

# A Solution for Studying the D.C. Motor Control Using NI myRIO-1900

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**Abstract**—Today, in industry, electrical motor is a very important element for mobile robots and autonomous systems. The virtual instrumentation and embedded myRIO devices are very useful tools for didactic purpose and understanding the working principles of the electrical motors control. In this paper, the authors propose a solution for DC motor speed controlling and monitoring. For this, an application was created in the LabVIEW programming graphical environment which is running on NI myRIO-1900 configurable equipment. This application highlights that the embedded device can be easily integrated into a teaching lab.

**Keywords**—virtual instrumentation; wireless communication; incremental numerical transducer; electric machines and drives; education in electrical engineering.

## I. INTRODUCTION

For over 40 years software and hardware have been developed in order create virtual instruments for measurements, analyzing and solving of different kind of problems in industry [1]. The LabVIEW software is a graphical programming environment to develop complex measurement, test, and control systems using intuitive graphical icons and wires that resemble a flowchart [2].

Using devices such as CompactRIO, CompactDAQ, and myRIO together with LabVIEW FPGA and LabVIEW Real-Time software, we have the possibility to design, program, test, and customize of these devices [3].

In the last few years, the myRIO was very used in universities for the student projects. It is a portable reconfigurable Input/output (RIO) device which finds its applications in design control, robotics and mechatronics systems. NI MyRIO includes analog inputs, analog outputs, digital I/O lines, LEDs, a push button, an onboard accelerometer, a Xilinx FPGA, and a dual-core ARM Cortex-A9 processor. Some models also include WiFi support as you can see in Fig.1 [4].

Even if the advent of power electronics has made replacement of DC motors with AC motors possible, in a lot applications, the DC motors are still used in application with mobile robots and autonomous systems [5]. Typically, the speed control of DC brushed motors was made through of a thyristor-controlled rectifier. Since, this rectifier generates harmonics in the network, a less polluting solution for the power supply network is the using of a DC-DC converter for

the speed control of the motor [6,7]. The speed of the DC motor can be controlled by the using Pulse-Width Modulation (PWM) technique. In our application, NI MyRIO 1900 was used for DC motor speed controlling and monitoring. This platform has PWM outputs, which are programmed using LabVIEW.



FIG. 1. NI MyRIO 1900 [4]

The control of the opening and closing of the field transistor and the load current can be ensured by sending commands from these NI MyRIO 1900 pins by changing the pulse relative duration [8].

## II. PROPOSED SOLUTION

In this paper, the authors propose a solution for controlling and monitoring a DC motor. For this, they created an application in LabVIEW graphical programming environment, which is running on a NI myRIO-1900 configurable equipment.

The circuit diagram for solution proposed is presented in Fig.2 and the experimental arrangement of laboratory prototype is illustrated in Fig.3. The experimental assembly allows a software application to:

- control the motor shaft speed;
- change the rotation direction of the motor shaft;
- monitor the angular position and the speed of the motor shaft by means of an incremental numerical transducer.

One of the reason for which we choose the NI myRIO-1900 is because the digital outputs can be configured as PWM outputs at different switching frequency and at selected duty

# Gsm Base D C Motor Control

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## **Gsm Base D C Motor Control:**

*Arduino-Based Embedded Systems* Rajesh Singh, Anita Gehlot, Bhupendra Singh, Sushabhan Choudhury, 2017-11-22

Arduino is an open source electronics platform based on easy to use hardware and software while LabVIEW is a graphical programming telling how to connect functions and work with a variety of datatypes when constructing applications This book will help beginners to get started with Arduino based embedded systems including essential know how of the programming and interfacing of the devices Book includes programming and simulation of Arduino based projects and interfacing with LabVIEW based on practical case studies The book comprises of total twenty five chapters with description working model of LabVIEW and programming with Arduino IDE *Science Abstracts*, 1995 ICICCT 2019 - System Reliability, Quality

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sincere gratitude to all the keynote speakers session chairs reviewers authors and participants for their valuable contributions A special word of thanks goes to the organizing committee sponsors and dedicated volunteers whose tireless efforts have made this event a resounding success As you explore the proceedings we hope that the ideas and collaborations born from this conference will continue to inspire impactful research and foster long term partnerships for a future that is both technologically advanced and environmentally responsible Organizing Committee ICCSCE 2025

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