Velocity Control of Permanent Magnet (PM) DC Motor using LabVIEW

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Abstract : In this paper, the speed control of Permanent Magnet DC (PMDC) motor is performed utilizing Lab VIEW interfaced with Arduino. The advantage of utilizing Lab VIEW with Arduino is economy and is basic in structure. The other speed control strategies like FPGA technique, fuzzy control, utilizing 555 clock and PID controllers are having the disadvantage of entangled plan inclusion, inconsistent control, troublesome in the online monitoring with rapid motors. These downsides persuaded us to take a shot at Lab VIEW with Arduino. The outcomes demonstrate that the speed control of PMDC motor can be successfully performed with this setup. The speed control of servo motor and stepper motor should likewise be possible with a similar module. The use of speed control is required in robots used in home, crane operation, transport line operation, altering the direction of motor in forward and invert operation and so forth. Diverse interfacing programming like LIFA and LINX is utilized to interface Lab VIEW and Arduino.

IndexTerms **- Arduino Uno, DC Motor, LabVIEW, LIFA, LINX.**

I. INTRODUCTION

DC Motor is considered as a vital part in region of research, industry and lab tests in view of its effortlessness, ease and productivity [1]. Here in this paper, terminal voltage control strategy is utilized. Here we are attempting to control the speed and course of perpetual magnet DC motor utilizing the interfacing gadgets like Arduino with Lab VIEW. PWM based speed control of DC motor is done in [2]. Miniaturized scale controller AT89S52 has been utilized to create PWM pulses.555IC is likewise utilized to detect the speed of DC motor. The creators [3] propose a technique for speed control which utilizes LabVIEW and PID controller for controlling the speed of DC engine. It is accomplished by utilizing arduino board. Utilizing Data Acquisition board, the open circle speed control system is created in LabVIEW virtual condition. Arduino basically fill in as the interfacing gadget that digitizes approaching simple signs to advanced signs for LabVIEW to decipher it and interface with the given gadget [4]. These DC motor ends up in extensive variety of use concerning Home automation like by controlling bearing of the engine, we can without much of a stretch open and close the window drapes, entryways and so forth and by controlling and checking the speed of the engine in LabVIEW we discover its application in Rolling Plants, Overhead Cranes and Traction; drives for handling industry, Battery driven vehicles, machine instruments which require exact speed control.

II. BLOCK DIAGRAM

The program starting by making the while loop on the square chart and introducing the Arduino association with LabVIEW interface for Arduino sketch. The instruments required can be found in the Arduino palette. LINX is better a better package and LIFA package incorporate wide assortment of sensors and incorporate wide assortment of board that we can use for interfacing with LabVIEW. The motion controller acts as brain of the system by taking the desired target positions and motion profiles and creating the trajectories for the motors to follow.

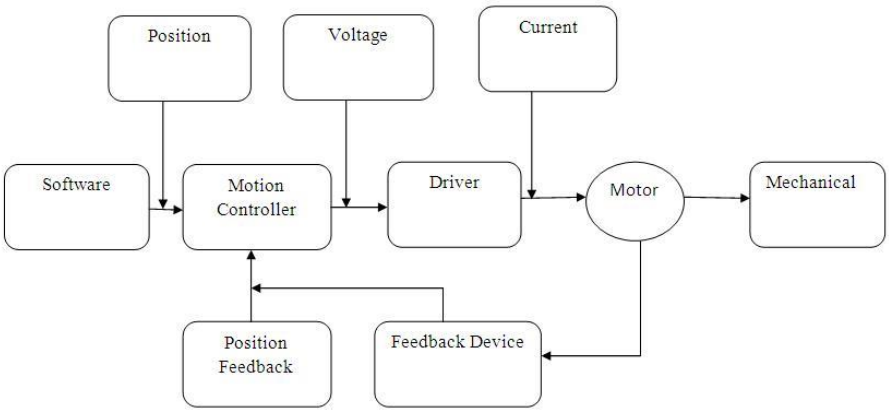

Fig. 1 Block diagram of motion control system

Subsequent to instating the Arduino board, we need to characterize the pin mode which we taken as input and output. In the wake of characterizing the pin mode we need to choose the stick in the front board in which we need to associate the motor. By utilizing of various logic gates we set up two control buttons in front panel by utilizing this client can control the course of panel. For controlling the speed of the engine at first we need to associate the any PWM pin of Arduino to the PWM pin of L298 and characterize a similar pin on the front panel.

These VI's will be burned in the Arduino microcontroller utilizing LIFA_ Base and interfaced with the DC motor. By utilizing this, a client can control the DC motor via seating on the portable PC and control and screen the speed of the engine. Figure 1 and 2 demonstrates the front panel of the open circle system in LabVIEW individually. We can utilize either tachometer or optical encoder for measuring the speed and can be confirmed with the equipment comes about.

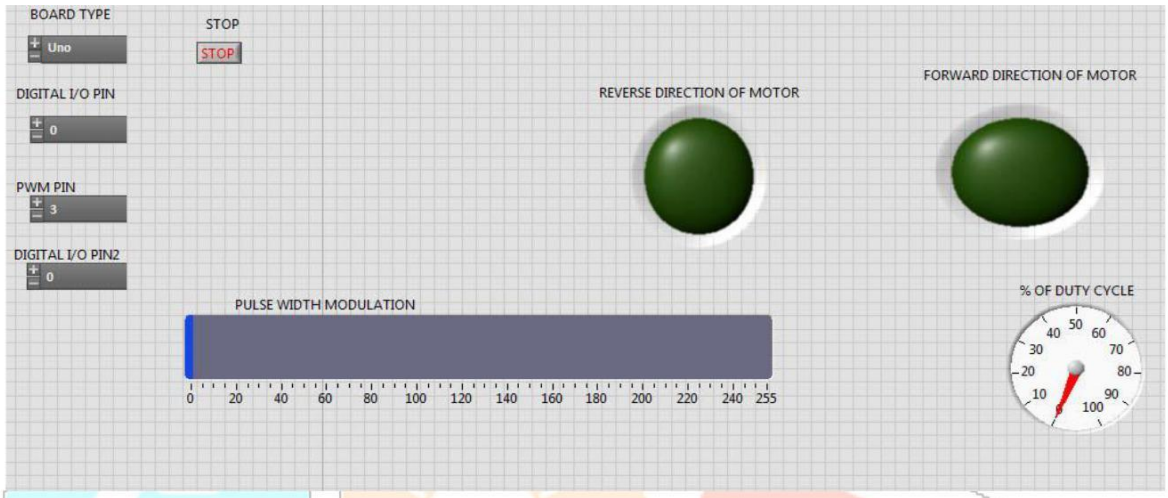

Fig. 2 Front panel of the open loop system

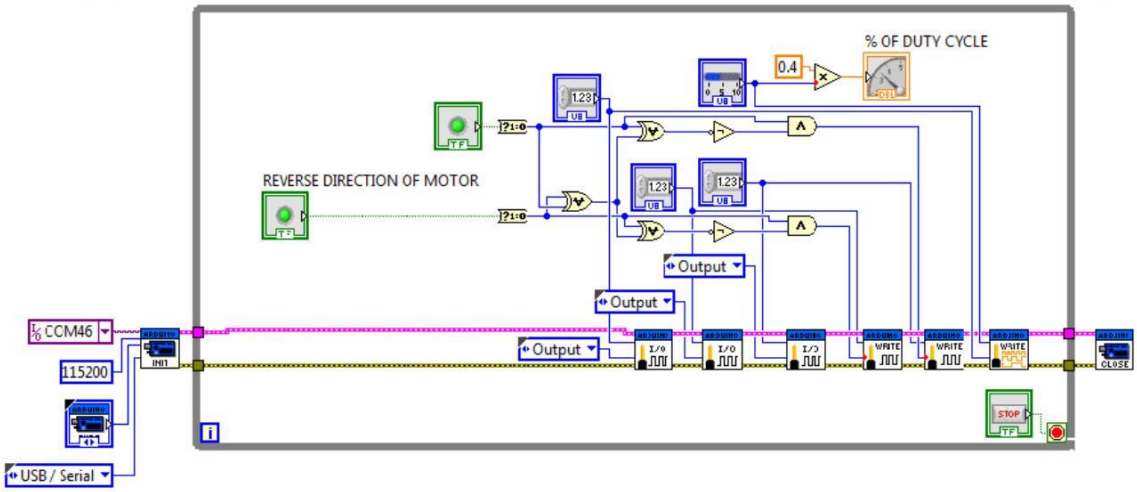

Fig. 3 Block Diagram of the open loop system

The front panel and block diagram of open loop system in LIFA base are presented in figure 3 and 4. We use LINX as it acts as an interfacing medium between Arduino and LabVIEW, user has an option to choose different board and the response is faster than LIFA base.

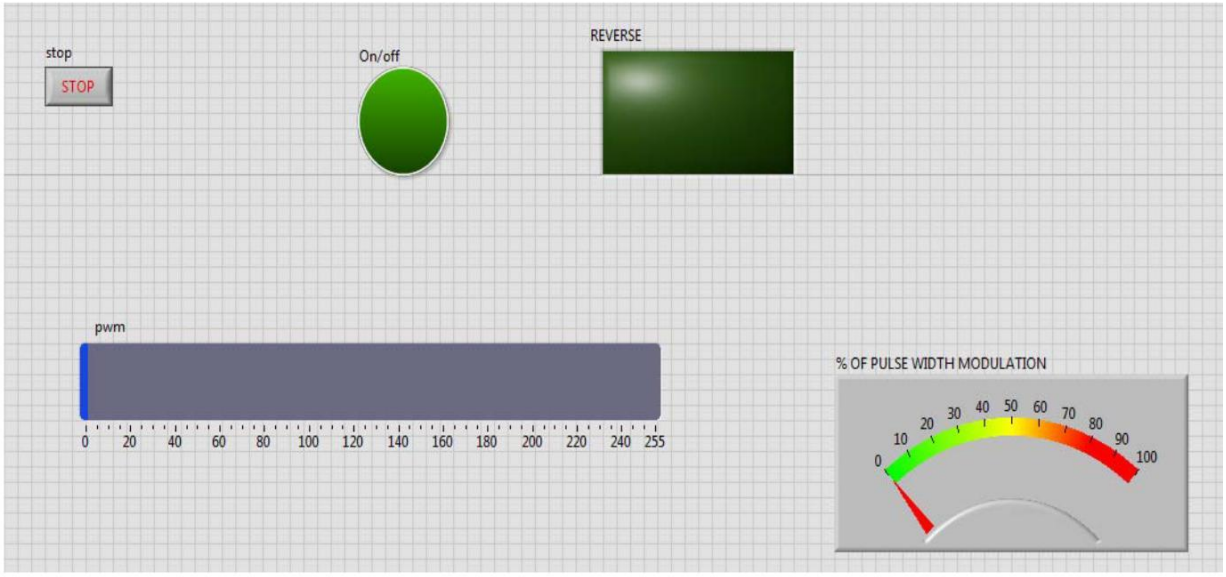

Fig. 4 Front panel using LINX

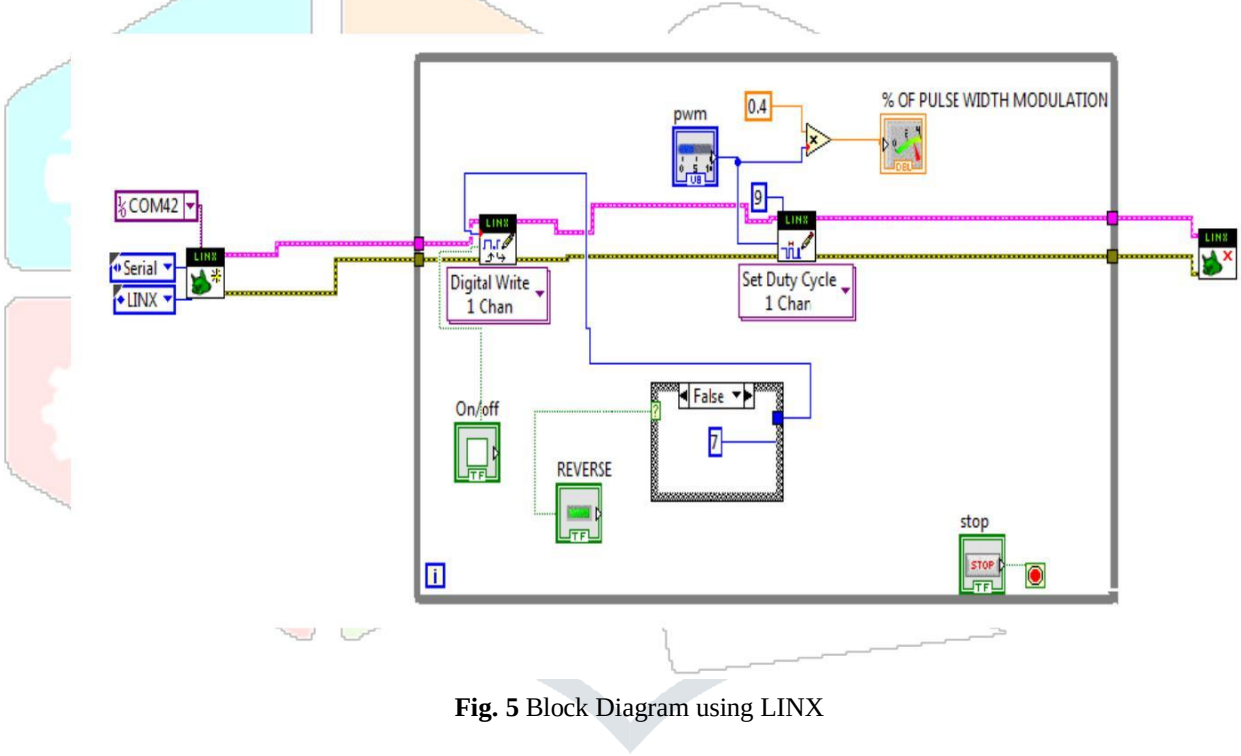

Fig. 5 Block Diagram using LINX

III. RESULT

At to start with, client need to set the port in which the microcontroller is associated. Then select the board after than by clicking run button, client need to run the program. After that by tapping on the forward heading, motor ought to be on. By shifting the even fill slider client can change the speed of the engine so this program is very basic and simple. The proposed speed control PMMC DC motor photographic view is shown in Figure 6.

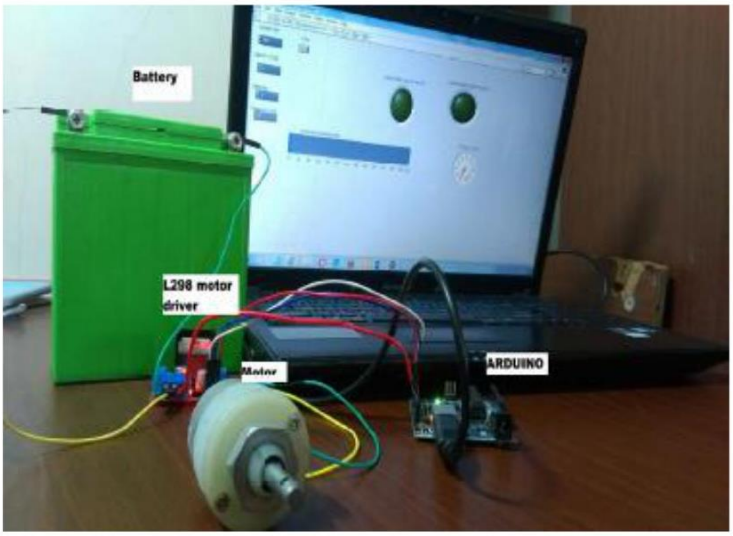

Fig. 6 Prototype of Speed control PM DC motor

IV. CONCLUSION

The strategy adopted in this paper is minimal effort method of controlling the speed of the motor and the direction of the motor. Here, we utilized the microcontroller (Arduino Uno) which assumes the part of Data acquisition system. The speed can be detected by utilizing tachometer or utilizing optical encoder for confirmation purposes. The technique executed in this paper can be utilized as a part of different modern applications and this strategy is very shoddy and aides in keep up the steadiness of the system.

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