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# BLDC Motor Speed Control with RPM Count

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**ABSTRACT:** This project focuses on developing a speed control system for a Brushless DC (BLDC) motor while simultaneously monitoring its RPM. The system utilizes a microcontroller, such as Arduino or Raspberry Pi, along with a sensor to measure the motor's RPM. By adjusting the pulse width modulation (PWM) signal sent to the motor, the speed can be controlled. The RPM count is obtained through feedback from an optical encoder or Hall effect sensor. The combination of speed control and RPM count provides precise control over the motor's performance. This project offers an exciting opportunity to explore the intricacies of BLDC motor control and enhance our understanding of its applications

**KEYWORDS:** BLDC motor speed control, RPM count

## I. INTRODUCTION

The purpose of this project is to develop a system that can control the speed of a Brushless DC (BLDC) motor while simultaneously monitoring its RPM (rotations per minute). BLDC motors are widely used in various applications, such as robotics, electric vehicles, and industrial automation, due to their efficiency and reliability. In this project, we will be utilizing a microcontroller, such as Arduino or Raspberry Pi, to control the speed of the BLDC motor. The control will be achieved by adjusting the pulse width modulation (PWM) signal sent to the motor. By varying the duty cycle of the PWM signal, we can regulate the average voltage and current supplied to the motor, thus controlling its speed. To accurately measure the RPM of the motor, we will incorporate a sensor, such as an optical encoder or a Hall effect sensor. These sensors provide feedback on the rotational position of the motor's rotor, allowing us to calculate the RPM.

## II. METHODOLOGY

### Components Required:

The main components used are Arduino Uno ATMEGA32P Microcontroller, Transformer, Bridge Rectifier, Voltage Regulator, 16\*2 LCD Display, IR Sensor, BLDC Motor, Keypad Matrix

### Working Principle

In this project the 230V AC supply is given to transformer, The stepdown transformer 230V to AC 12V The transformer gives output of 12V And 0v, The 12v And 0v output voltage is fed to Bridge Rectifier circuit convert AC into DC using diode Arranged in bridge circuit the output wave generated is of same polarity irrespective of same input. To control the speed of a BLDC motor, we use a technique called pulse width modulation (PWM). This involves adjusting the width of the electrical pulses sent to the motor. By changing the duty cycle of the PWM signal, we can control the average voltage and current supplied to the motor, thus controlling its speed.

### III. MODELING AND ANALYSIS

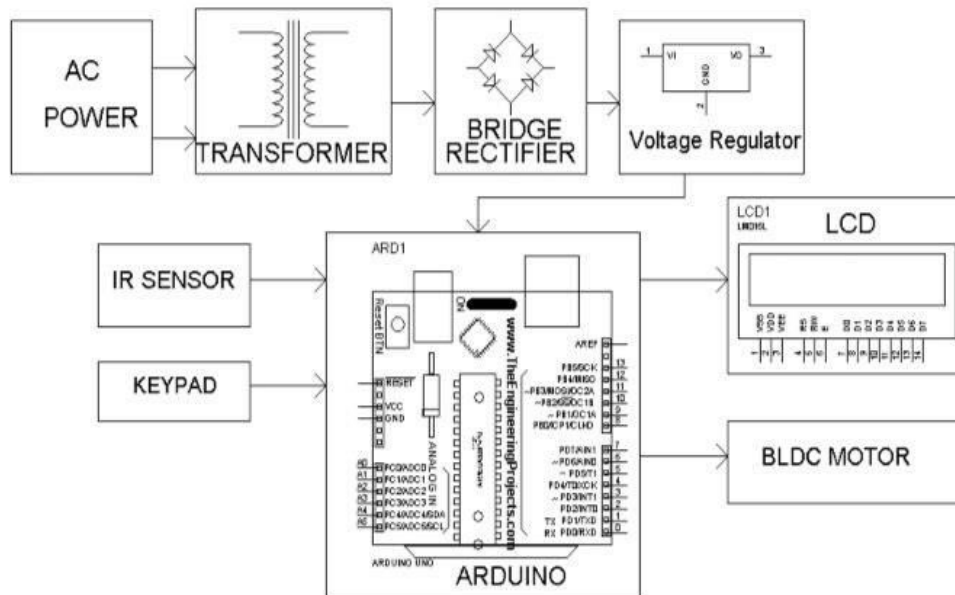


Figure1: Block Diagram of Model

### IV. RESULT AND DISCUSSION

#### Specifications of Model

##### Microcontroller –

ATmega38p 8 bit AVR family microcontroller  
 Operating voltage - 5v  
 Recommended input voltage - 7-12V  
 Input voltage limit - 6-20V

##### step down transformer\*

Input vontage - 230v AC  
 Output voltage - 12V -0V  
 Output current - 1A

##### Voltage Regulator

IC 7805 voltage regulator with 5v output voltage  
 Minimum and maximum input voltage - 7and 25 V  
 Operating current -5mA  
 Highest junction temperature is 125°c

##### BLDC motor

Type - C8025M125 DC  
 Voltage -12V  
 Current - 0.22A

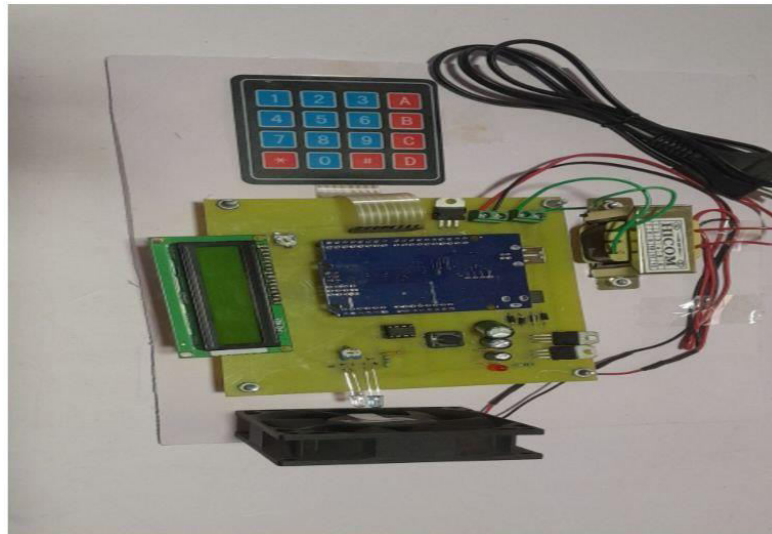


FIGURE 2: HARDWARE OF MODEL

## V. CONCLUSION

In conclusion, this project has successfully demonstrated the ability to control the speed of a Brushless DC (BLDC) motor while monitoring its RPM. By utilizing a microcontroller and adjusting the pulse width modulation (PWM) signal, we were able to regulate the motor's speed with precision. The incorporation of a sensor, such as an optical encoder or Hall effect sensor, provided accurate feedback on the motor's rotational position, allowing us to calculate the RPM. This RPM monitoring ensures that the motor operates at the desired speed for specific applications, enhancing its efficiency and performance. By undertaking this project, we have gained valuable insights into the complexities of BLDC motor control and the importance of RPM monitoring. This knowledge can be applied to various fields, including robotics, electric vehicles, and industrial automation, where precise speed control is crucial.

## ACKNOWLEDGEMENTS

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