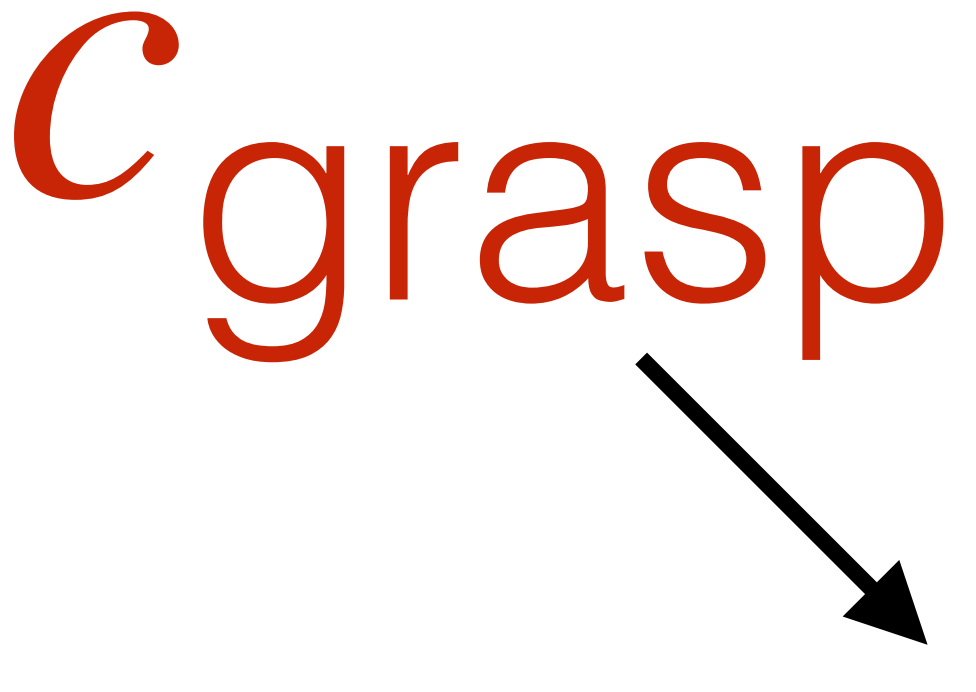
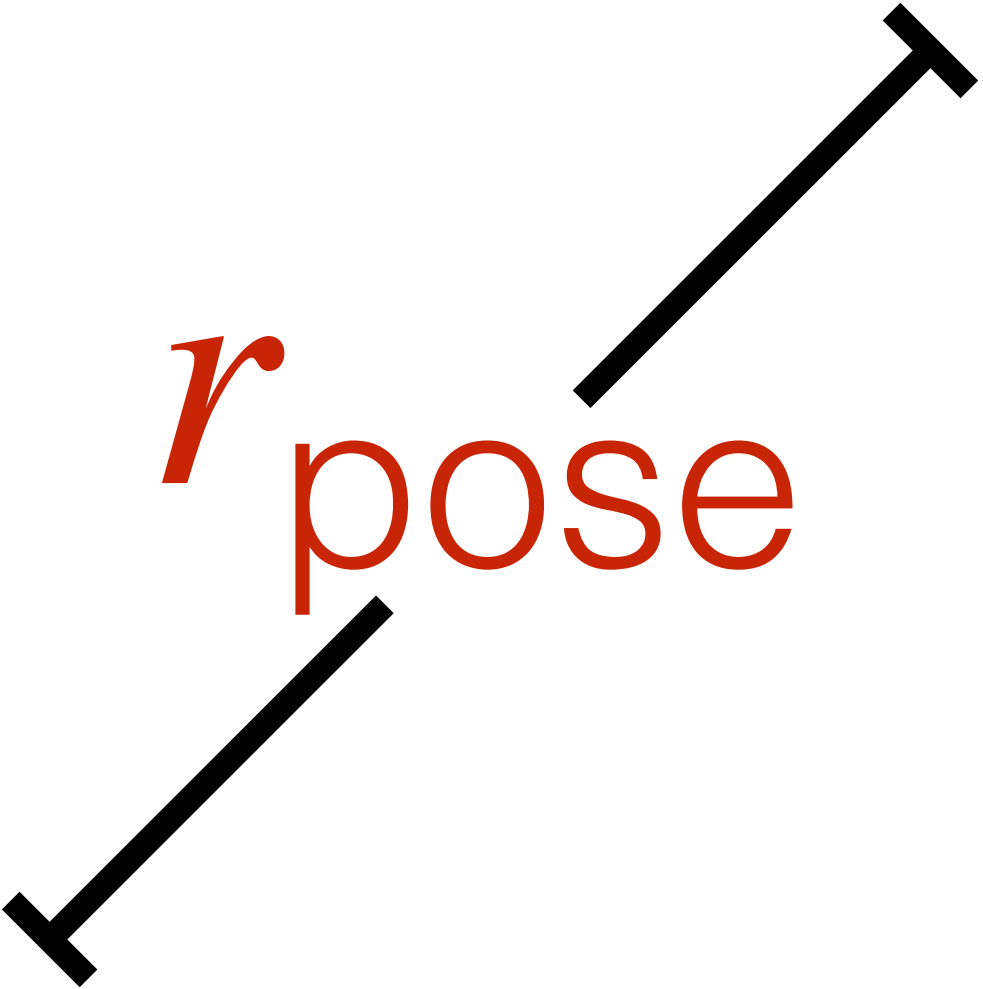
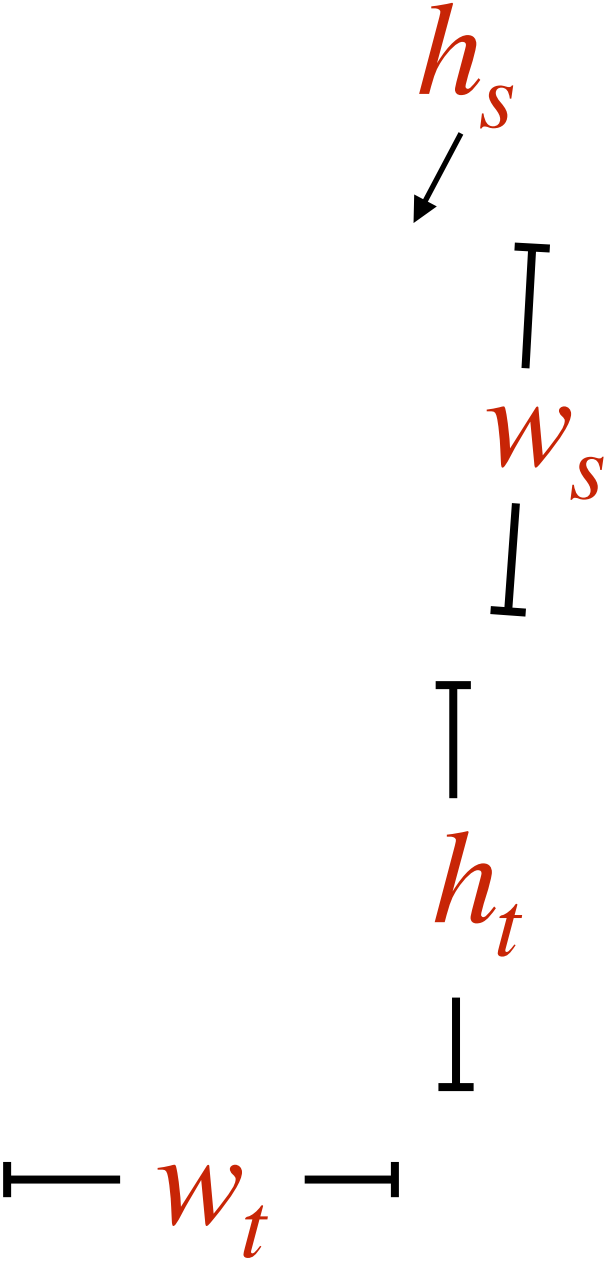



c_{grasp}

C pour


rpose


h_s
w_s
h_t
w_t

Cup-1

Cup-2

Skill: Pour(Cup-1)

Effect: Contains(Cup-2, Liquid)

Preconditions:

Contains(Cup-1, Liquid)

Holding(Cup-1,)

Shape(Cup-1) = (,)

Shape(Cup-2) = (,)

RelativePose(Cup-1, Cup-2) =

GoodPour(, , , , , ,)

Zi Wang (MIT CSAIL)

Robot Learning

5

Describing model of a skill in TAMP

w_s
h_s

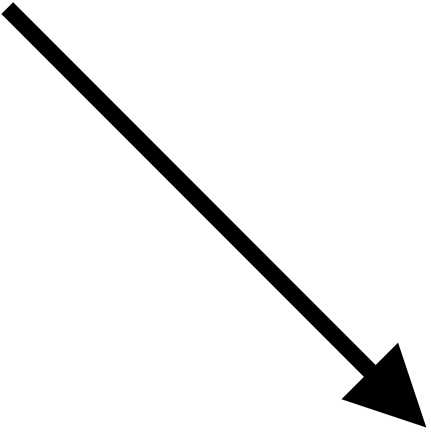
w_t
h_t

rpose

w_s h_s w_t h_t c_{grasp} c_{pour} r_{pose}

c grasp

Gripper



Describing model of a skill in TAMP

Skill: Pour(Cup-1)

Effect: Contains(Cup-2, Liquid)

Preconditions:

Contains(Cup-1, Liquid)

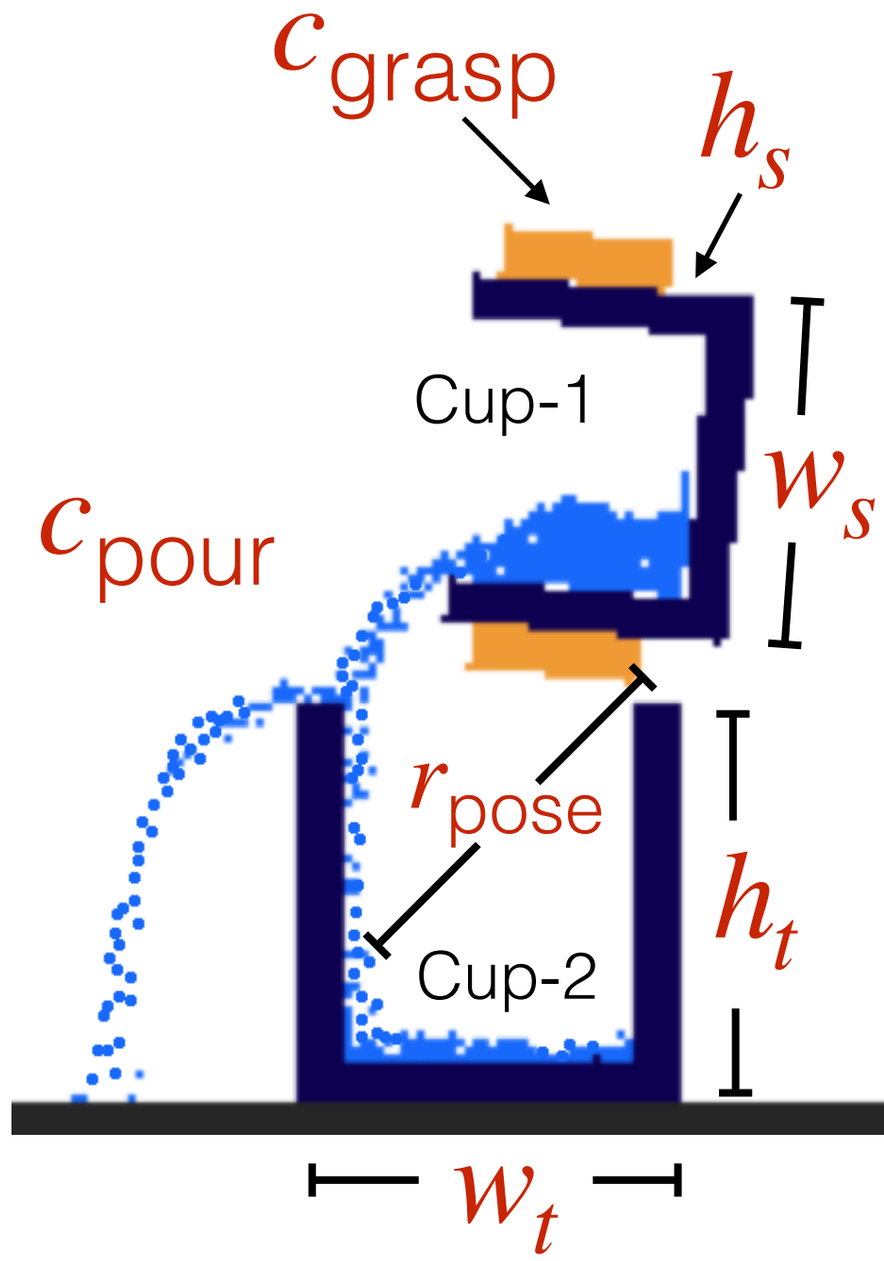
Holding(Cup-1, c_{grasp})

Shape(Cup-1) = (w_s, h_s)

Shape(Cup-2) = (w_t , h_t)

RelativePose(Cup-1, Cup-2) = r_{pose}

GoodPour(w_s , h_s , w_t , h_t , c_{grasp} , c_{pour}, r_{pose})



Challenges in TAMP

- how to acquire new low-level motor skills?

  [Levin et al., ISER 2016] [Schenck et al., CoRL 2017] [OpenAI, 2018] [Ebert et al., CoRL 2017]……

most robot learning

- which variables in the environment are relevant to the skill?

  ongoing work w/ Victoria Xia&Leslie Kaelbling

- under what conditions will executing the skill achieve some particular effect in the world?
- how to sample the parameters that satisfy those conditions?

our focus of learning

this talk *[Wang&Garrett&Kaelbling&Lozano-Perez, IROS 2018]*

GoodPour($w_s, h_s, w_t, h_t, c_{\text{grasp}}, c_{\text{pour}}, r_{\text{pose}}$) = True