MiRo is a different sort of robot based on a simple premise: animals are a lot smarter than today's robots in many respects. Not only that, they are robust, adaptable and good at communicating their 'quasi-feelings' – all features that we'd like to see in our robots. So, rather than working out how to develop smart robots from scratch, our approach is to build robots that think and operate much like mammalian animals; from their senses and decision-making processes, all the way through to their bodies and behaviours. MiRos' are particularly suited to robot-human interaction as well as robot-to-robot interaction and swarming/herding.

Designed to have an emotionally engaging personality by a talented development team led by the award-winning designer Sebastian Conran, and experts in biomimetic and 'brain-based' robots, Professor Tony Prescott and Dr Ben Mitchinson from the University of Sheffield, MiRo aims to accelerate research on next generation animal-like robot companions.

MiRo is currently programmed to respond to aural, visual, and tactile stimuli, modulating its internal emotional state, and communicating expressively through movement, colour and sound. On-going research may add map-building & navigation, memory, learning from reward, speach, person perception and multi-modal social interaction capability.

MiRo is a development project that is just starting out. Researchers are invited to collaborate in creating the functionality of tomorrow's companion robots by programming MiRo's software to interface with our unique brain-inspired robot controller; or build your own control system (on-or off-board) and show us how it should be done!

Partners include:

The University Of Sheffield.

brl Bristol Robotics Laboratory

EDINBURGH CENTRE FOR ROBOTICS

For further information or to register interest contact:

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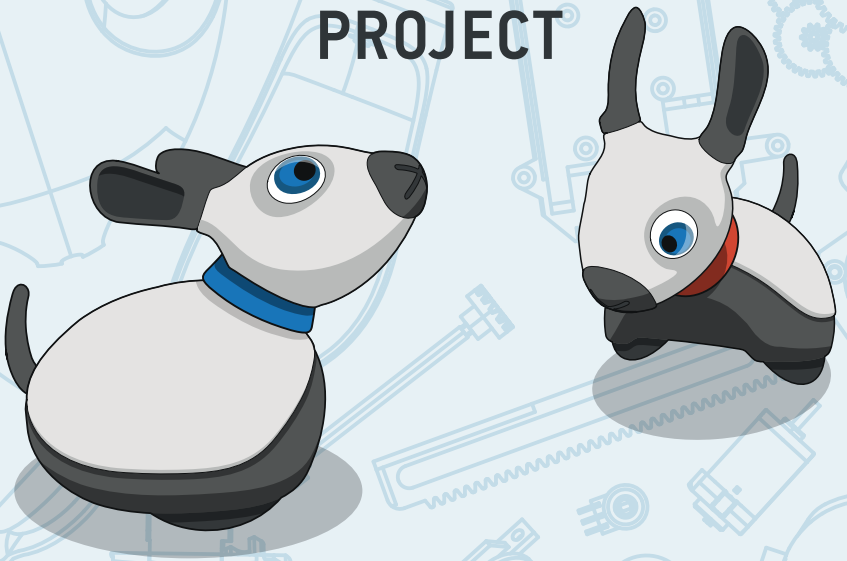
DISCLAIMER: MiRo is a developer platform that will need sophisticated programming skills to operate and maintain. It is intended for evaluation purposes only, not for general consumer use. As such, it is not within the scope of the EU Product Directives and may not meet the associated technical requirements.

JOIN THE MiRo PROJECT



DEVELOPER KIT

In the future social robots will share our personal space, interact with us and each other, providing entertainment and emotional engagement. MiRo is a higly-featured low-cost fully programmable autonomous platform particularly suited for developing companion robots.

MiRo has six senses, eight degrees of freedom, and an innovative brain-inspired control system. It is a flexible platform ideal for research and education paired with its software simulation package.

Join the MiRo development community and help investigate and create the next generation of biomimetic autonomous companion robots.

Consequential ROBOTICS

OUTLINE TECHNICAL SPECS.

MOVEMENT: The MiRo platform is built around a core differential drive base and a three Degrees of Freedom (DoF) (lift, pitch, yaw) neck. Additional DoFs include rotation for each ear, tail droop and wag, and eyelid open/close. All DoFs are equipped with proprioceptive sensors (potentiometers for absolute positions and optical shaft encoders for wheel speed). The platform also has an on-board speaker currently programmed to produce mammal-like vocal sounds.

SENSING: 3D cameras in the eyes and stereo microphones in the base of the ears are complemented by a sonar range-finder in the nose. In the body, four light level sensors are placed at each corner of the base, two infrared 'cliff' sensors point down from its front face, four capacitive sensors are arrayed along the inside of the body shell providing sensing of direct human touch and an additional four capacitive sensors over the top and back of the head (behind the ears). Internal sensors include twin accelerometers, a temperature sensor, and battery voltage monitoring.

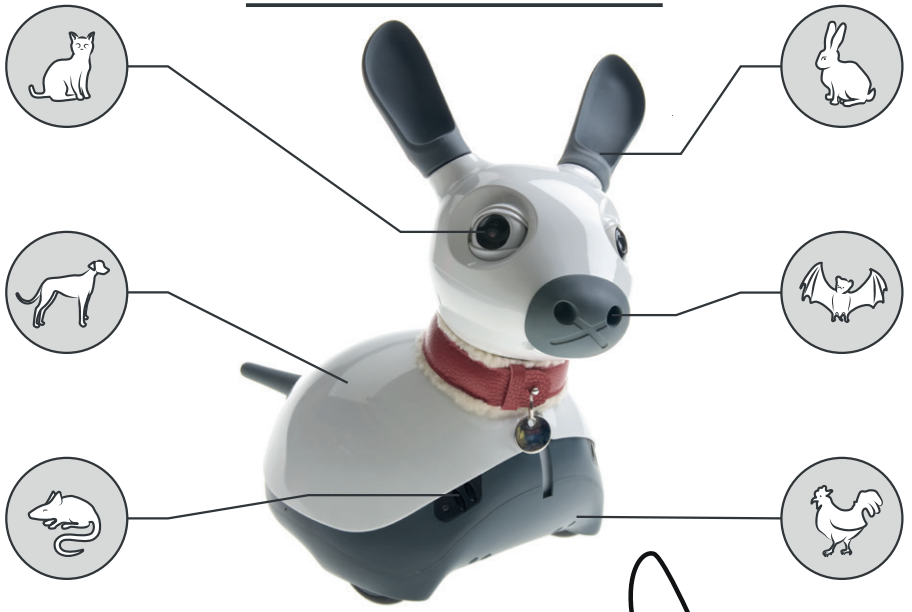
CONTROL AND INTERFACES: MiRo's bio-mimetic control architecture is based on twenty years of research on animal brains and behaviour giving it the first truly brain-like operating system distributed across three embedded ARM processors. You can take control of MIRO through this system or, if you prefer, control MIRO directly from your favourite development environment (WiFi and Bluetooth LE provide off-board communications). If you are a ROS programmer, MiRo can be easily configured as a ROS node.

BIO-MIMETIC FEATURES

1. STEREO EYESIGHT
Cats have the edge when it comes to eyesight. MiRo's eyes are colour sensors, similar to those used in mobile phone cameras.

2. TOUCH SENSITIVE
Just as a dog responds to stroking, so stroking MiRo's back is one way you can engage with and alter MiRo's emotional state, which is reflected in MiRo's expressive behaviour.

3. LIGHT SENSITIVE
A mouse might scurry for cover when a light is switched on: MiRo can sense the difference between light and dark thanks to light sensors.



4. STEREO HEARING
MiRo's ears can rotate, like those of a rabbit, whilst stereo microphones can be used to localise the source of sounds.

5. ECHOLOCATION
Bats and dolphins use biological sonar for navigation to help them pinpoint their position. MiRo's nose houses an effective sonar sensor.

6. CLIFF SENSOR
Most creatures stop when they encounter a steep drop. MiRo's cliff sensors help to ensure that he will not topple off a table or down a flight of stairs.

SENSORS
1: Cameras
2: Microphones
3: Ultrasonic ranger
4: Light sensors
5: Cliff sensors
6: Capacitive touch
7: Accelerometers

PROCESSING/COMMS
8: P1 - Spinal cord
9: P2 - Brainstem
10: P3 - Forebrain
11: WiFi
12: Bluetooth
13: SD Card reader

ACTUATORS
14: Wheel motors
15: Neck lift
16: Head yaw
17: Head pitch
18: Ear actuators
19: Eyelids
20: Tail actuator
21: LED light displays
22: Speaker