Artificial Intelligence Robotics & Automation

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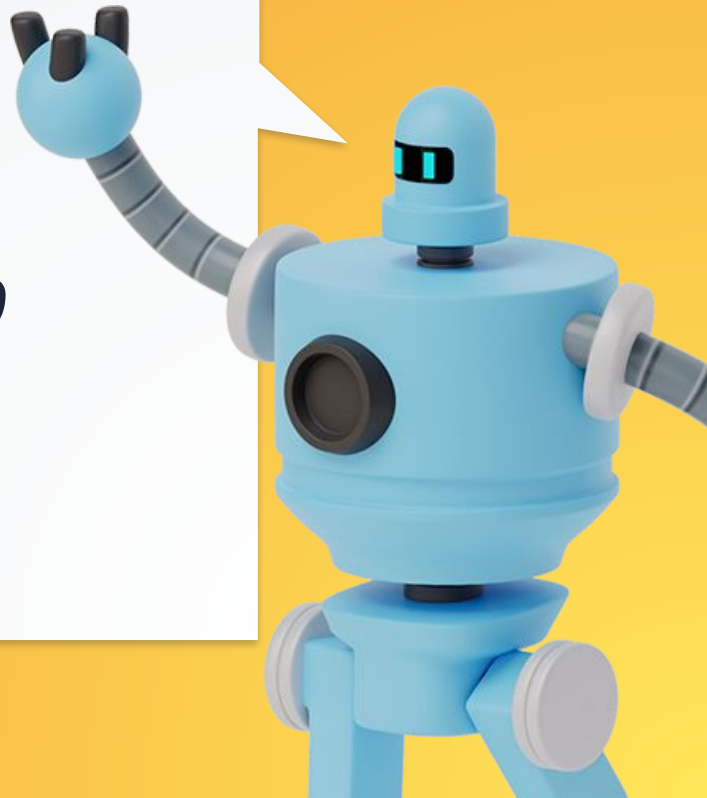
ROBOTICS

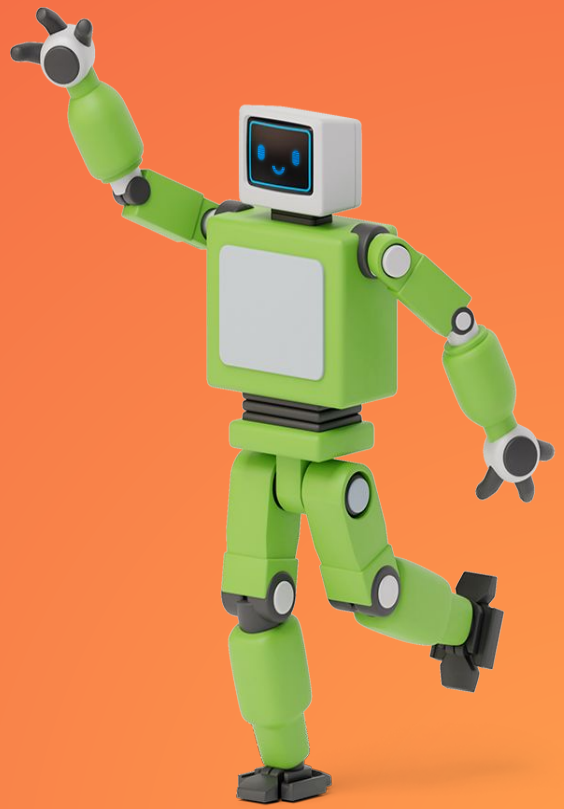
“In which agents are endowed with physical effectors with which to do mischief”.



INTRODUCTION

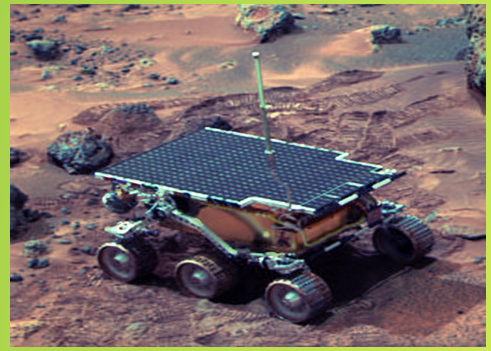
Robots are physical agents that perform tasks by manipulating the physical world. They're equipped with **effector** such as:

- Legs
- Wheels
- Joints
- Grippers



ROBOT'S PRIMARY CATEGORIES

- Manipulator
- Mobile Robot
- Mobile Manipulator



ROBOT HARDWARE

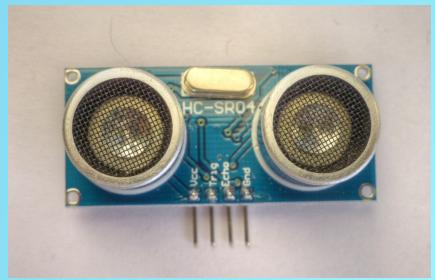
Sensors

The perceptual interface between robot and environment.

- **Passive sensors:**Cameras, capture signals generated by other sources
- **Active sensors:**Sonar, send energy into the environment

Active sensors tend to provide more information than passive sensors. The main sensors are:

- ❖*Range Finders*
- ❖*Location Sensors*
- ❖*Proprioceptive Sensors*



ROBOT HARDWARE

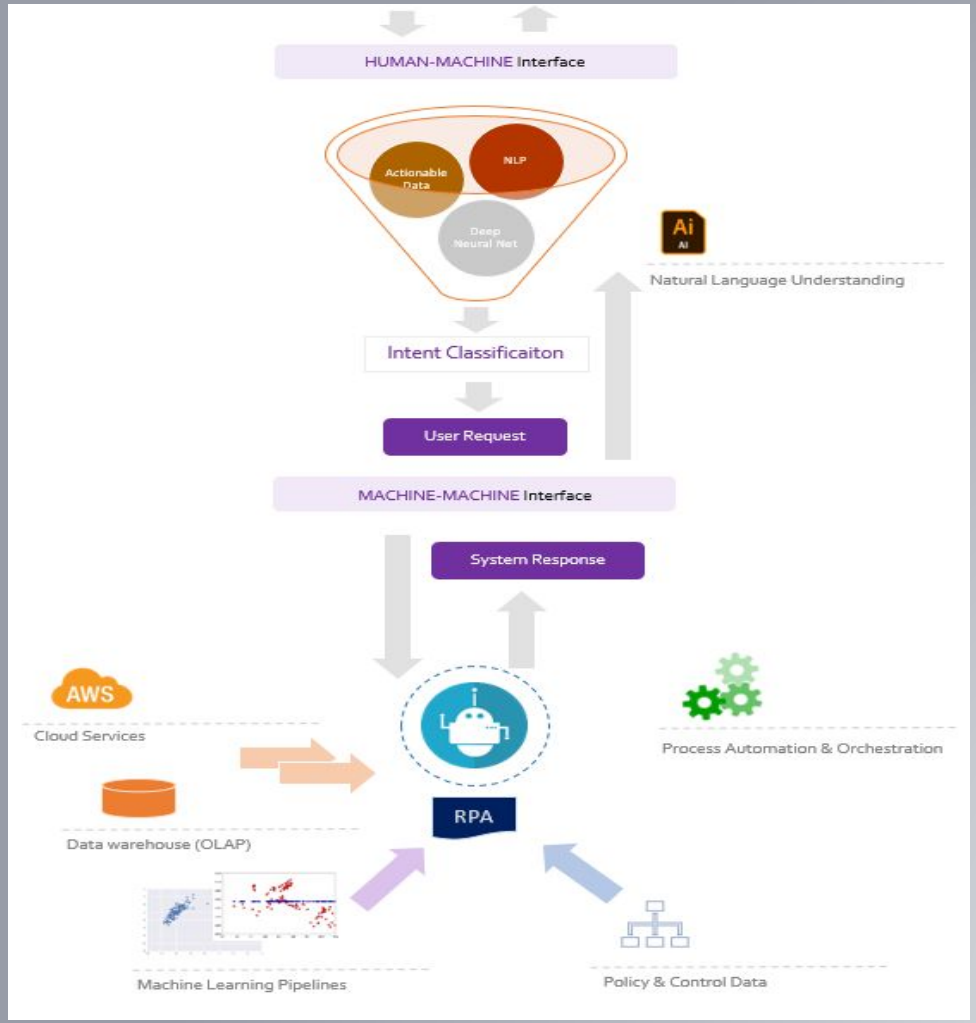
Effectors

Effectors are the means by which robots move and change the shape of their bodies. The design of effectors is about motion and shape in the abstract, using the concept of **degree of freedom**(DOF).

We count one degree of freedom for each independent direction in which a robot, or one of its effectors, can move.

A Mobile robot as an AUV has six degree of freedom, three for its (**x,y,z**)location in space & three for its (**yall,roll,pitch**) angular orientation.

These 6 degrees define *Kinematic state* or *pose* of the robot


HUMAN-MACHINE Interface
Actionable Data
NLP
Deep Neural Net
Ai
AI
Natural Language Understanding
Intent Classificaiton
User Request
MACHINE-MACHINE Interface
System Response
AWS
Cloud Services
Process Automation & Orchestration
RPA
Data warehouse (OLAP)
Machine Learning Pipelines
Policy & Control Data