



Descripcion

El laboratorio de *Robotica* esta basado en la plataforma NI sbRIO. El software esta desarrollado en el ambiente de programación grafica LabVIEW.

El laboratorio ha sido diseñado para clases teoricas y practicas en robotica, Ello permite a los estudiantes adquirir habilidades practicas usando los sensores mas comunes usadas en robotica, controlando un manipulador con 4 grados de libertad y un robot móvil con 4 motores independientes.

EL paquete tambien incluye un codigo demo Fuente abierto, lo cual permite a los estudiantes usarlo para el desarrollo de sus propios algoritmos de control y mediciones usando los sensores equipados en la plataforma.

Required hardware and software

- Plataforma NI sbRIO
- Plataforma de laboratorio de Robotica
- Modulo NI LabVIEW Robotics
- Modulo NI LabVIEW FPGA
- Opcion de desarrollo NI Real-Time
- Software de laboratorio
- Manual de usuario

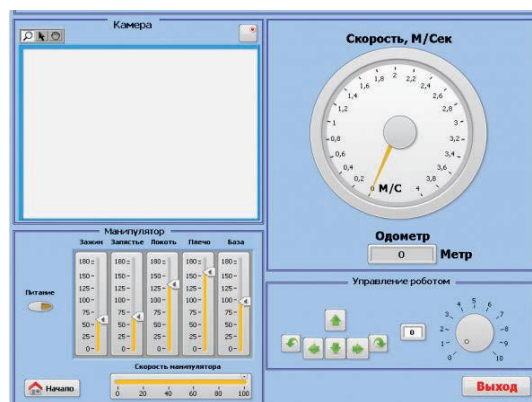
Caracteristicas

- Control de los motores usando la plataforma NI sbRIO
- Control del manipulador con cuatro grados de libertad
- Ruedas omnidireccionales
- Capacidad para llevar a cabo mediciones de los siguientes sensores:
 1. Medidor de distancia ultrasonico
 2. Medidor de distancia laser
 3. Encoder
 4. Medidor de distancia infrarojo
 5. Brújula Digital
 6. Sensor de presion atmosferica.
 7. Sensor de temperatura
 8. Giroscopio
 9. Acelerometro.

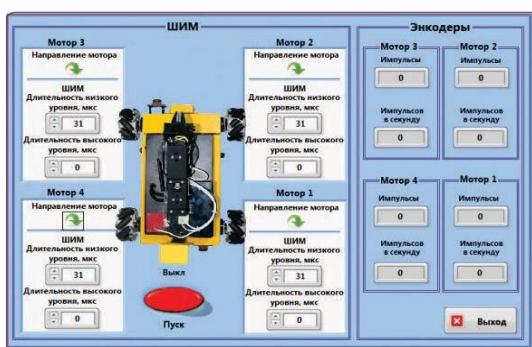
Lab de robotica

Lista de laboratorios

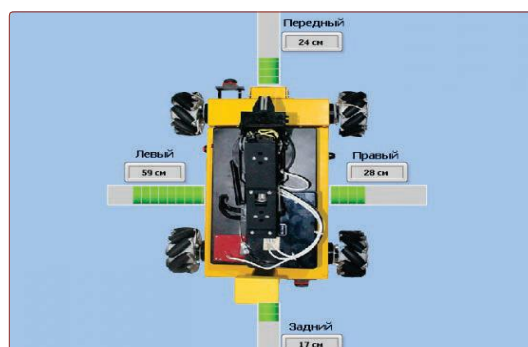
1. Introducción a la Robótica Plataforma Educativa
2. Control PWM simultaneo de motores
3. Control de un robot movil con ruedas omnidireccionales
4. Sensores de medición de distancia por ultrasonido
5. Sensores de medicion de distancia por infrarojos
6. Sensores de luz y color
7. Medidas del Angulo usando un sensor del magnetometro
8. Evasion de obstaculos
9. Brújula electrónica basada en sensor de magnetorresistencia



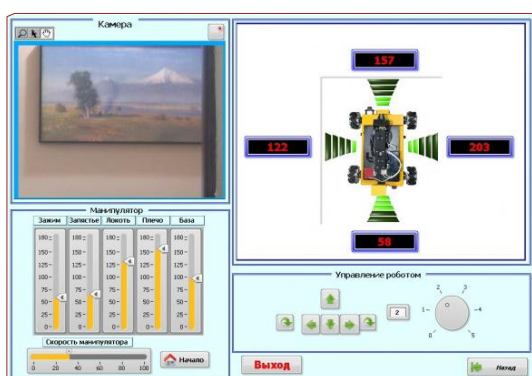
Introduccion a la robotica plataforma educativa



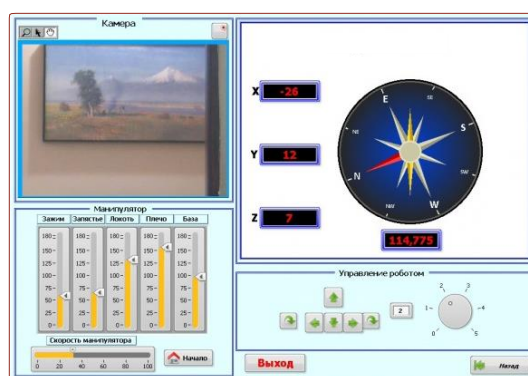
Control PWM simultaneo de motores



Sensores de medición de distancia por infrarojos



Medidor de distancia infrarojo



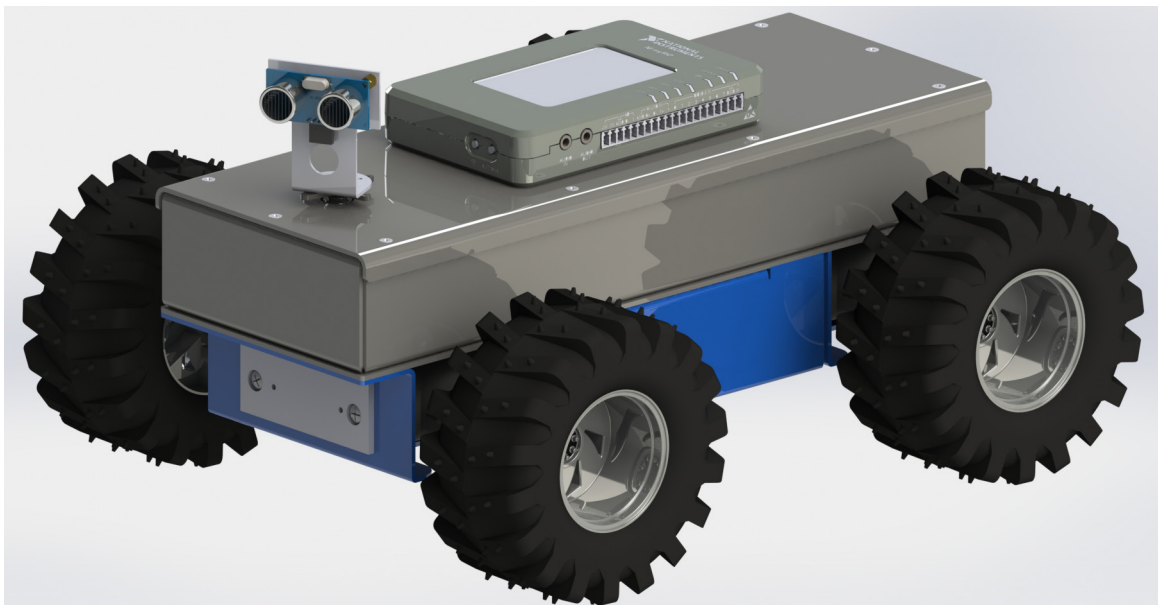
Brújula digital

Robotics Platform for Education and Research

Overview

The Robotics Platform for Education and Research has been designed as a bench for practical experiments and as an open platform for robotics algorithms design and development. The platform is based on a four-wheel mobile robot equipped with MEMS sensors with 10 degrees of freedom, a manipulator with 2 degrees of freedom, a servo motor mounted color camera and an ultrasonic distance scanner. The platform has been developed using National Instruments Virtual Instrumentation and hardware platforms.

Both research groups and high schools and university students can benefit from using our platform. The platform can be controlled and configured from a personal computer, over the WiFi connection.



Features

- Simultaneous and independent control of motors using NI myRIO controller;
- Control of a manipulator with 2 degrees of freedom;
- Data acquisition and measurements using the following sensors:
 1. Ultrasonic distance meter;
 2. Digital compass;
 3. Barometer;
 4. Accelerometer;
 5. Gyroscope.

Laboratory Works

1. Getting Started with the Robotics Platform;
2. Simultaneous PWM Control of Motors;
3. An Ultrasonic Sensor Based Scanning Radar;
4. Infrared Distance Sensors;
5. Obstacle Avoidance;
6. Electronic compass on the magneto-resistive sensor.

The platform is equipped with the NI myRIO controller, based on the Xilinx Zynq® system on a chip (SoC). It features a 667 MHz dual-core ARM Cortex-A9 processor and a customizable 28,000 gate field-programmable gate array (FPGA). Using this platform, the students can unleash the power of NI LabVIEW system design software both in a real-time (RT) application and on the FPGA. Rather than wasting their time on debugging code syntax or developing user interfaces, students can use the LabVIEW graphical programming paradigm to focus on constructing their systems and solving their design problems without the added pressure of a burdensome tool.



Hardware and Software

1. NI MY RIO-1900;
2. NI LabVIEW Robotics Module;
3. NI LabVIEW FPGA Module;
4. NI LabVIEW Real-Time Module;
5. Personal Computer.

Software

Along with the test bench we supply an open source demonstration software which can be used for measurements from all installed sensors. This demonstration package can be used as a template for the development of user-specific custom software.

