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Review on Arduino board based Speed controlling of a DC Motor

Payal Bhalerao[1], Gayatri Khaire[2], Vaishnavi Kamble[3], Aakansha Ragade[4], Mithun Bhavsar[5]

Diploma Student, Department of Electrical Engineering Mahatma Gandhi Mission Polytechnic College - [MGM's Polytechnic] Aurangabad, affiliated with MSBTE. Maharashtra, India[(1,2,3,4,)]

Professor, Department of Electrical Mahatma Gandhi Mission Polytechnic College - [MGM's Polytechnic]Aurangabad, affiliated with MSBTE. Maharashtra, India[(5)]

ABSTRACT: Speed of DC motor varies proportional to the input voltage. With a fixed supply.voltage the speed of the motor can be changed by switching the supply on and off frequently that the motor notices only the average voltage effect and not the switching operation. This project focused on controlling the speed of a DC motor using PWM techniques. The project its consists of Arduino and motor driver, thermal sensor, current sensor. The program is write in Lab view to take the input values from the user, then rotates the motor by varying duty cycle pulse on the motor. Arduino along with Lab view are used to create the virtual instrument for designing a real time embedcontroller for controlling the speed of a DC motor in an open loop control system.

KEYWORDS: DC motor,Lab view,Ardunino,Sensor, voltage, PWM-Pulse-width modulation, DC motor controller, Input values.

I. INTRODUCTION

The DC Motor plays a crucial role in research and laboratory experiments because of simplicity and low cost. The speed of the motor can be controlled by the three methods of terminal voltage control, armature rheostat control methodand flux control method.

II. LITERATURE SURVEY

The Motor control are realized with two approaches Hardware and Software through the application of Visual Basic (VB). A permanent magnet moving coil of the DC motor adjustable speed drive control is implemented with hardware setup and software program in Visual Basic code. The main feature used in Hardware and Software is their peripherals (parallel port peripherals) are used to interface with hardware and software medium like simulation. And We have connected the hardware with 32 bits parallel port cable to the CPU. As we can increase the load on the DC motor & the voltage of the driver circuit decreases, whichis leads the connected LEDs to glow showing that we have to reaches to the peak value of the motor in RPM. The output of the given system is achieved from the GUI of the lab view the coding is done in the visual basic.

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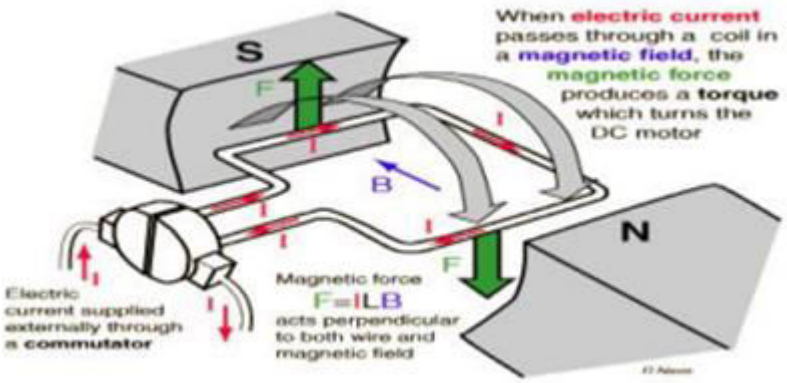

IX.

Fig no. 1 DC motor working principle

III. PROPOSED SYSTEM DEVELOPMENT

A DC motor is a machine that which converts electrical energy into mechanical energy. The operation is based on that simple electromagnetism, i.e. "when a current carrying conductor is placed in a external magnetic field it experiences a force which is proportional to the current and the external magnetic field." A torque is generated by the magnetic reaction and the armature revolves in this induced a voltage in the armature windings which is opposite in direction to the outside voltage applied to the armature, when the current is passed through the armature of the DC motor hence, this is known as back voltage or counter e.m.f. The back voltage rises till in the becomes equal to the applied voltage as the motor rotates faster, the speed at which the DC motor rotates depends on two factors - the armature current as well as the strength of the magnetic field acting on the armature. The stronger the field, the slower is the rotation rate required to produce a back voltage huge enough to counteract the applied voltage. Hence, the speed of the DC motor can be controlled by varying the field current. Every DC motor consists of six parts: axle, stator, rotor, commutator, field magnet and brushes. The stator holds the motor casing as well as the two permanent magnets which is helps to the generates the external magnetic field. The rotor rotates with respect to the stator; it has windings which are electrically connected to the commutator

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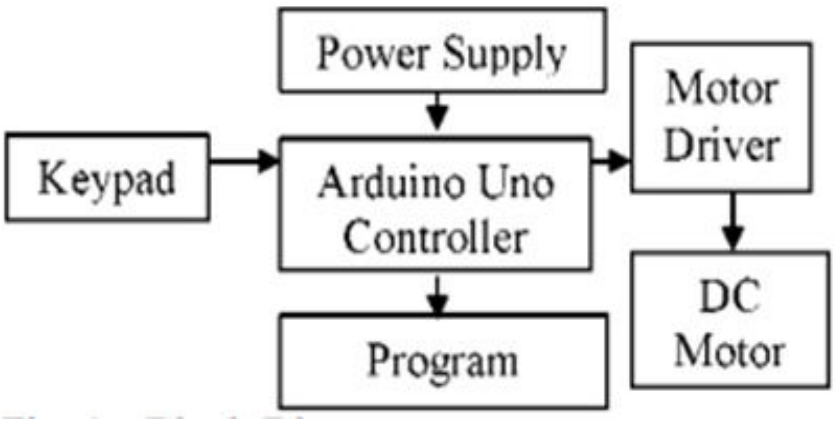

Fig no.2 Block Diagram

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This figure shows the block diagram of speed control of DC motor using Lab view. This project is divided into two sections First is controlling and another is showing real time parameters (Current and Temperature) on Lab view. Arduino UNO is used for controlling the motor. Arduino is the basically microcontroller which has several inputs and outputs. By interfacing the Lab view and Arduino were give instruction to Arduino as well as we read analog data from Arduino. The PWM output of the Arduino is given to H-Bridge motor driver is (L298N). By controlling PWM output of the Arduino in LabVIEW we control the speed of DC motor.The Hall Effect of current sensor is connected in series with the help of motor to measure current and temperature sensor is used to read the temperature of motor. The output of both sensors arethe analog, this analog signals are read by theArduino and these parameters are shown on Lab view.The power required for motor driver and sensors is provided by 12V and 5V power supply.

Fig no. 3 Arduino system

In many applications simple voltage regulation would cause lots of power lesson control circuit, so a pulse width modulation method (PWM) is used to DC motor controlling applications. In the basic Pulse Width of Modulation of the (PWM) method, the operating power to the motors is turned “on” and “off” to modulate the current of the motor. The ratio of "on" time to "off" time, what is the speed of the motor. In this paper I will the introduce speed control of DC motor.

IV. HARDWARE COMPONENT ARDUINO UNO

The Arduinoboard based on the speed controlling of DC motor. It has 14 digital input and output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, the USB connection, of power jack, then ICSP header and reset button. It contains everything is needed to the support of microcontroller; simply connect to the computer with USB cable or power with an AC-to-DC battery to get themstarted. You can tinker with your UNO without alert too much about doing something wrong, worst case scenario you can replace the chip for few dollars and start over again. "Uno" means one Italian and was choose to mark the release of the Arduino Software.

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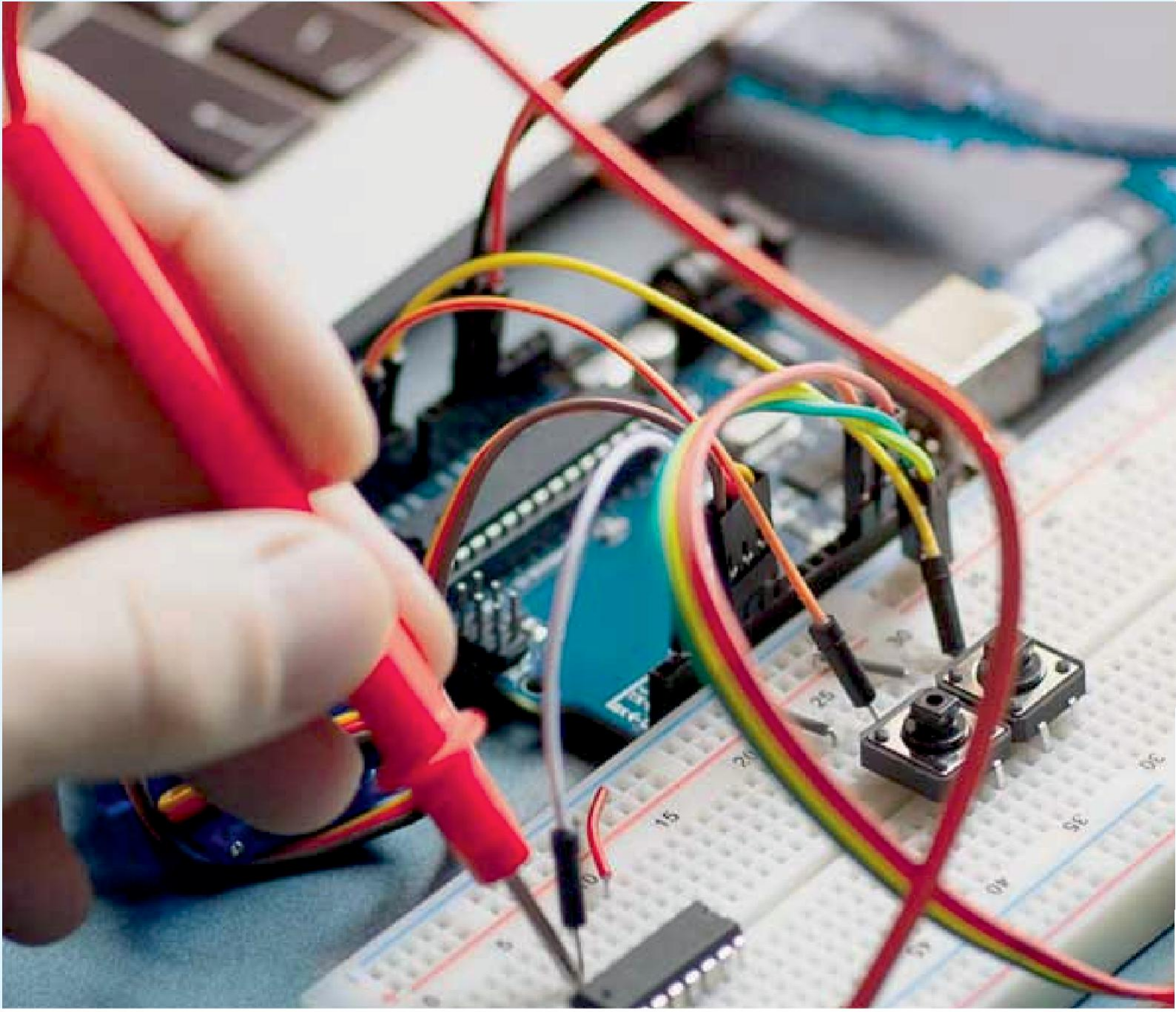
V.CONCLUSION

From all the measurements for the experimental devices implemented in the electrical machinery workshop , can be exported appropriate modeling for each engine in order to measure the drum power to determine the duty cycle for the desired constant speed. This contributes to the linearity of the operation of the DC motor , with constant agitation. First, it was the automatic feedback speed control using tacho signal from the machine shaft. When performing experiments but found that the speed measuring device was defective, and not having any other option we turned to open-loop control, with potential for expansion in a closed loop, or using tacho, or drum current measuring device

REFERENCES

[1] Md. Selim Reza, Md. Abdullah Al Mamun, “Design and Development of LabVIEW Based DCMotor Speed and Direction Control System”, International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181, Vol. 4 Issue 05, May-2015.
[2] Pratap Vikhe, Neelam Punjabi, Chandrakant Kadu, “Real Time DC Motor Speed Control using PID Controller in LabVIEW”, Vol. 3, Issue 9, September 2014 .
[3] Olden. P, “Open Loop motor speed control with LabVIEW”, SoutheastCon, Proceedings IEEE, pp. 259-262, 2001.
[4] A Khoei Kh. Hadidi, “MicroProcessor Based Closed- Loop Speed Control System for DC Motor Using Power MOSFET”, 3rd IEEE international conference on Electronics, Circuits and Systems (1996) vol.2, pp.1247-1250.
[5] L.Boaz, S.Priyatharshini. "Atmega328 Based Industrial Conveyor Model Simulation in PROTEUS ISIS." International Journal for Scientific Research & Development 3.2 (2015).
[6] L, Boaz. "Microcontroller Based Industrial DC Motors Console Model Simulation in PROTEUS ISIS." International Conference on Emerging Trends in Engineering and Technology. Trabancore Engineering College, Oyoor, Kollam, Kerala, India, 2014.
[7] R. J. Brodd, and K. V. Kordesch. Leadacid batteries, Book, Wiley-Interscience Publication, ISBN 0-471-08455-7.
[8] P. H. Mellor, N. Schofield, A. J. Brown.



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