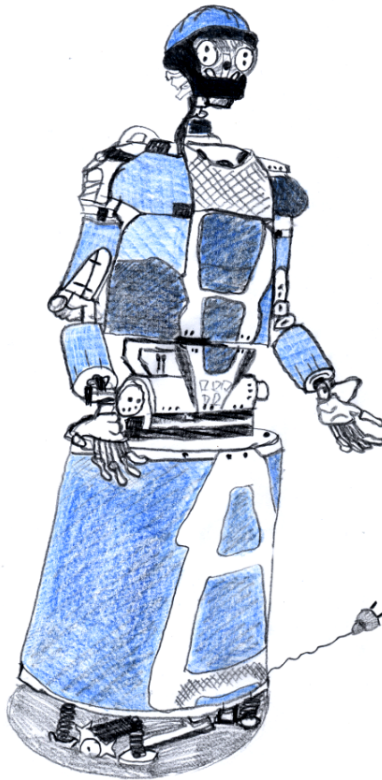


IT-Milestones

Humanoid robots are very popular these days.



Not only has Hollywood featured such charming creatures like C3PO in *Star Wars* or “i,ROBOT” starring Will Smith. It also seems a very tempting conception to have such a friendly creature in ones own home. No more cramped dishwashers to be emptied after a tiring day at work. No more shopping to be put away in the fridge. - Just tell “ROBBI” to do it for you. There will be no moaning or complaining as with the kids. ROBBI will thank you and just do what has to be done.

How do you make ROBBI do all these wonderful things for you?

This is the amazing part. No pressing buttons, no typing of complicated codes into a keyboard. - You touch his shoulder and just t e l l him. ROBBI is a highly sophisticated machine, which – among other useful things - has a module for “*speech recognition*”. And this is not just “sit” or “attack”, like you would shout to your dog. No, you really can communicate with the robot via natural speech. Say something like: “*Would you mind emptying the dishwasher for me, ROBBI love, please?*” And the thing will do it. He might have some problems in understanding you, first. But he will definitely adapt to your speech. When attempting the task, ROBBI will not lift the whole dishwasher, like a terminator, and shake it until everything inside is scattered to the floor with a crash. No, he will take every single item out with his sensitive five-finger hands, and put it away in the cupboard, where it belongs.

We are not talking Science Fiction. - This is real!

In the two German exhibitions *CeBIT* and *Automatica* “ARMAR-III” was presented with its currently available skills.

ARMAR's creators of the Institute for Computer Science and Engineering (CSE/IAIM), University of Karlsruhe showed, “the robot's abilities to perceive its environment visually, [they] also showed how we can communicate with the robot via natural speech. ... [ARMARIII's] 3D face and hand detection and tracking were ... successfully demonstrated. ...

Among [ARMARIII's] motor-skills were the active tracking of objects with the head, combining neck and eye movements ..., basic arm reaching movements, early hand grasping tasks and force-based controlled motion of the platform.”

What is it that makes the humanoid concept so attractive for todays scientists?

Read, what the Scientists say themselves: “The design of humanoid robots requires coordinated and integrated research efforts that span a wide range of disciplines such as learning theory, control theory, artificial intelligence, human-machine interaction, mechatronics, perception (both computational and psychological), and even biomechanics and computational neuroscience. These fields have usually been explored independently, leading to significant results within each discipline. The integration of these disciplines for the building of adaptive humanoid robots requires enormous collaborative resources that can be achieved only through long-term, multidisciplinary research projects.”

(ARMAR-III: An Integrated Humanoid Platform for Sensory-Motor Control; T. Asfour, K. Regenstein, P. Azad, J. Schroder, A. Bierbaum, N. Vahrenkamp and R. Dillmann; University of Karlsruhe; Institute for Computer Science and Engineering (CSE/IAIM)

We knew, there was more in ARMARIII or any other humanoid project than emptying dishwashers. Apart from always making a good story for the press, they are “long-term, multidisciplinary research projects”. And this makes them truly valuable for the advancement of modern science.

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Vocabulary:

humanoid	menschenähnlich
tempting	verführerisch, verlockend
cramped	überfüllt
tiring	ermüdend
moan	jammern, stöhnen
complain	sich beklagen, beschweren
sophisticated	komplex, kompliziert
speech recognition	(elektronische) Spracherkennung
attempt	etwas in Angriff nehmen
scattered	verstreut
item	Artikel, Gegenstand
available	verfügbar
perceive	wahrnehmen
detection	das Entdecken, die Erkennung
tracking	das Nachführen, Verfolgen
grasp	festhalten
force-based controlled motion	kraftabhängige Kontrolle der Bewegung
require	beanspruchen, benötigen
mechatronics	Mechatronik beschäftigt sich interdisziplinär mit dem Zusammenwirken mechanischer, elektronischer und informationstechnischer Systeme.
perception	Wahrnehmung
neuroscience	Neurowissenschaft
significant	bedeutsam
adaptive	lernend, anpassungsfähig
achieve	erreichen, bewältigen
advancement	Weiterentwicklung, Fortschritt

A) Questions for discussing the text:

1. What do you know about “C3PO” and “i,ROBOT”?
2. Do you know more humanoids acting in science fiction movies?
3. Do you think a device like this could be helpful in your home?
4. What kind of abilities or aptitudes should it have?
5. There are two different levels of speech recognition mentioned in the text. – Explain the difference between them.
6. ARMAR III was developed by a team of scientists at Karlsruhe University and later shown at two trade exhibitions. – Describe its “currently available skills”.
7. What is it that makes the humanoid concept so attractive for today's scientists?

B) How does the text say it? - Find the correct scientific term.

	(elektronische)Spracherkennung
	kraftabhängige Kontrolle der Bewegung
	beschäftigt sich interdisziplinär mit dem Zusammenwirken mechanischer, elektronischer und informationstechnischer Systeme.

C) How does the text say it? - Find an equivalent for the phrases below in the text and insert them in the boxes below.

Keine Einkäufe mehr, die man im Kühlschrank verstauen muss.	
Würde es dir etwas ausmachen, den Geschirrspüler für mich auszuräumen?	
Er könnte gewisse Probleme haben, dich zu verstehen.	
ARMARs motorische Fähigkeiten waren unter anderem das aktive Verfolgen von Objekten mit dem Kopf.	
Zum Bau anpassungsfähiger menschenähnlicher Roboter bedarf es eines enormen Einsatzes an (interdisziplinärer) Zusammenarbeit.	

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D) Jumbled Sentences – Please put them in the correct order.

robot | communicate | with | really | can | you | speech | via | the | natural |

he | to | will | adapt | definitely | speech | your |

item | he | take | every | out | single | will |

its | environment | robot's | the | can | perceive | visually |

were | arm | successfully | basic | movements | demonstrated | reaching |

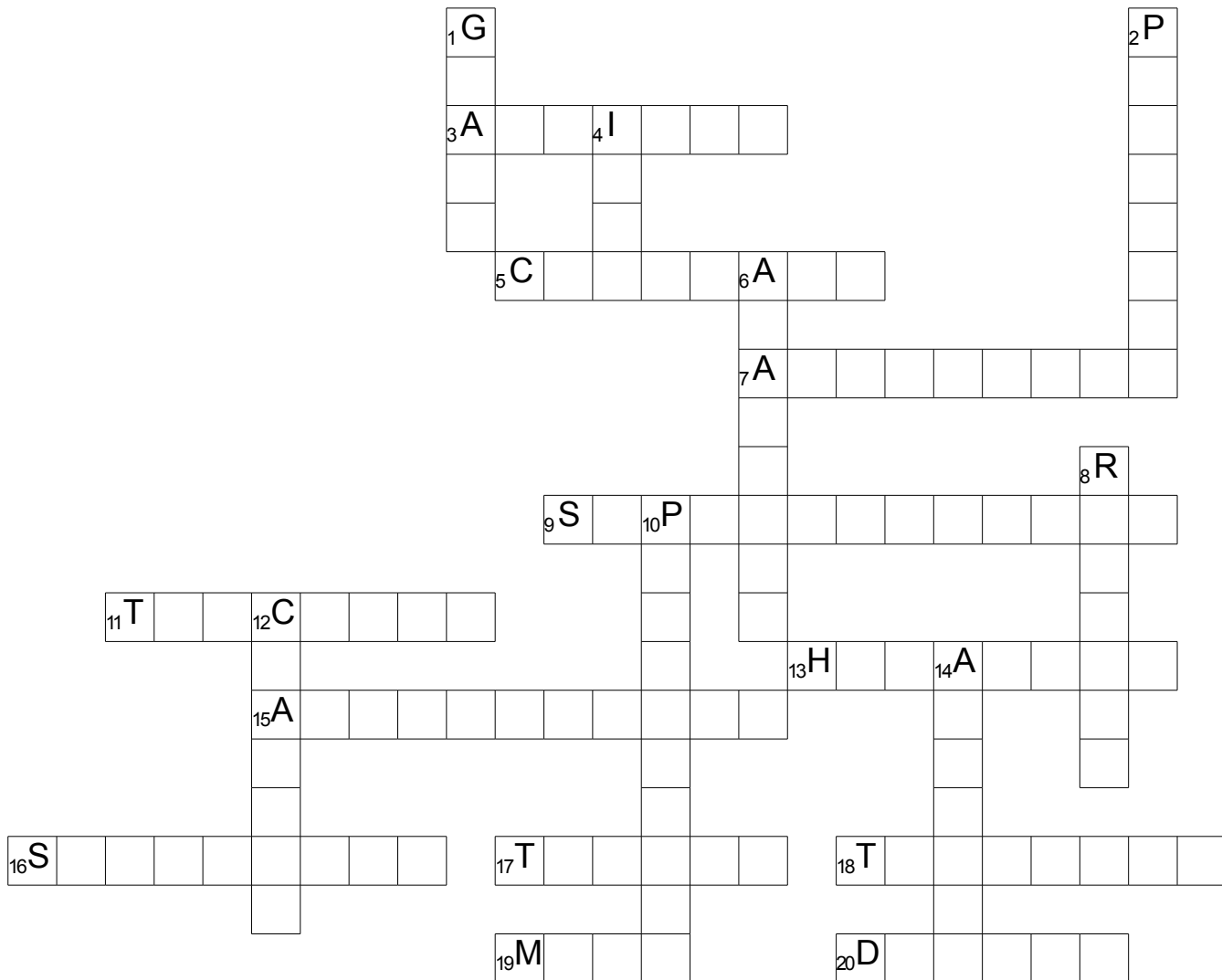
IT-Milestones

E) Insert the missing words.

ROBBI is a highly (h a o i e s p c s t d t i) _____ machine, which has a module for “speech (o o e n t i r g n i c) _____”. And this is not just “sit” or “attack”, like you would (h u t o s) _____ to your dog. No, you really can (m n t c o u i m c e a) _____ with the robot via (a u a l n t r) _____ speech. Say something like: “*Would you mind emptying the (i h a h r e s s w d) _____ for me, please?*” And the thing will do it. He might have some problems in understanding you, first. But he will (i y e e i d n l t f) _____ adapt to your speech.

When (e t p g i t t a m n) _____ the task, ROBBI will not lift the whole dishwasher, like a (e t n m r a o i t r) _____, and shake it until everything inside is (t c e e t d a s r) _____ to the floor with a crash. No, he will take every single (t m i e) _____ out with his (e s t v s i n i e) _____ five-finger hands, and put it away in the cupboard, where it belongs.

F) Test Your Vocabulary:



Across:

3. erreichen, bewältigen
5. sich beklagen
7. verfügbar
9. komplex, kompliziert
11. mit den Augen) nachverfolgen
13. menschenähnlich
15. Weiterentwicklung
16. verstreut
17. ermüdend
18. verführerisch
19. stöhnen, sich beklagen
20. aufspüren

Down:

1. greifen, ergreifen
2. wahrnehmen
4. Gegenstand, Artikel
6. lernend
8. benötigen
10. Wahrnehmung

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B) Lösung:

speech recognition	(elektronische)Spracherkennung
force-based controlled motion	kraftabhängige Kontrolle der Bewegung
mechatronics	Mechatronik beschäftigt sich interdisziplinär mit dem Zusammenwirken mechanischer, elektronischer und informationstechnischer Systeme.

C) Lösung:

Keine Einkäufe mehr, die man im Kühlschrank verstauen muss.	No more shopping to be put away in the fridge.
Würde es dir etwas ausmachen, den Geschirrspüler für mich auszuräumen?	Would you mind emptying the dishwasher for me?
Er könnte gewisse Probleme haben, dich zu verstehen.	He might have some problems in understanding you?
ARMARs motorische Fähigkeiten waren unter anderem das aktive Verfolgen von Objekten mit dem Kopf.	ARMAR's motor-skills – among others - were the active tracking of objects with the head.
Zum Bau anpassungsfähiger menschenähnlicher Roboter bedarf es eines enormen Einsatzes an (interdisziplinärer) Zusammenarbeit.	The building of adaptive humanoid robots requires enormous collaborative resources.

D) Lösung:

You really can communicate with the robot via natural speech.

He will definitely adapt to your speech.

He will take every single item out.

The robot's can perceive its environment visually.

Basic arm reaching movements were successfully demonstrated.

E) Lösung:

ROBBI is a highly **sophisticated** machine, which has a module for “**speech recognition**”. And this is not just “sit” or “attack”, like you would **shout** to your dog. No, you really can **communicate** with the robot via **natural** speech. Say something like: “*Would you mind emptying the **dishwasher** for me, please?*” And the thing will do it. He might have some problems in understanding you, first. But he will **definitely** adapt to your speech.

When **attempting** the task, ROBBI will not lift the whole dishwasher, like a **terminator**, and shake it until everything inside is **scattered** to the floor with a crash. No, he will take every single **item** out with his **sensitive** five-finger hands, and put it away in the cupboard, where it belongs.

F) Lösung:

