Creative Scratch Robots for Under $30

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Introductory description and overall goals:

Would you like to build playful robots for under $30 dollars? Robots that dance, play music, tell jokes, throw candy and more.

Figure 1 – Scratch robots made from premium quality junk

Build-It-Yourself aims to make engaging, playful robotics accessible to all. Premium quality junk is used to build creative, robotic sculptures that quickly attract attention.

Method:

Build-It-Yourself Scratch robots have the following components:

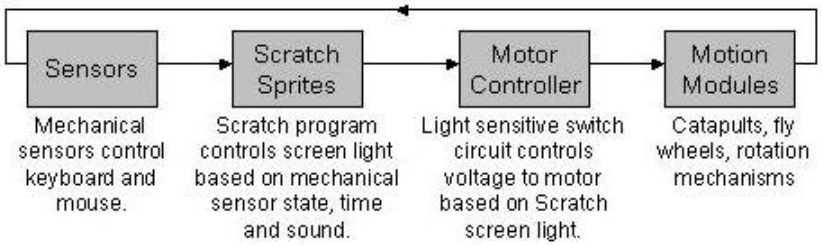

Figure 2 – Components for Scratch Robots under $30

Expected Outcomes:

Instructions to build sensors, motor controller and motion modules are posted online.

Live Webcast workshops are run by MIT, Harvard and Cornell engineering students.

Invention Universe enables members to share creations online.

www.build-it-yourself.com

KEY WORDS:

Scratch; robotics; project-based-learning; construction-system

For reference only

Scratch Robotics for Under $30 (Workshop proposal extended description)

Workshop parameters:

1. Participants will learn how to create engaging robots from 'premium quality junk,' $30 worth of Radio Shack electronic parts and Scratch (freeware from MIT).
2. Directed to education publishers, educators and kids 8 – 18.
3. Up to twelve (12) participants.
4. Two (2) hours (or more)

Equipment required:

1. Screen projector

The Demand:

There is a strong demand for robotics programs.

1. Many are predicting that robotics will be the next technology to significantly change the world. (Bill Gates, Scientific American, Jan 2007)
2. Robotic projects engage kids in a way that sets the stage for multi-discipline learning.
3. Robotics can stir the imagination of almost anyone (young, old, boy, girl, rich, poor) unlike other complex technologies.
4. There are so many 'black boxes' in our lives that sometimes, we fail to appreciate the basic art and science that underlies how things work.

The Problem:

How can we engage as many kids as possible in robotics? Many kids have access to computers but cannot afford expensive robotic construction kits. Even when such kits are purchased, they may not have long product lives. Not only may expensive parts become obsolete, but also teachers may need to be re-trained with new lesson materials.

The Mission:

Build-It-Yourself aims to make engaging, playful robotics accessible to all.

1. Webcast workshops are lead by engineering students from leading universities.
2. Instructions and videos are posted online.
3. Members can share their creations online in Invention Universe.

Figure 3 – Scratch Robots Construction System

The Build-It-Yourself robotic construction system is inexpensive, transparent and extremely flexible. Build-It-Yourself robots have the following components:

1. Almost any program on any device that has a screen display (the controller)
2. Sensor modules built from common craft materials can detect a coin or movement. The sensor modules are mechanically linked to the keyboard and/or a mouse where they can be interpreted by a program that can control the screen display.
3. A simple, electronic breadboard circuit detects light intensity on an LCD or LED screen and drives a geared motor. Scratch or almost any program controls the computer screen display based on keyboard, mouse, sound and time inputs.
4. Motion modules, also built from common craft materials, can make a robot dance, throw candy, and beat drums.
5. Speech recognition and audio clips, inherent in Scratch, can add an exciting dimension.
6. Premium quality junk (which kids can collect from a recycle bin, toy collection, or coffee shop) is used to build creative, robotic sculptures that quickly attract attention.

Project Management Site:

www.build-it-yourself.com/biy-projects/proj-scratch-robotics/index-scratch-robotics.html

The PowerPoint presentations we use to introduce kids to these life skills are posted at:

www.build-it-yourself.com/support/support-projectware/biy-projectware-presentations.html

The Build-It-Yourself mission is to inspire and guide kids to use technology creatively and constructively. In the process, we introduce multi-discipline, 21st century skills including collaboration, computer programming, modular construction, the art of presentation, and an appreciation for the social consequences of technology.