



COLLEGE OF ENGINEERING, DESIGN, ART AND TECHNOLOGY
(CEDAT)

June 04, 2012

PRESS RELEASE

CEDAT MAKES A DIS-ARMING ROBOT

The iLabs@MAK Project, one of the innovative Projects in the College of Engineering, Design, Art and Technology, has made a robot that can be used to detect and dis-arm explosive material. The Explosive Ordinance Disposal (EOD) robot is remotely controlled on a computer to navigate through relatively flat surfaces within a 20m radius.

The design and construction of the robot was motivated by the need to demonstrate local capacity in development of technology in the fight against terrorism, especially after the deadly July 9, 2010 terrorist attacks in Kampala. It is one of the projects undertaken by special crop of young people, emanating from iLab@MAK's initiative to promote science and technology innovation in secondary schools: It was built by 3 former students of St. Mary's College Kisubi, currently in their S.6 vacation; Alvin Kabwama, David Tusubira and Nigel KinyeraOkot, under mentorship of Prof. Sandy Stevens Tickodri-Togboa, Cosmas Mwikirize, Doreen Orishaba and Michael Kyesswa. The genesis of the robotics research was in 2010, when, with support from the presidential innovations fund, iLabs@MAK started a pilot initiative to promote problem based learning and encourage creativity amongst the young generation at two schools, St. Mary's College Kisubi and Gayaza High School. Each school was given simple materials with which to build and program robots that undertake meaningful tasks in day to day life. The two schools were then involved in the first schools' robotics challenge last year where the prototypes were show-cased. The three students who built the EOD robot were selected from the best exhibitors of the day to intern with the iLabs@MAK Project over the course of their holiday.

The EOD robot minimizes the risk of harm to the officers involved in counter-terrorism since it can be sent out on reconnaissance missions and performs tasks that would otherwise expose humans to danger. It is made in such a way as to imitate the human senses of sight, touch, and locomotion, portrayed by an internet connectable camera, a robotic arm and wheels respectively. The mechanical structure of the robot comprises mainly aluminum pieces, while motion is achieved with the help of two d.c motors for the wheels and 8 servo motors for movement of the arm and rotation of the camera. The robot utilizes a Lego NXT brick for storing and processing instructions and utilizes a 12V 300mAh battery. Communication between the robot and the control computer is achieved through wireless communication: Bluetooth is used to send commands from the PC to the NXT brick whereas WiFi/WiMax is used

to connect the control computer to the camera so that there is a live video stream depicting the robot movements. The use of an internet based camera makes it possible to view the video feed from various locations so that experts who are possibly not on site can advise on the course of action.

The robot also has a radiation sensor which can detect radiations and the direction from which they are being emitted. This is useful in detection of radiation associated with the material under search. The direction of the infrared radiations is displayed on the monitoring station, so that the movements of the robot can be altered accordingly. The robot is able to gauge the distance between itself and an obstacle by use of an ultrasonic sensor, and through dark environments by use of Light Emitting Diodes fitted below the arm and the camera. All control instructions for the robot are achieved using the LabVIEW Programming environment. The nature of the disarmament made by the robot depends on the type of device fitted onto the arm: whether cutting, shooting or lifting.

To the iLabs@MAK Project and Makerere University as a whole, the innovation is a phenomenal achievement, which will inspire young people to work harder and realize that there is no limit to their imagination. In fact, having seen the fruits of the previous year, iLabs@MAK has now moved to extend the Schools' Engineering Challenge to upcountry schools and more schools in the Central region. This year, the challenge we will involve Dr. Obote College Boroboro, Lira Town College and Lango College in the North, Ntare School, Mbarara High School, Mary Hill High School and St. Joseph's Vocational School in the West, as well as Mt. St. Mary's Namagunga, Kings College Budo, Makerere College School, Gayaza High School and St. Mary's College Kisubi. The schools from the different regions will participate in regional challenges, after which the winners will tussle it out at the National Challenge slated for September this year.

The robot innovation has already won accolades on the local scene: It came best at the recently concluded 2nd Annual Communications Innovations Awards exhibition, organized by UCC and held at the Serena Kampala Hotel on May 19, 2012.

For more information contact:

1. Cosmas Mwikirize, llabs@MAK project
College of Engineering, Design, Art and Technology
0782964834, cmwikirize@tech.mak.ac.ug
2. Betty Kyakuwa, Communication Officer
College of Engineering, Design, Art and Technology
0772697500, pr@cedat.mak.ac.ug