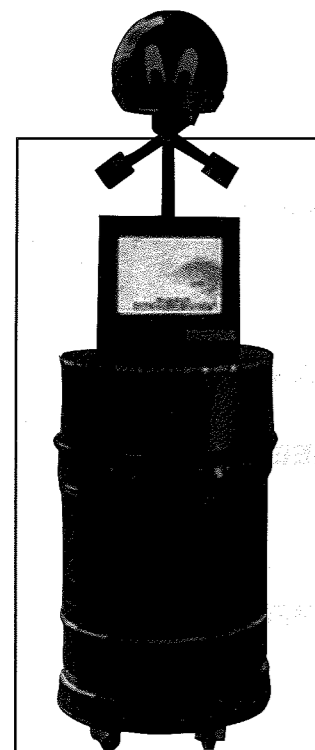


Read "Machines with feelings" and answer questions 1 to 8.

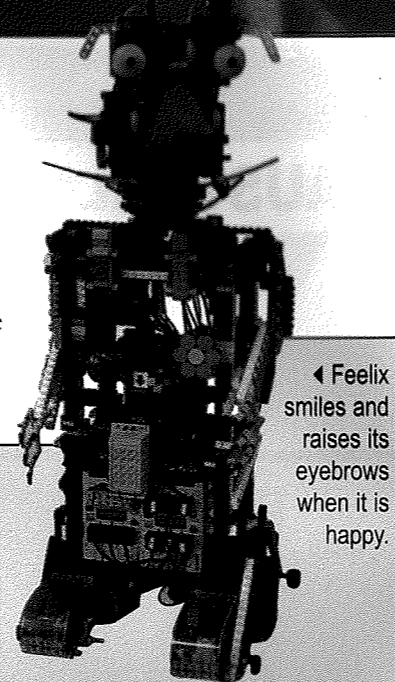
Machines with feelings

We often attribute emotions to machines, saying perhaps that the car is 'behaving badly' when it will not start. Can an inanimate object really have feelings? Modern roboticists are trying to answer this question by building machines that act as though they have feelings.



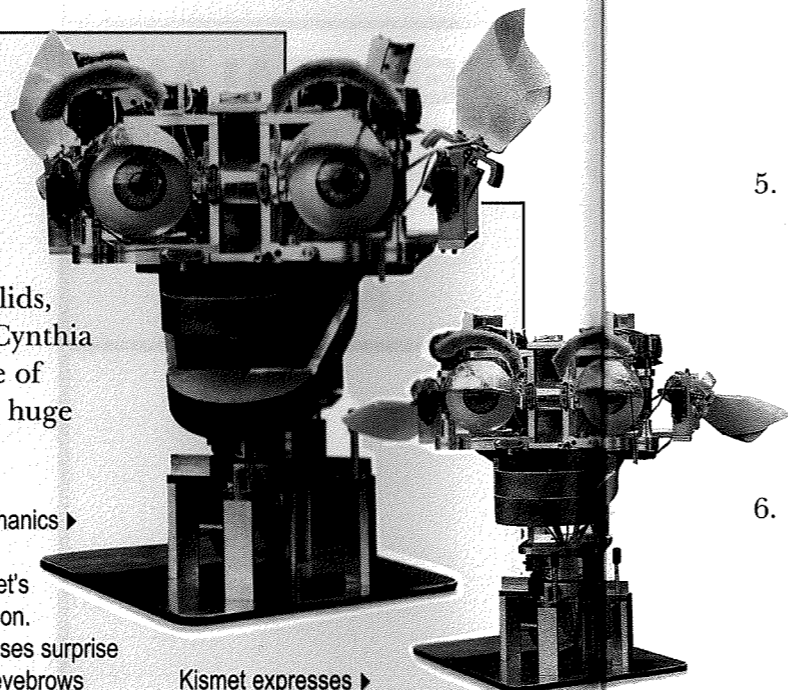
SAGE Sage was developed in the 1990s by US engineer Illah Nourbakhsh. It was used as a tour guide at the Carnegie Museum of Natural History. When its batteries got low, Sage responded as if it were tired and became angry if people got in its way. However, when there were only a few visitors at the museum, it became lonely. As soon as anyone paid attention to it, it became cheerful and started telling jokes.

FEELIX Jakob Fredslund and Lola Canamero from Lego-Lab in Denmark have created Felix. Felix is programmed to react with anger, happiness or fear when its feet are touched in different ways. Felix is a simple robot, but has taught people a great deal about how humans interact with robots that seem to show feelings.



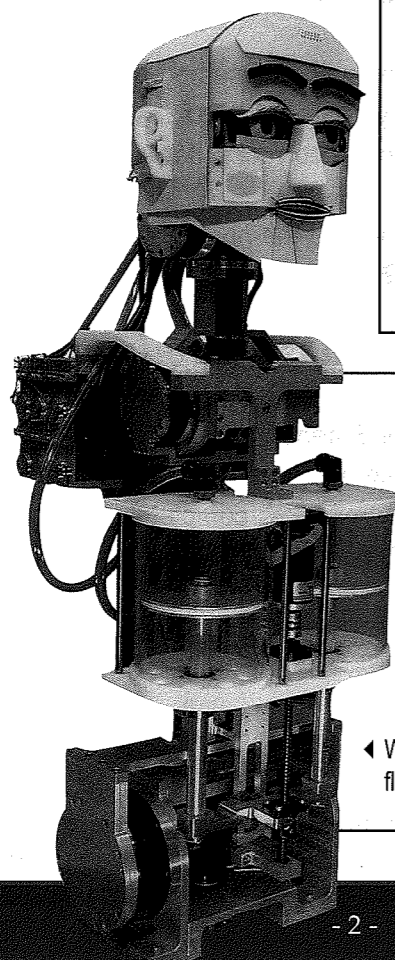
◀ Felix smiles and raises its eyebrows when it is happy.

KISMET Kismet is a robot capable of face-to-face interaction. Kismet responds to human facial expressions and hand gestures. It uses signals such as gaze direction, facial expression and vocal babbling. Kismet has mobile ears, eyebrows, eyelids, lips and jaw. Kismet was designed by Cynthia Breazeal at the Massachusetts Institute of Technology in the USA and has had a huge influence on the world of robotics.



Complex mechanics ▶ are needed to produce Kismet's facial expression. Kismet expresses surprise by raising its eyebrows and opening its eyes wide. Kismet's ears can move to contribute to its expression.

Kismet expresses ▶ sadness by lowering its eyelids and brows and drooping its ears. The mouth is clamped shut.



SHY MACHINE / WE-4

Since Kismet appeared, other researchers have developed similar robots. Waseda University in Japan has produced WE-4 – a more realistic, but perhaps less appealing, machine. WE-4's face is covered with plastic sheeting that lights up in a blush when the robot is embarrassed. Unlike Kismet, WE-4 has a sense of touch.

◀ WE-4 can blink as quickly as a human. Its lips are extremely flexible. A set of mechanical lungs makes WE-4 appear to breathe.

- Which robot was designed to react to facial expressions?
 - Feelix
 - Kismet
 - WE-4
 - Sage
- What do both Felix and Kismet do to express an emotion?
 - blush
 - blink
 - raise their eyebrows
 - droop their ears
- Which literary technique does the writer use in the line "the car is 'behaving badly'"?
 - simile
 - pun
 - exaggeration
 - personification
- Two emotions that both Sage and Felix can express are
 - happiness and anger.
 - happiness and fear.
 - surprise and anger.
 - sadness and embarrassment.
- There are two photographs of Kismet. Which emotion is Kismet expressing in this photograph?
 - happiness
 - surprise
 - sadness
 - embarrassment
- Which of the following statements is **CORRECT**?
 - Lola Canamero created Felix at Waseda University in Japan.
 - Illah Nourbakhsh invented WE-4 at the Lego-Lab in Denmark.
 - Jakob Fredslund designed Sage to be used at the Carnegie Museum of Natural History.
 - Cynthia Breazeal designed Kismet at the Massachusetts Institute of Technology.
- Which statement about the robots would the writer agree with?
 - Although Kismet can express a wide range of emotions, it is difficult to distinguish one emotion from another.
 - Although Sage has been designed as a museum guide, it blushes with embarrassment when asked a question.
 - Although Felix responds to people, it becomes confused when it is the centre of attention.
 - Although WE-4 has many lifelike features, it does not look particularly lifelike.
- What is the main purpose of the text?
 - to demonstrate how different countries are competing to build more realistic robots
 - to argue against the increasing use of robots in everyday life
 - to describe robots that have been developed to imitate some human emotions
 - to show how robots have been designed to assist humans in their daily lives

