AFROBOTS

African Robotics: Digital transformations in design

African creativity, Digital transformations in industries, Future sites of Production, 'Africa's fourth industrial revolution', Robotics, DIY making

As part of the activities of the World Economic Forum, the Victoria and Albert Museum London in collaboration with Rwandan Museums presents 'AfroBots' - an exhibition of African Robotics. Rarely seen robotic samples from across the African continent are on display, including the AZIBOt, the Fundi-walker, a Bird Bot, a SpiderBot, and a DogBot.

These digital specimens are generously provided by leading African academic departments of science, robotics and engineering as well as informal 'maker spaces' for amateur inventors. Many of these prototypes incorporate animal characteristics, playing with the boundaries of the physical, the digital and the biological.

The exhibition challenges the common belief that our world's future is being discovered in the high-tech laboratories of American scientific institutes, or debated at business and political forums held in the Alps - and invites us to think about the future as being designed by tech communities in Africa.

ROBOTIC SPECIES ON DISPLAY

The Turtle Bot Tour Guide
This off-the-shelf Turtlebot is programmed to politely escort visitors of Ashesi University College around the campus on a tour. It uses the Robot Operating System (ROS), and a navigation framework to load and stich together maps of the campus, and plan the requested journey.

The Segway
The Segway robot is able to stay upright and keep its balance while moving forwards, backwards, and up an incline. It was built with a Lego NXT robotics kit and a gyroscopic sensor and uses the concept of feedback control in its programming.

Provided by Ashesi University Computer Science Department, Berekuso
Ashesi is a private, non-profit liberal arts university located in Ghana, whose mission is to 'remake Africa' through leadership skills and 'design thinking', offering a distinct perspective on African problem solving. Ashesi Computer Science Department lead by Dr. Ayorkor Korsah, offers a range of undergraduate degrees in computer science and management information systems and hosts a range of a robotics programmes for high school students.
www.ashesi.edu.gh

The SpiderBot 'Six'
This hexapod is a creative robot platform. Six has 6 legs and 12 degrees of freedom - its joints are powered by 12 heavy duty servo motors, allowing unique, dynamic movement. The removable joints and top mounted camera enhance Six's ability to interact with the world.

The DogBot 'Roli'
Roli is a 3D printable planetary rover style robot designed to be a workhorse - much like a space exploration vehicle. A 7.4v LiPo battery powers 2 motors, giving it enough torque to tackle tough terrain. Its Camera adds impressive vision tracking capability.

The ManBot 'JD'
JD is a fully functional 3D printable humanoid robot. JD boasts vision and speech recognition, changeable expressions, as well as 16 degrees of freedom with metal gear heavy duty servo motors. That means he has 16 motorized joints for moving his limbs, walking, and even dancing!

Provided by MINT Innovations, Accra
MINT Innovations is a development and education company base in Ghana, which explores connection between STEM (Science, Technology, Engineering and Mathematics) and the real world. Under the direction of Benjamin Nortey, MINT develops robotic 'guides' for the health industry and teaches young people how to build robots, making use of recycled materials. MINT works with institutions from pre-school to college introducing robotics into the curriculum.
www.mintinnovations.net

The Starling Bird Bot
This bird bot prototype is a mechanical starling, imitating a common urban bird in Cape Town. Running on a Nokia phone battery, it incorporates a sound-synthesizer whose pitch depends on light exposure, glowing LED eyes, and head and wing movement via a hacked motor.

Provided by African Robots, Cape Town / Harare
African Robots is an art and technology project based in South Africa which creates interactive electronic street art - 'street art' here means art sold by local craftsmen in South Africa and Zimbabwe, using inexpensive materials like electrical wire, beads and waste wood. African Robots lead by artist Ralph Borland works with artisans, sharing skills to to catalyse innovation.
www.africanrobots.net

The AZIBOt
The AZIBOt is a species of gripper bot with a robotics arm for playing fetch. It is an Arduino-based platform constructed from a set of open-source, 3D printable parts – the AZIBOt Robot Kit - described as 'the first Robotics kit for the African community'.

Provided by SenEcole, Dakar
SenEcole is an organization based in Senegal, whose goal is to inspire future engineers and scientists for the sustainable development of Africa. SenEcole promotes STEM (Science, Technology, Engineering and Mathematics) education through robotics, believing robotics to be the best form of learning tool. SenEcole under the direction of Dr. Sidy Ndao hosts robotics camps for high-school students and runs the Pan-African Robotics Competition (PARC) across West Africa.
africanrobots.net

The Fundi-Walker - Junior
The Fundi-Walker Junior is a simple-structured four-legged walking mechanical animal. It employs basic principles such as levers, pivots and gears, and includes a direct current motor and a battery pack. This Robot is built by learners ages 6-8 years.

The Fundi-Walker - Senior
The Fundi-Walker Senior is a similar species of four legged mechanical walking animal to the Junior, but its motion is entirely based on programming. It is comprised of two servo motors, fitted plastic limbs and an on-board Arduino coded to co-ordinate its walking pattern.

The Fundi Bot Victory Rover
The Fundi Bot Victory Rover is an intelligent rover with a life-saving agenda. It is designed to reduce the risk to human life caused by high radiation in steel producing companies. It monitors environments using a temperature sensor, an obstacle sensor and XBee radio communication.

The Fundi Bot Night Crawler
The Fundi Bot Night Crawler is an unmanned ground vehicle that braves uninhabited territories to test for pollutants. Employing its temperature and gas sensors, the Night Crawler gathers and streams environmental data. It is constructed from discarded tyres, metal cut-offs and broken printer parts.

The Fundi Autobot
The Fundi Autobot is a roving data gatherer that helps with disease control in contaminated areas that require spraying. It is made from wooden cut-offs, a micro controller, 2 temperature sensors, a 12v battery, high torque motors and a spraying tank.

Provided by Fundi Bots, Kampala
Fundi Bots is a non-profit education initiative based in Uganda, which aims to teach very young African children the fundamental principles of computer programming, electronics engineering and mechanical engineering as an additional form of literacy to learning the basic alphabet. Fundi Bots under the direction of Solomon King Benge works with students from 6 years old - in and out of school - through school-based and public access programs.
www.fundibots.org

Photographic art contributions by:

The Yllux Series
Artist Jean Katambayi Mukendi develops artistic prototypes of sustainable local electrical devices in the Democratic Republic of Congo, where electricity cut-off are a serious matter. The prototypes - made from found materials in the region - are an attempt to challenge the current reality of imported devices that are irreparable and unsuitable to the Lubumbashi context.

The Afrobots exhibition was kindly sponsored by the Victoria and Albert Museum and Rwanda National Museums. Additional research was supported by the Leverhulme Trust

This exhibition also marks the launch of AfriDesignX (The Africa Design Exchange) – a design and innovation platform supported by the Leverhulme Trust and lead by the curator, Cher Potter in partnership with the Victoria and Albert Museum and University of the Arts London. For more information, see: Afridesignx.com