



## Web Monitoring and Closed Loop System for Medical Centrifugal Machine with IOT

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# Web Monitoring and Closed Loop System for Medical Centrifugal Machine with IOT

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**Abstract.** This Project Paper is based on Web Monitoring and closed loop system for medical centrifugal machine with IOT and using BLDC Motor, BLDC Motor and its Control is done with Closed Loop Technology. Peer Drives are gaining Popularity due to their Dominance over the similar Control versus Major Drivers without Management. Software setup is made with reference to Controller and Inverter boards, along with receiver and transmitter under Transmission Protocol. Communication is handled over the Internet. Communication module provides a way to monitor the working state of a machine. The IOT being integrated with the machine that allows Unique Login credentials to be assigned, permitting medical persons to monitor the parameters using IOT produced by that machine. The hardware project for a closed loop -controlled BLDC motor has excellent performance. Especially fast response and high torque. With high precision.

## 1. Introduction

This paper is about Web Monitoring and closed loop system for medical centrifugal machines with IOT. Normally Centrifuge machine are used in several laboratories to distinguish fluids like gasses or liquids based on density. We have implemented medical centrifugal machine with IOT, In current medical centrifugal machine the medical person has to vary the knob to set rpm for different types of test's like thyroid test, urine test and other body fluid tests and for some test he has to wait for long time to get sample report. So This paper shares a smart and user friendly medical centrifugal device where everything is interconnected, the medical person can easily set the speed and time for specific test from any location and he can track the patient data easily. For speed control in a centrifugal machine a special motor which has a higher efficiency called BLDC motor helps to set the accurate speed for different tests of fluids for required range.

## 2. Literature Surve

[1,2] From this paper, the design by using the method of open loop system which does not have the automatic control. The main disadvantage of this work is that medical person can not monitor the patient data easily. To overcome the drawback the next researcher is done the analysis of BLDC motor by using closed system [3,4]. In this work, they used only embedded system based control, it may not help to predict the accurate speed of the BLDC motor. To overcome these issues the next person did the analysis by advanced embedded system using ARDUINO [5,6]. Here ARDUINO controls the speed of a motor at a particular delay time but not monitoring the entire operation [7,8]. Seeing the above drawbacks we are in need to modify the speed control techniques using IOT. This will help to continuously monitor the patient database from a medical centrifugal machine. This process makes a smart way of getting sample results of fluids.

### 3. Block Diagram

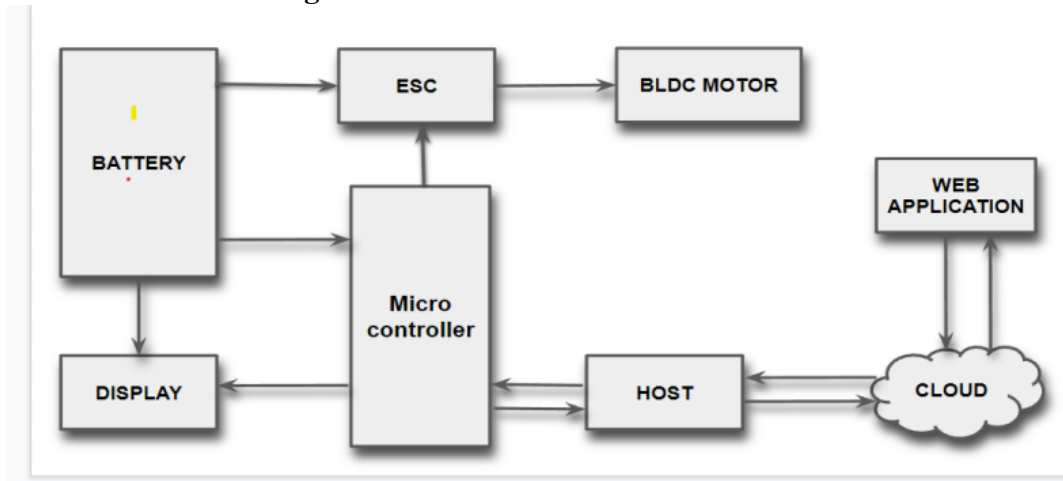


Fig 3.1 WEB Monitoring based BLDC Motor control block diagram

**DC input supply:** The input is 12 volts dc from the battery, since the BLDC motor needs a dc supply to operate, so we are using the battery as a main source.

**Electronic Speed Controller (ESC):** ESC is an electronic circuit that controls and regulates the speed regulation. It consists of switching circuits and regulators. In this work ESC controls the speed of the BLDC motor, based on the command given from the microcontroller.

**Brushless DC Motor (BLDC):** A brushless DC motor is an electronically commutated electric motor which does not have rollers & commutators, the controller provides pulses of current to activate the switching devices of MOSFETs and it is used to create the rotating magnetic field.

**Host:** Host is basically a server which helps to transfer the data from microcontroller to a cloud and also receives data from cloud to microcontroller.

**Cloud & Web application:** Cloud storage is a cloud computing model in which data is stored on accessed remote servers from the internet. Web application is a software to connect the remote server for monitoring the database from centrifugal machines. The Fig 4.1 which illustrates the flow chart of Web monitoring cloud-server system.

## 4.Flow Chart

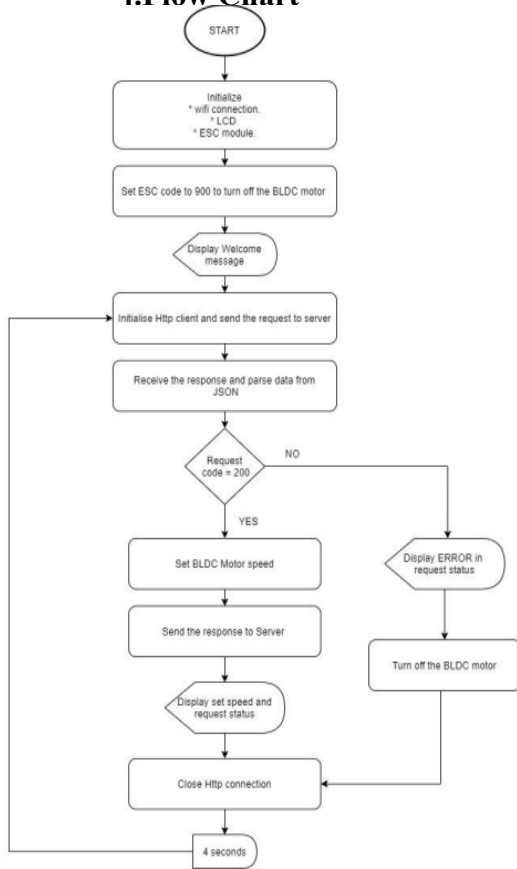


Fig 4.1 Flow Chart of Web monitoring cloud-server system

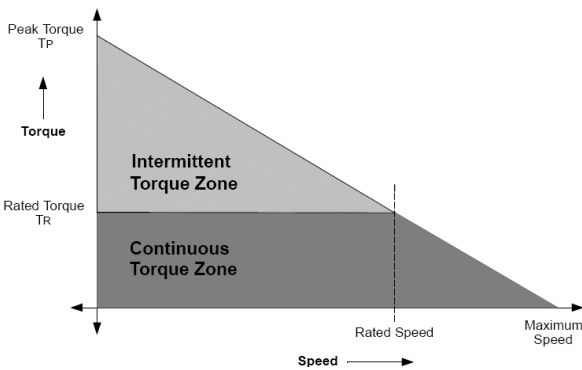


Fig 4.2 Torque-Speed Characteristics

The Fig 4.2 which illustrates the speed torque characteristics of BLDC motors. In these characteristics there are two zones namely (i) continuous torque zone (ii) Intermittent torque zone. during the operation the BLDC motor speed reaches to rated speed at the same time torque becomes rated value. After a certain duration the motor reached maximum speed then the torques also directly proportional to the speed of the motor.

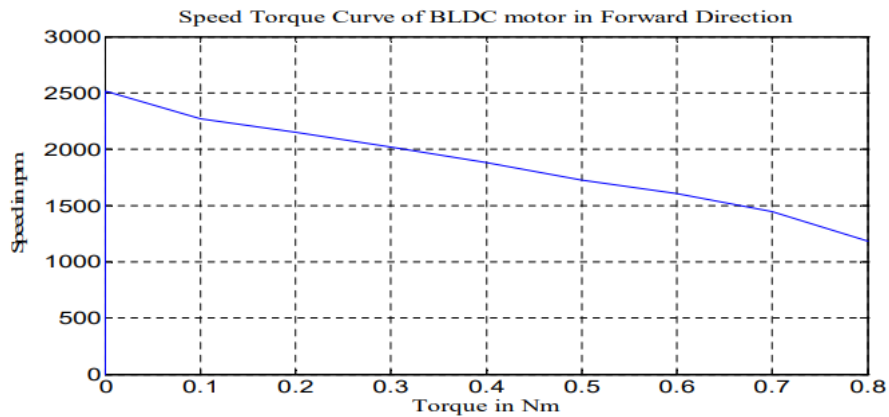


Fig 4.3 Speed-Torque Curve

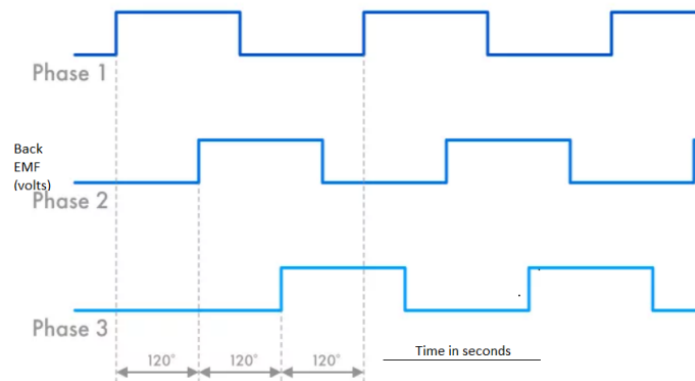


Fig 4.4 PWM Signal

The BLDC motor controller identifies the rotor's position. Upon receiving the sensor data, an array of MOSFETs switches the current, injecting it into the right winding. When large current drops, power MOSFETs can replace a set of IGBTs and GaN switches. Rephrase To control a brushless motor circuit with a schematic, either integrated or external drivers can operate in parallel to the MCU. The drivers of a schematic act as intermediaries between the transistor switches and a microcontroller. The six-step process for controlling a three-phase BLDC motor is necessary to complete a full switching cycle. Thus, it is through duty cycles for the high side and low side transistors that the current in the stator winds is controlled one after the other. In order to decide which current switching method is best for a motor controller, you should take a look at the different choices available. The names of the methods deal with the nature of the waveform that the switch uses.

## 5. Web Monitoring results

IOT asset tracking utilizes devices, sensors, and connected devices to enable remote monitoring and management of an asset's geolocation and movements. With IOT asset tracking, those business assets and their management can be made sense of and visualized with dynamic graphs and charts that show real-time events. , when connected IOT devices or collections of sensors detect abnormalities or deviations in specific areas or devices, such data can be used to identify and understand problems independently or triangulate problems. IOT monitoring also bridges the gap between devices and business by collecting and analyzing the rich data that IOT assets generate. That wealth of data makes it smart.



1.

## 6. Conclusion

Web Monitoring and closed loop system for medical centrifugal machine with IOT The proposed system will help the medical people to monitor the blood test data from their remote location using Unique Login Credential. The speed of the motor for different tests can be varied virtually where it saves the time . Monitoring of the motor is done with the help of Internet Of Things or IOT. The data is stored in the Cloud and the data can be accessed.

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