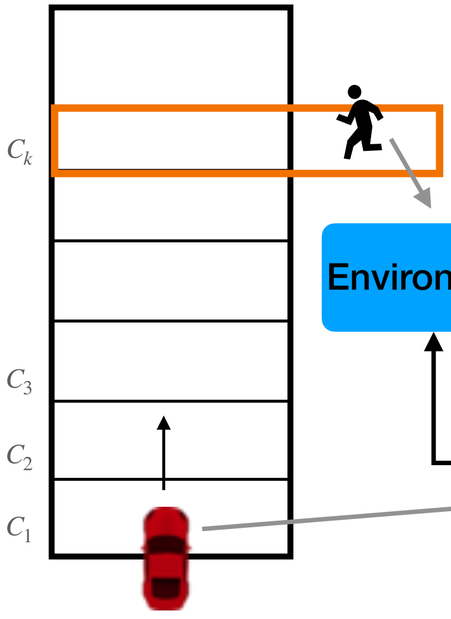
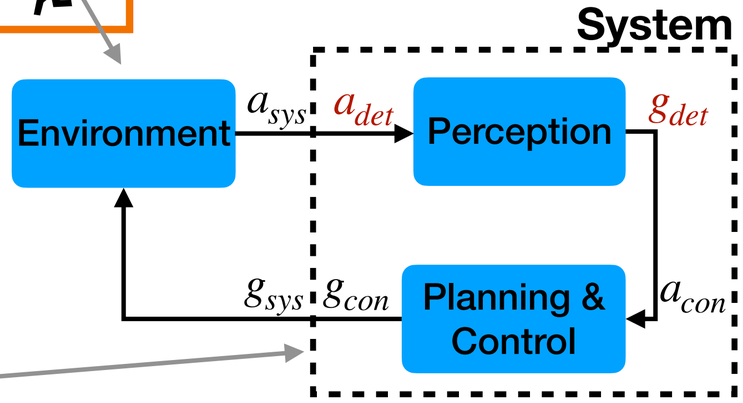
Car pedestrian example



System-level contract

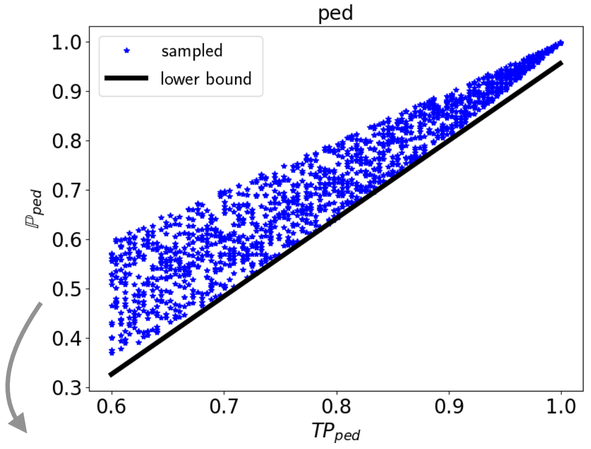
a_{sys}: distance to object

g_{sys}: Probabilistic safety specification



(a_{sys}, g_{sys})

Controller chooses actions based detection inputs



(a_{con}, g_{con}) found by sampling and deriving the tightest affine lower bound

pacti

Confusion matrices store evaluations of the detection model

True environment class

Predicted class	*ped*	*obj*	*emp*
ped	TP_{ped}		
obj		TP_{obj}	
emp			TP_{emp}

True positive rates

Key idea: Finding requirements on the confusion matrix for the system-level contract to hold

(a_{det}, g_{det}) has desired lower bounds on confusion matrix elements

a. System-level architecture and specification

b. Controller specification

c. Confusion Matrices