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Speed Control of D.C Motor using GSM Technique

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Abstract: *Electric drive systems employed in several industrial applications need higher performance, responsibility, and skill to vary the speed. One among the enticing options of the dc motor over all alternative styles of motor is that the relative ease with that speed management may be achieved. During this paper, speed management of dc motor mistreatment GSM technology has been investigated. It's a closed-loop real time system, wherever the feedback circuit is coupled to the motor shaft to produce the feedback speed signal. A mobile phone is hooked up to the feedback circuit that is a trigger. The PWM signal are send to motor driver to vary the voltage provide to motor. GSM (SMS) controlled dc motor is automatic control system which capable of receiving a set of command instructions in the form of short message service and performs the necessary actions like start stop and speed control. We will be using a dedicated modem/mobile at the receiver module i.e., with the robot itself and send the commands using SMS service as per the required actions. The mobile unit which is dedicated at the motor driver is interfaced with an intellectual device called micro controller so that it takes the responsibility of reading the received commands in the form of SMS from the mobile unit and perform the corresponding predefined tasks such as motor start, stop, motor direction and speed control at different levels etc.*

Keywords: *DC motor, GSM technology, PWM, speed control*

I. INTRODUCTION

The advances in the technologies connected to wireless communication have led to the emergence of many engineering styles to help the human needs. As we have a tendency to all recognize, industries play a major roles in any developing country like ours and implementing mobile communication device to facilitate industrial tasks is the basic plan of this project. Direct current motors area unit sometimes found wherever the load needs is adjustable speed and easy management of force. Typical application for dc motors area unit rolling mills, overhead cranes, elevator, battery driven vehicles and machines tools requiring precise speed management. The dc motor electrically consists of 2 circuits; known as the field circuit and the coil circuit. The field circuit consists of stationary windings and therefore the coil circuit is found within the rotating winding. There is a unit essentially 3 kinds of dc motors: the series motor, the shunt motor, and the compound motor. Internally and outwardly, all 3 kinds of dc motor area unit much a similar. The most variations between the motors area unit in the approach in that the sphere coil and coil circuit area unit organized the 3 most common speed-control strategies area unit adjustment of the flux, sometimes by suggests that of field-current management, adjustment of the resistance associated with the coil circuit, and adjustment of the coil terminal voltage. Speed management of dc motor might be achieved exploitation mechanical or electrical techniques. In the past, speed controls of dc drives area unit principally mechanical and requiring massive size hardware to implement. The dc electrical motor system exploitation GSM technology is associate degree automatic management system that is capable of receiving a set of command directions via movable and performs the necessary predefined actions. The mobile unit is interfaced with associate degree intellectual device known as small controller so it takes the responsibility of reading the received commands and before it performs any task. The aim of this work is to style a speed system of dc motor by exploitation GSM technology. This technique are in a position to change on and off the dc motor regardless of the space and to regulate the dc motor speed at desired speed. GSM (SMS) controlled dc motor is automatic control system which capable of receiving a set of command instructions in the form of short message service and performs the necessary actions like start stop and speed control. We will be using a dedicated modem/mobile at the receiver module i.e., with the robot itself and send the commands using SMS service as per the required actions. The mobile unit which is dedicated at the motor driver is interfaced with an intellectual device called micro controller so that it takes the responsibility of reading the received commands in the form of SMS from the mobile unit and perform the corresponding predefined tasks such as motor start, stop, motor direction and speed control at different levels etc. With GSM technology, we have a tendency to will access the operations of a dc motor remotely. The dc motor management system for industrial applications encompasses lighting, security, telecommunications, access and safety, data and recreation systems and thermal comfort systems . Besides the switch and therefore the speed management of the dc motor, the system is for automation of commercial applications that can conjointly offer auxiliary management to the user and to modify the user perform any operation from an overseas place, therefore creating this system really world.

II. REVIEW OF LITRETURE

- A. Atul Kumar Dewangan, Nibbedita Chakraborty, Sashi Shukla, Vinod Yadu, “ PWM Based Automatic Closed Loop Speed Control of DC Motor” International Journal of Engineering Trends and Technology- Volume 3Issue 2- 2012.This paper worked on 3 section induction management exploitation single section input and GSM. The authors used management throughout this work could also be an overseas speed management using a GSM technique that proves to be a lot of effective and reliable in applications. The general principal was the constant voltage and frequency principle that needs that the voltage magnitude and voltage frequency applied to the stator of a motor maintain a seamless quantitative relation.
- B. Jeetender Singh Chauhan, Sunil Semwal, “Microcontroller Based Speed Control of DC Geared Motor”, International Journal of Engineering Research and Applications, Vol. 3, Issue 1, January -February 2013. This paper there add GSM primarily based motor watching and speed management, therein paper they emphasizes the planning side of associate device that was embedded which may build management over up to eight equipment’s by inflicting a particular text message from a telephone were given by them. The author extra that controller was effective and little and fewer house overwhelming within the project work undertaken, GSM technology primarily based automatic system is intended to watch and management speed of academic degree Induction motor/DC motor and put together performs necessary operation like begin, stop, reverse the rotation text.
- C. Hamid Saeed Khan, Muhammad Bilal Kadri, “DC Motor Speed Control by Embedded PI Controller with Hardware-in-loop Simulation”, Electronics and Power Engineering Department, PN Engineering College 2013. In this paper they have style a model within which speed was controlled exploitation slippery mode with a primary order equation supported the speed error. The results of the shift operate was integrated with a current limitation employing a logic equation. The current limitation assures the machine protection and therefore the output of the logic block is that the signal of the voltage to use on the motor coil.

III. BLOCK DIAGRAM

In this project we have used Arduino uno as the microcontroller a DC motor which is attached to it and a 9v battery. Sensor we have used is GSM module (A GSM modem or GSM module is a hardware device that uses GSM mobile telephone technology to provide a data link to a remote network. From the view of the mobile phone network, they are essentially identical to an ordinary mobile phone, including the need for a SIM to identify them to the network). We have also, used pot as it can change the speed of the DC motor manually and a button which is used to select the mode whether it is (GSM or automatic) mode or manual mode.

There are two ways by which speed of DC motor can be changed:

- 1) *Manual Mode:* Here, first we should ON the project and set the button mode at manual. As we have kept the button mode at manual, we can use the pot as a manual part which we can move anti clock wise or close wise to change the speed of the DC motor. As the user can set the speed so the speed of motor will change according to the pot set by the user.
- 2) *GSM Mode:* Similar to manual mode in GSM mode we first ON the project and set the button at GSM mode. As the GSM module is connected to the mobile via Bluetooth so as the user gives the information to the GSM. The GSM transfer the information to the Arduino and sets the speed as per the user. As user sets the speed in his/her mobile or any online device the same speed is been given to the Arduino and the motor starts according to the speed the user has set.

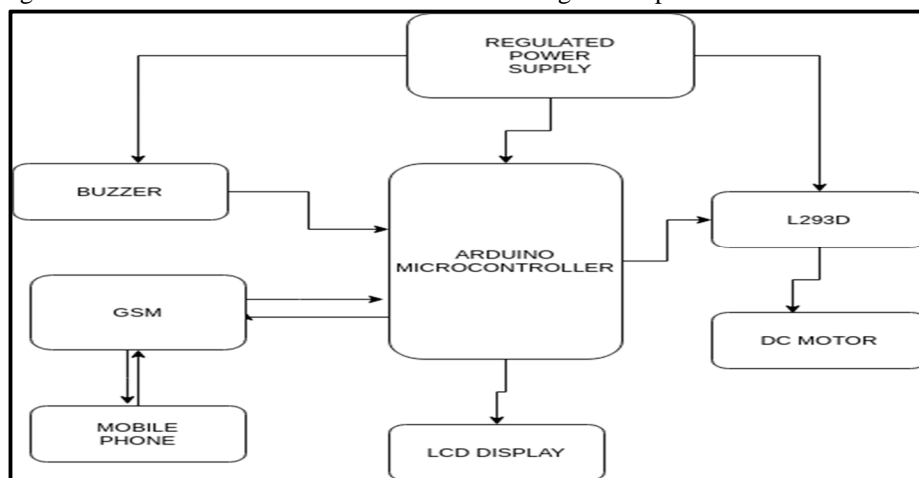


Figure 1. Block diagram of proposed work

IV. METHODOLOGY

Motors are more frequently used in our daily life than you might think. From irrigation / water pump motor to vibration motor in your smartphone, from electric vehicles to gasoline / diesel ignition motor and from electric saw to electric tooth driller. Electric motors did a great help to human kind and pushed us light years ahead from an era where man power decided health of an economy to an automated zero man economy, of course with a smart electronic brain. Turning ON and OFF motor is not enough for many applications; we need to precisely control the rotational speed and the direction of motors. To do this we are using a method called PWM which we will learn in detail. For many applications we might need to start or stop / control speed of motors remotely, so we introduced GSM in the circuit so that we can control the DC motor anywhere in the world. This project include microcontroller Sim 800 GSM module, LCD display, proximity sensor , BLDC motor, Arduino UNO kit, power supply kit. the power supply kit is used to step down the voltage for the arduino kit which require 5V DC supply. GSM is connected to arduino by UART (Universal asynchronous receiver transmitter) microcontroller. LCD (16:2) is connected to digital pin of arduino. The whole process will be displayed on LCD screen. The microcontroller unit connected to speed control mechanism. The speed is varying using Pulse with Modulation Technique. The PWM is a very simple and most widely used to control speed of Brushless DC Motor. The GSM is a Global system for mobile communication GSM is an International digital cellular telecommunication. We used the GSM SIM 800. By using AT's command we can send and receive SMS through the microcontroller

V. ADVANTAGES

- A. Devices can be controlled from long distances.
- B. Economical design
- C. Can be easily implemented in homes
- D. Can be used by everyone with just the knowledge of text SMS
- E. Format of the SMS is simple to understand and write.

VI. APPLICATION

- 1) The previous chapter deal with stated merits and de-merits of the project, the project can be put for use in following fields-
- 2) Home automation, which was the seed for developing the idea of project.
- 3) Remote device control.
 - a) This will help to eliminate need of human personnel attending the device till it has to be switched off/on. Based on experience of approximate time to switch on/off, he/she can control the device, saving time.
 - b) It will also help to control device while attending to other work.
 - c) User can control device in case of forgetting to do so while leaving for some other place.
- 4) Energy Conservation
- 5) Irrigation systems

VII. FUTURE SCOPE

In this paper, the GSM based mostly DC motor speed system that is quick and economical with improved accuracy is intended. The projected project is may be enforced with ARDUINO UNO microcontroller victimization embedded c-language. To manage industrial appliances remotely uses GSM based mostly system satisfying user wants and necessities. For ex. we are able to other on its memorizing power for creating it sensible machine.

VIII. CONCLUSION

This paper provides we have been able to successfully implement the speed of DC motor using SMS. The project basically consists of Arduino Uno as a microcontroller and motor driver, thermal sensor, comparator, key pad, 16X2 dot matrix LCD display and rotation feedback Sensor. Initially the motor runs at the rated speed, when the user want to change the speed of the motor to the desired speed, the user will forward the SMS which specifies the speed at which the user want the motor to be operated. The motor is rotated an X RPM speed, can be detected by using feedback sensor and microcontroller. If the desired speed to be achieved is above the speed at which the motor is running then the microcontroller continuously increases the duty cycle till the speed comes to a desired level. If the desired speed to be achieved below the speed at which the motor is running then the microcontroller continuously decreases the duty cycle till the speed comes to a desired level. The system will revert back with an SMS showing the speed at which the motor is operating.



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