

Robot-based mobile platform for programming learning

Manousaridis, Konstantinos (1); Mavridis, Apostolos (2); Kalogiannis, Gregory (2); Anagnostopoulos, Konstantinos (1)

Organization(s): 1: Mediterranean College, Greece; 2: Aristotle University of Thessaloniki, Greece
1: k.manousaridis@emcthes.edu.gr, 2: apmavid@csd.auth.gr

Introduction

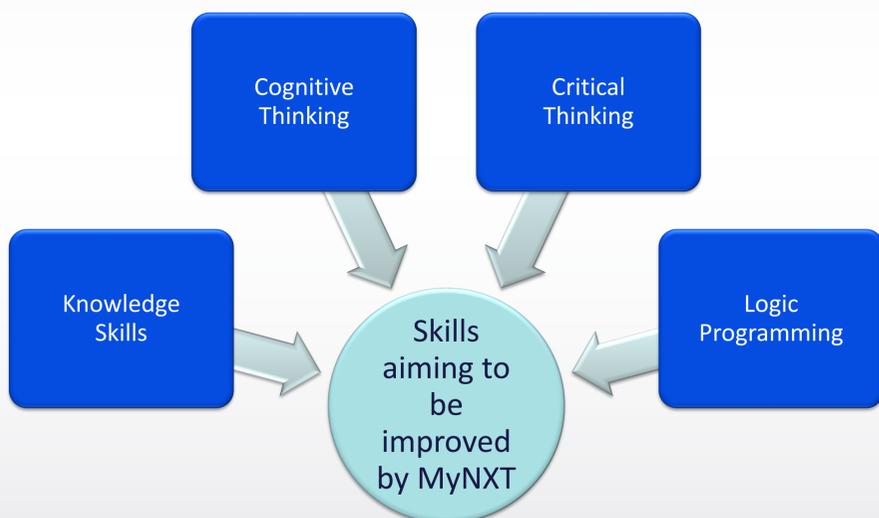
MyNXT is an android application created to facilitate students' learning experience. The work at hand has been carefully designed in order to enhance children's cognitive thinking and urge them towards logic programming. The application controls the NXT intelligent brick, which is part of the LEGO Mindstorms robotic kit. A robot around the NXT, can be designed in different ways and with various components.



NXT Intelligent Brick



MyNXT test robot design

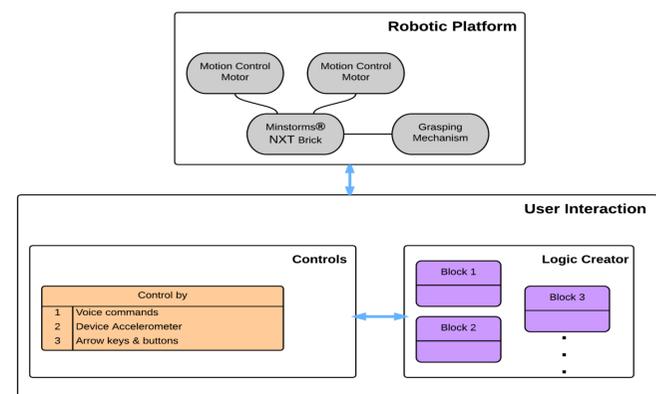


Application Design

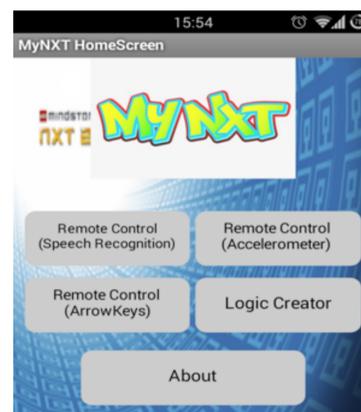
There are four utility buttons in the home screen, all of which control the NXT via Bluetooth. The first three offer the user different types of direct control:

- **Speech Recognition**, which recognizes specified voice commands on the touch of the microphone icon. Those commands are given to the user at the bottom of the screen.
- **Accelerometer**, that takes advantage of the android device's built in accelerometer to transfer and translate the movements of the device to moving the robot forward, backward, left and right.
- **Arrow Keys**, a common button control with direction arrows.

While the fourth, **Logic Creator**, allows the user to prebuild the logic that the robot will later on execute when the run button is pressed. Hence, children are allowed to create and execute their own linear logic.



Architecture of MyNXT



MyNXT home screen



Logic Creator screen

Defensive Design

In order for the application to be simple and engaging for children, simple instructions are given at all stages. In every control screen there is an indicating label that guides the user to the proper function of the application. When entering any control screen the label prompts the user to press the "CONNECT" button in order to connect the device with the robot. After the connection is established the label in each control screen instructs the user with the next step in order to control the robot. For example in the "Speech Recognition" control screen the indicator reads "Press the Microphone to Give Commands". Programming of the app has also taken into account defensive design in order to assure that there will always be written instruction within the application in order to avoid potential misuse or mishap. For example, if the Bluetooth on the device is turned off when the "CONNECT" button is pressed, a pop-up warning is issued, informing the user to turn the Bluetooth on.

Application Links



MyNXT .apk



YouTube presentation



Robot building manual .pdf



Author contact details

Future Work

MyNXT is based on a modular architecture that makes it easy to extend the main application by adding more features. There is actually no limit to the extensions that can be developed, given enough time. For instance, there could be an implementation for the various Lego sensors to provide the user quite more options and flexibility. Another approach could be to create a quest line with specific tasks that should be finalized by the user in order to correctly complete the quest with the minimum commands possible.