SPEED SYNCHRONIZATION OF MULTIPLE MOTORS USING GSM

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ABSTRACT: **Since from early days, DC motors are used for various purposes in commercial ways. Since they are easy controllable, it has got good relative characteristic features with speed and torque. From the influence of above statement, DC motors can be easily synchronized and controlled in either direction. In commercial places like industries and factories, there is a need of parallel arrangement for any of the machines. If in case any of the machine for service or any abrupt changes appeared in any other machines, the other will be in operating state. For equal load sharing, we need to synchronize the machines. In our system, we are going to synchronize the two DC motors, with one as master and other ass slave motor. These two DC motors will starts its operation of running with the utilization of Pulse Width Modulated technique, so that easy controlling and operating with higher efficiency.**

KEYWORD: Dc motor, Microcontroller, GSM modem, motor driver,ADC, loadcell.

1. INTORDUCTION

More often DC motors have wide range of applications than other motors because of its good characteristic nature with the influence of electrical energy. DC motors one of the most suitable characteristic is that its good & easy controlling and less complexity of working for better ooperation for any of the job.In our system, 12v 150rpm DC motors. Rarely, DC motors are controlled from any of the two methods mentioned below,
1.Armature voltage control method
2.Field flux control method.
But in this system, we selected other method to control the action of the two Dc motors.
1.Automatic mode i.e using a device known as loadcell.
2.GSM mode i.e controlling from remote
places by sending commands through SMS.
Now you can see that how the DC motors are controlled using the above two methods in the working segment.

2. LITERATURE SURVEY:

Conducting literature survey prior to begin a research system is vital as this will supply us with much needed additional information on the methodologies and technology available used by other research counter parts around the world on this topic.

While studying the papers, we knew that PWM technique is widely used for the speed control of the DC motor. Primarily supply is given to the PIC Microcontroller, then controller generates the pulses which is of 5v dc, the generated pulses are nothing but PWM signals. this PWM signal is given to the motor driver circuit which intern dc motor. This is a wired communication technique through manual operation[2].

After studying this paper, we know that GSM & GPRS is the advanced technology which will helpful to control the action of motors from remote places. This GSM operation is very fast and manpower required is less, GSM technique works on AT commands. This mode of operation is wireless.[4].

3. WORKING:

In our system, we used component units like microcontroller, relay, GSM, Motors, transformer and driver units. Basically we are getting 230V Ac supply but for our system we need 12V DC as well as 5V Dc supply, 12V is for motor action and 5V is for other units like microcontroller, GSM, relay and drivers. The 230V ac supply is reduced to 12V AC supply using 12-0-12 step down transformer. The outage of supply from the device is given to the rectifier circuit which intern changes AC to DC supply of 12V only with the presence of harmonics. To minimize the distortic harmonics, capacitor filters are used to convert the impure DC to pure DC supply. The available 12V DC is given to two motors, again the 12V Dc is given to the 74XX IC regulator which will reduce 12V to 5V. This 5V Dc is applied to microcontroller, GSM and driver.
Here mainly to run the motors, PWM method is applied. So that good and advanced method is used. Here in our system 2 microcontroller units are used, one for PWM action and other for rest of the application like GSM and load cell.
Motor driver is a device which operating in between the action of motors and microcontroller.
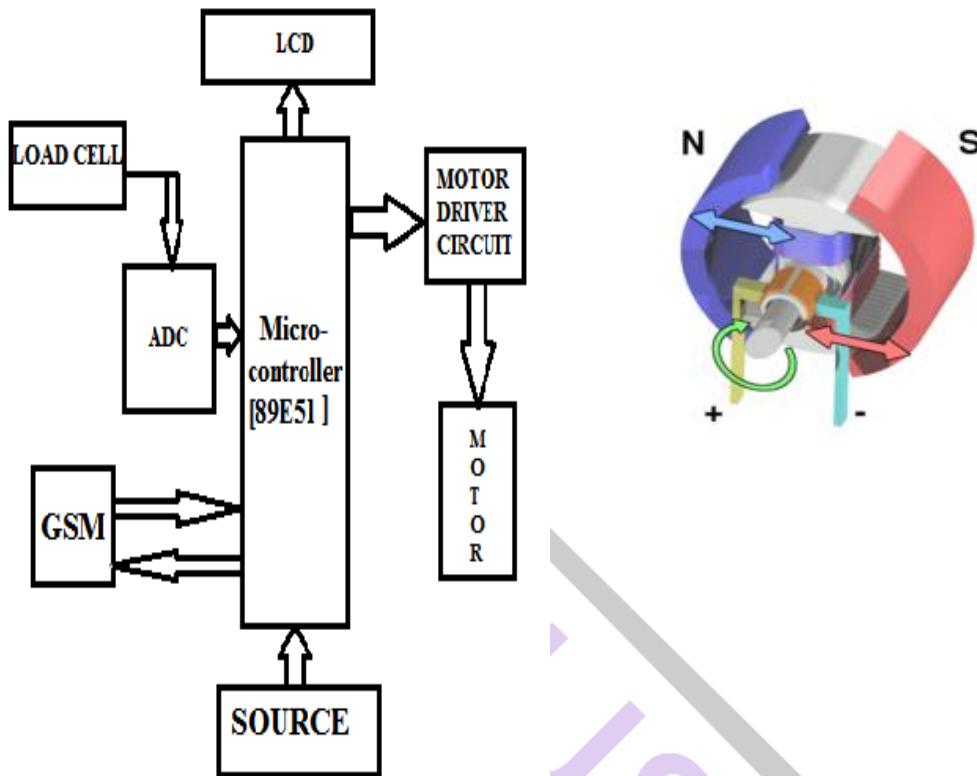
Relay is placed because to avoid unsuitable conditions for the device, thus relay acting as a safety device for the kit.

- **Load cell:**

The motor starts its normal operation utilizing PWM. When there will be a failure of materials coming into near the motor driver belt or crossed of belt or load on one motor raises, then automatically load cell sends signals to microcontroller through ADC. The sending signal from load cell is analog in nature. This analog property of signal is changed to digital accurate signal using Analog to Digital converter device. Thus microcontroller unit look after the rest of the action of the two DC motors.

IN1	IN2	Motor1
0	1	Rotates in one direction
1	0	Rotates in other direction

- **GSM mode:**

This mode operation can be called as wireless unique method of operating of motors. This method of operating is very advanced and easily handled just by giving commands to the GSM modem through SMS. Initially, when the motor starts their operation, the layman will get a SMS that 'Device is started'. Later he can change the operation of Dc motor i.e clockwise or anticlockwise, variation of speed for both the motors as per his requirement. If both the motors are running at 120rpm, a sudden abrupt change will introduce between them. So the result will be reduction of speed in any of the one motor (as per mills applications are considered), say reduced to 90rpm. In order to meet the condition of synchronism, the layman should send SMS to modem to get the other motor speed to be decreased to 90rpm. This can be achieved with the help of his cell phone just by simple typing i.e 90RPM and send it to GSM modem. As the command sent, the result will be the speed reduction.

4. **SOFTWARE USED:**
- Embedded c language:- embedded c language is a well known and very easier to understand, to read and to write the programs comparatively with assembly level language of embedded system
- Kiel u vision 2:- it is a compiler used to compile the programs which is written in c language, further it will detect the errors and uncertain syntax and to create .hex file

5. **ADVANTAGES:-**
- Using automation technique like load cell, man power is eliminated
- Rapid operation using GSM
- Instantaneously controlled from remote places
- Advanced method for developing trends in future.

6. **APPLICATIONS:-**
- In control system plant for lag and lead adjustment

- Industrial applications like rolling mills, textile mills erc….
- In traction system.

7. CONCLUSION:-

Efficient and high quality performance of a dc motors in the field of domestic, industrial and commercial applications requires less maintenance, smooth , very easy and safe operation.

So for these conditions, speed, direction and synchronization need to be done in advanced and latest development methods. So, our system will be more suitable than any other for the speed control of dc motor.

REFERENCE:

[1] **KIMEMIA ELVIS WANJAGIUniversity of NAIROBI** has published the system report of **WIRELESS CONTROL OF A DC MOTOR**.

[2] **Rajesh Singh[1], Saurabh Kumar[2], Ravi Kumar[3], and Vivek Kumar[4]**. Has published. The paper describes the synchronization, speed and direction control of Dc motor using P.W.M (pulse width modulation)