Humanoid Robots

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Overview

- Definiton
- What are they good for ?
- What can they do?
- History
- Different models
- Fazit

Definition

"an automatically controlled, reprogrammable, multipurpose, manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation applications."

International Organization for Standardization ISO 8373

"machine that looks like a human being and performs various complex acts (as walking or talking) of a human being"

Merriam-Webster

"I can't define a robot, but I know one when I see one."

Joseph Engelberger

What are they good for?

- Doing our work
- Help in disaster situations
- Elderly care
- Medical care

What can they do?

- Musicians & singing & dancing
- Playing ping pong
- Pour „Weißbier“ in a glass
- Play soccer
- Solving rubic´s cube
- Ride a bycicle
- Skating
- Boxing Competition in Japan
- Remote Control
- Catwalk robot

History

250 BC	The Lie Zi described an automaton
50 AD	Hero of Alexandria described a machine to automatically pour wine for party guests
1495	Leonardo da Vinci designs a humanoid automaton that looks like an armored knight, known as Leonardo's robot.
1921	Czech writer Karel Čapek introduced the word "Robot" in his play R.U.R. (Rossum's Universal Robots). The word "Robot" comes from the word "robota", meaning, in Czech, "forced labour, drudgery"
1970	Miomir Vukobratović has proposed Zero Moment Point a theoretical model to explain biped locomotion

History

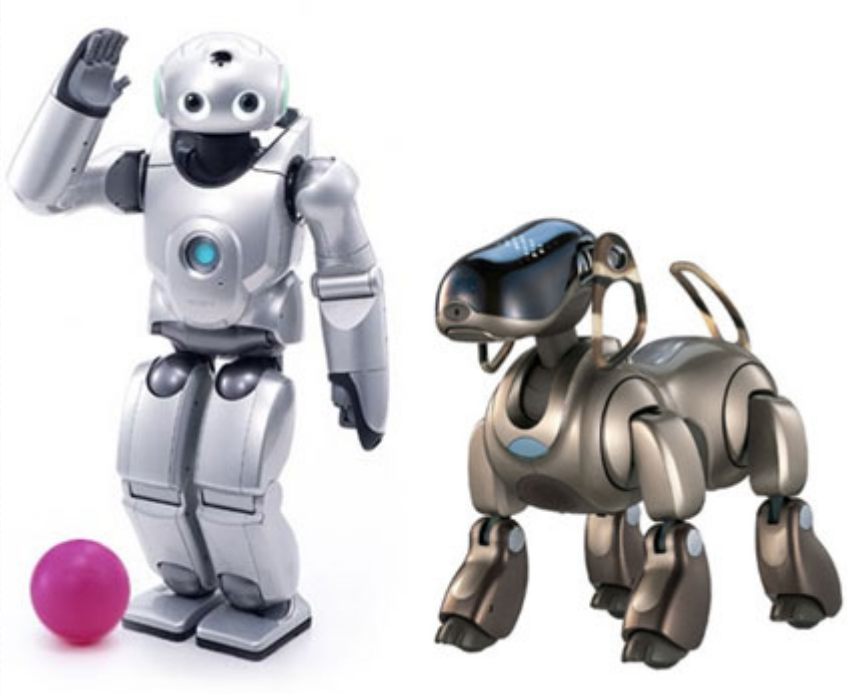
1973	In Waseda University, in Tokyo, Wabot-1 is built. It was able to communicate with a person in Japanese and to measure distances and directions to the objects using external receptors, artificial ears and eyes, and an artificial mouth
1986	Honda developed seven biped robots which were designated Eo (Experimental Model o) through E6
2000	Honda creates its 11th bipedal humanoid robot, ASIMO.
2001	Sony unveils small humanoid entertainment robots, dubbed Sony Dream Robot (SDR). Renamed Qrio in 2003.
2009	HRP-4C, a Japanese domestic robot made by National Institute of Advanced Industrial Science and Technology shows human characteristics in addition to bipedal walking.

Different Models

- Sony Qrio
- Toyota Partner Robots
- Honda Robots
- Honda Asimo

Qrio

- Sony
- First presented in 2000
- 58 cm
- First running robot
- Follower of Aibo



Qrio

- Recognizes faces
- Can learn new faces

- Knows already 60 000 words
- Learns more words during conversation

-> it will be pleasure to talk to Qrio

Toyota Partner Robots

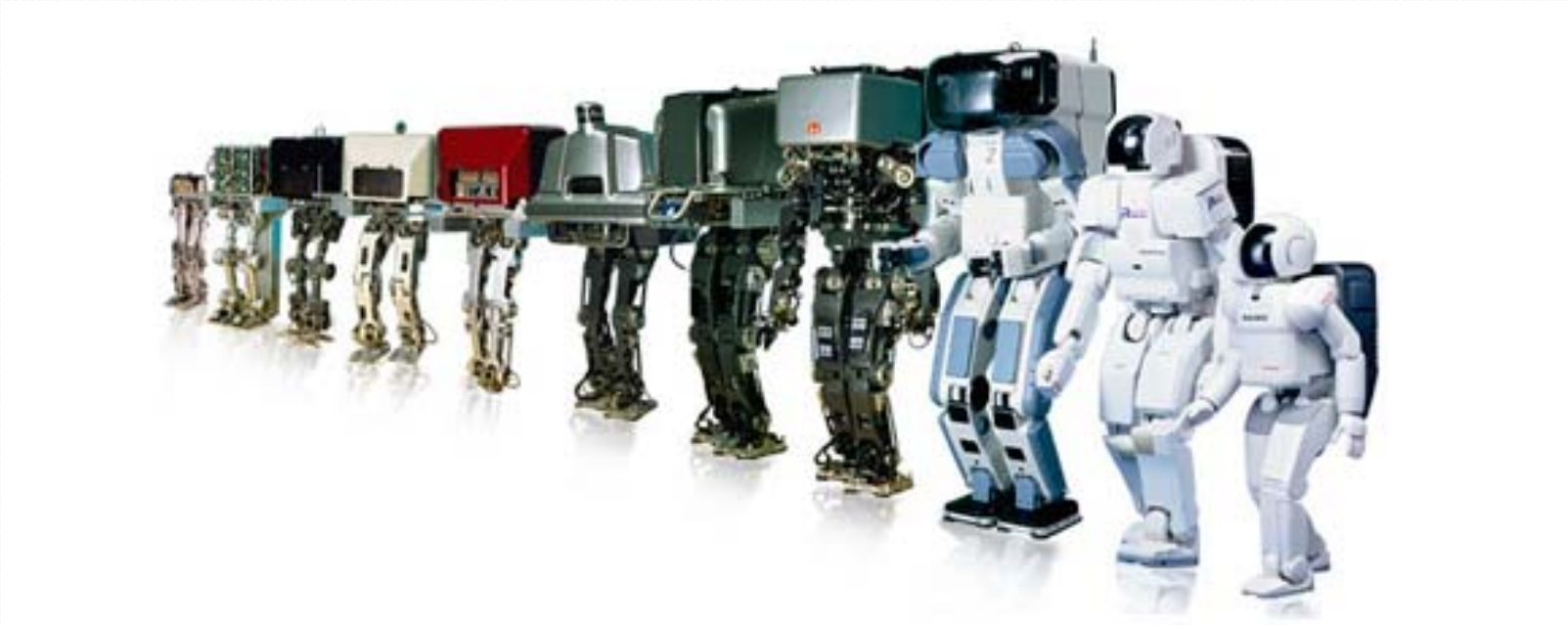
- First introduced EXPO 2005 in Japan
  - 6 brass (Trumpet, Tuba, Horn)
  - drummer
  - DJ
- Designed for service in daily life situations

Violine Playing Robot

- Introduced in 2007
- Presented with mobility robot
- 1,52 m
- 56 kg

- Sound?
- Good imitation of human expression while playing

Honda Robots



E-Series

	E0	E1	E2	E3	E4	E5	E6
Unveile	1986	1987	1989	1991	1991	1992	1993
Weight:	16.5 kg	72 kg	67.7 kg	86 kg	150 kg	150 kg	150 kg
Height:	101.3 cm	128.8	132 cm	136.3 cm	159.5 cm	170 cm	174.3 cm
DOF	6	12	12	12	12	12	12
Image							

P-Series

	P1	P2	P3
Unveiled	1993	1996	1997
Weight:	175 kg	210 kg	130 kg
Height:	191.5 cm	182.0 cm	160.0 cm
DOF	30	30	28
Walking speed	-	2 km/h	2 km/h
Continuous opating time	-	15 min	25 min
Image			

Asimo

Specifications

	Old Model	New Model
Running speed:	-	6 km/h
Normal walking speed:	1.6 km/h	2.7 km/h
Height:	120 cm	130 cm
Weight:	52 kg	54 kg
Continuous operating time:	30 min	1 hour
Operating DOF:	26	34

Intelligence

- Recognition of moving objects
- Posture/gesture recognition
- Environment recognition
- Sound recognition
- Face recognition
- Integration with user's network system
- Internet connectivity

Fazit

- Robots can already do a lot
- Intelligence is not jet high enough for „real“ autonomy
- Every company has its own main research
- Developing Robots is expensive and takes time, therefore only small steps can be expected from researches
- All researches connected will someday lead to a real humanoid robot for service in daily life situations

Thanks for Listening!

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