Introduction to Robotics
CSE 461

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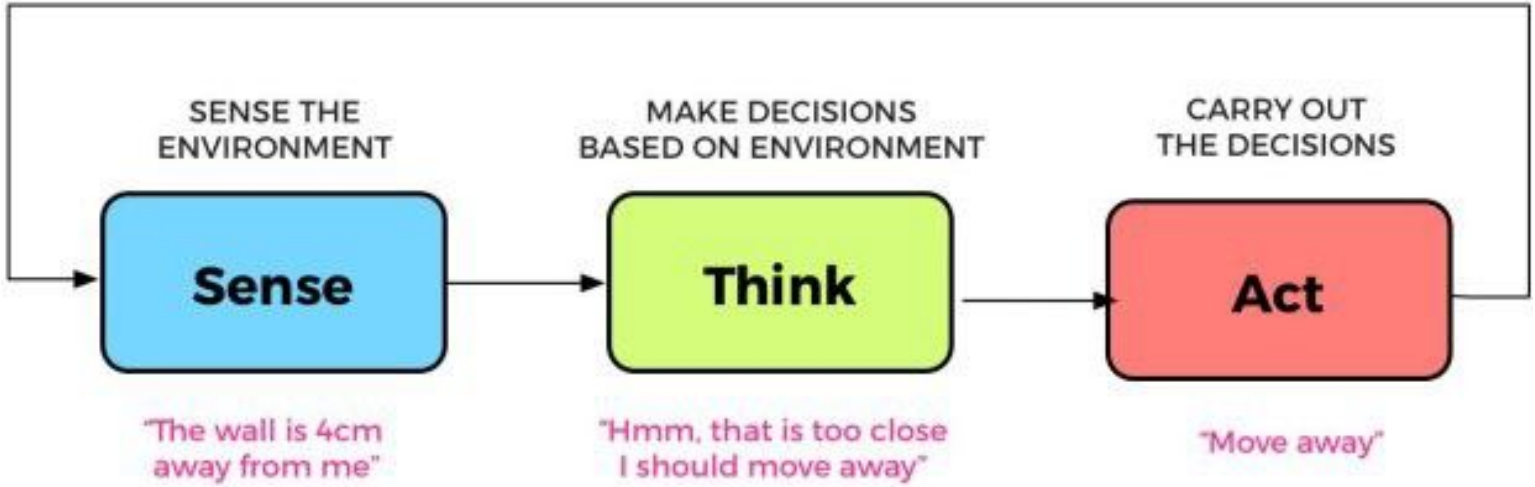
Lecture 3: Chapter 1(Introduction to robotics: basics)

Previous Class

1. Primitives

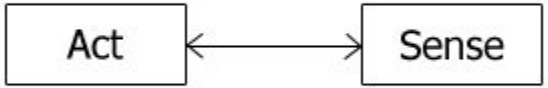
Recall


SENSE THE ENVIRONMENT
MAKE DECISIONS BASED ON ENVIRONMENT
CARRY OUT THE DECISIONS
Sense
Think
Act
"The wall is 4cm away from me"
"Hmm, that is too close I should move away"
"Move away"

Paradigms of Robotics

ROBOT ARMS
Olympic Games
Creative

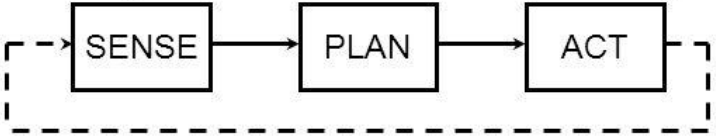
Reactive Paradigm



Robot Primitives	INPUT	OUTPUT
SENSE	Sensor Data →	Sensed Information
PLAN		
ACT	Sensed Information →	Actuator Commands

The Hierarchical Paradigm

S,P,A organization of Hierarchical Paradigm

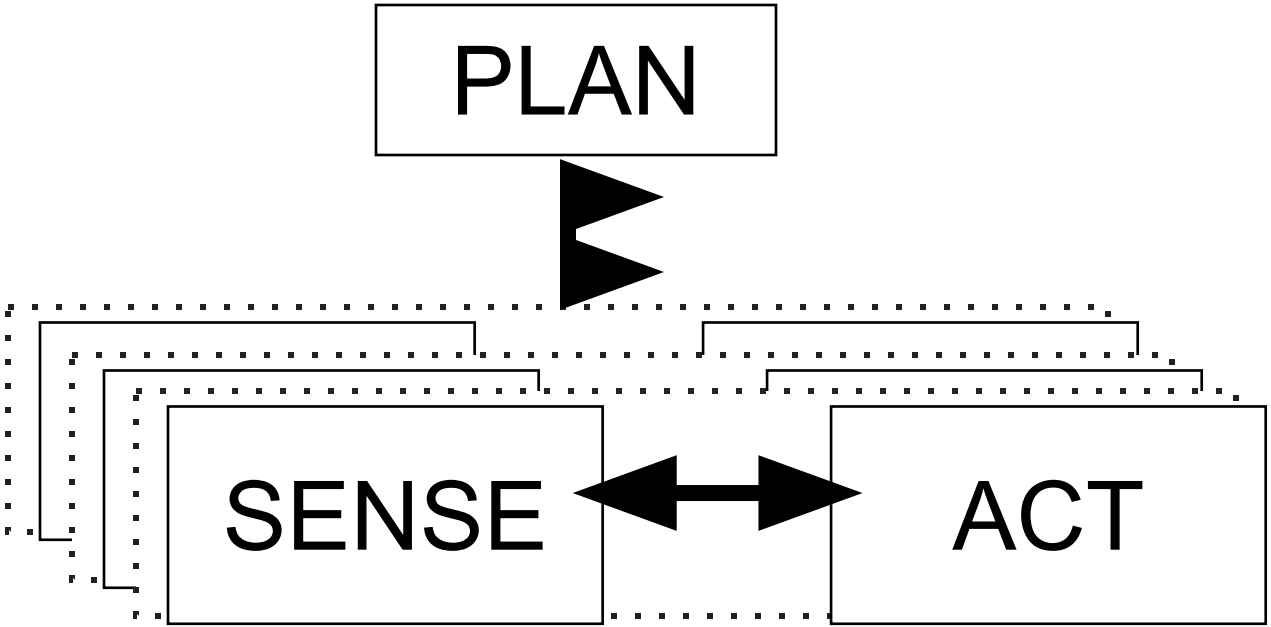


Alternative description of how the 3 primitives interact in the Hierarchical Paradigm

ROBOT PRIMITIVES	INPUT	OUTPUT
SENSE	Sensor data →	Sensed information
PLAN	Information (sensed and/or cognitive) →	Directives
ACT	[redacted] directives →	Actuator commands

Robot for Human Welfare

Hybrid deliberative/reactive paradigm



Advantages

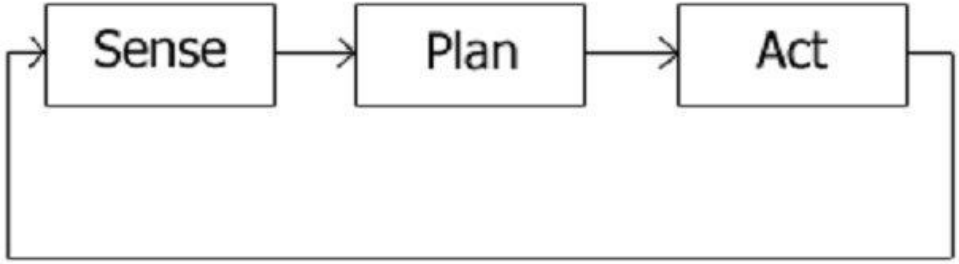
- Asynchronous processing technique allows to function Independently
- Planner can slowly compute next goal while robot can perform reactive task

Local and Global Model

- Reactive for Local control
- Deliberative for Global control

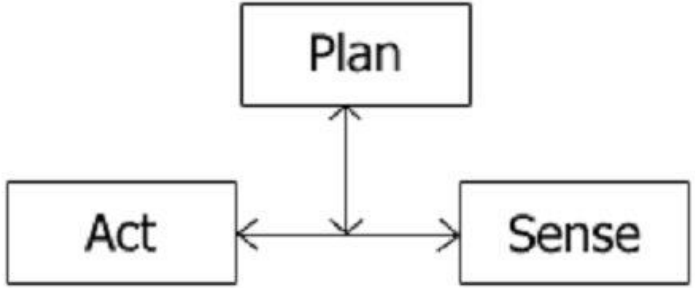
- However; Robot behavioral management requires to know its current mission, state and environment beside path-planning, map-making, monitoring etc. So, both local and global models are required to be considered for a robot performance.

Hierarchical/deliberative paradigm



The reactive paradigm

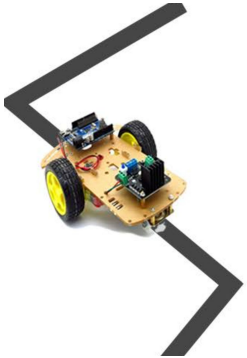
Hybrid deliberate/reactive paradigm



Group Activity

A : Line Following Robot

B : Mini Baymax



Group Activity

A : Fire extinguisher robot

B : Baymax

C: Farm bot

Let’s talk about a dream !

https://www.youtube.com/watch?v=fn3KWM1kuAw

Next Class

- Subsystem

Thank You