



STARTER USING IOT

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Abstract— The objective of the project is to control the motor from the remote places and to provide protection to the motor .The motor is turned on/off from the remote places itself through GPRS. The webpage is created through which the motor on/off status can be identified and the motor can be turned on/off.Arduino software is used which receives the GPRS signal from webpage .The signal from the Arduino inturn controls the motor action through relay driver circuit. Additionally the voltage and current sensor is given as feedback to the Arduino to protect the motor from overvoltage and overcurrent.Thus the motor can be controlled from the remote places through internet.

I. INTRODUCTION

In day to day life motors play a major role in domestic and industrial sector. Irrespective of the type of supply the motors are started using starters. In industrial sectors, manual operation for ON/OFF of the motor may not be reliable. At many instances the operators at control room may not be available to control the motor. Recently the technological growth has paid way for various automatic starters and controllers. This project is about to control the starter through internet. But high rating motors require safe operation. The main objective of this project is to control the motor and to provide proper protection to the motor. Hence in this project it is proposed to model a device which is dynamic, cheap and wireless in the field of motor controlling. Safety of a motor is also a major concern because malfunctioning of a motor can cause a huge loss in production also increase maintenance cost of the motor itself. That's why safety function is included in this project. One can observe motor's operation from a remote place and control it. The motor starter is controlled from the remote places through GPRS technique using arduino software. The webpage is created to access On and Off control of motor through GPRS .

II. IOT BASED MOTOR STARTER CONTROL

The main objective of this project is to control the switching of the motor. The control is done by wireless signal transmission. There are three functions to be performed project which is shown in figure 1.

2.1. Motor Control

The motor can be turned on or off by using the button which is created on webpage. The signal is transferred to the receiving side through GPRS (general packet radio) which is connected to arduino. The motor is turned on or off based on the signal.

2.2.On Off State Detection

The signal received from the webpage enables the Arduino which inturn operates the relay through driver circuit. The relay thus controls the on/off state of the motor depending upon the signal received.

2.3.Motor Protection

The voltage and current sensor's output is given as feedback to the Arduino.If the current or voltage exceeds the specified limit then the relay will automatically cut off the starter.12V dc motor is used which has a rated speed of 1000 revolutions per minute.

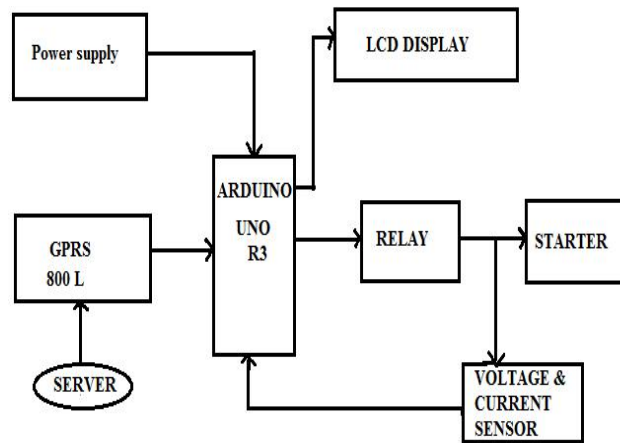


Figure 1 Block diagram of IoT based starter controller

The webserver is created to monitor and control the on/off status of the motor using HTML code. The control signal from the webserver is transmitted to Arduino through GPRS module. Once the Arduino receives the signal it operates the relay which in turn controls on/off of the motor. The voltage and current sensors are used as feedback to the Arduino to protect the motor from overvoltage and overcurrent.

III. ARDUINO SOFTWARE

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The pin diagram is shown in figure 2. Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, and anyone interested in creating interactive objects or environments. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

3.1 Features of Arduino

The key features are

- (1) Arduino boards are able to read analog or digital input signals from different sensors and turn it into an output such as activating a motor, turning LED on/off, connect to the cloud and many other actions.
- (2) You can control your board functions by sending a set of instructions to the microcontroller on the board via Arduino IDE (referred to as uploading software).
- (3) Unlike most previous programmable circuit boards, Arduino does not need an extra piece of hardware (called a programmer) in order to load a new code onto the board. You can simply use a USB cable.
- (4) Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program.
- (5) Finally, Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

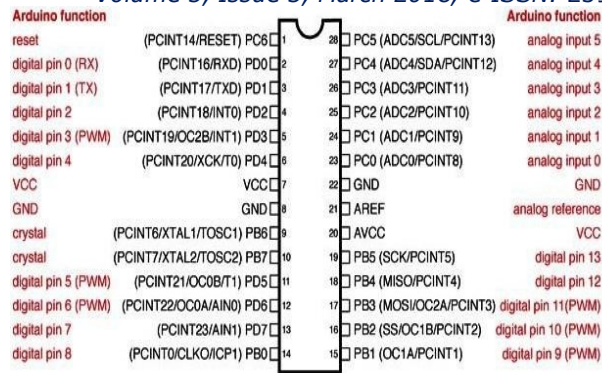


Figure 2 Pin diagram of Arduion

IV.ARDUINO GSM SHEILD

The Arduino GSM Shield 2 allows an Arduino board to connect to the internet, make/receive voice calls and send/receive SMS messages. The shield uses a radio modem M10 by Quectel. It is possible to communicate with the board using AT commands. The GSM library has a large number of methods for communication with the shield. The shield uses digital pins 2 and 3 for software serial communication with the M10. Pin 2 is connected to the M10's TX pin and pin 3 to its RX pin. The modem's PWRKEY pin is connected to Arduino pin 7. The M10 is a Quad-band GSM/GPRS modem that works at frequencies GSM850 MHz, GSM900MHz, DCS1800MHz and PCS1900MHz. It supports TCP/UDP and HTTP protocols through a GPRS connection. GPRS data downlink and uplink transfer speed maximum is 85.6 kbps. To interface with the cellular network, the board requires a SIM card provided by a network operator.

V.GPRS

General Packet Radio Service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM). GPRS usage is typically charged based on volume of data transferred, contrasting with circuit switched data, which is usually billed per minute of connection time. Sometimes billing time is broken down to every third of a minute. Usage above the bundle cap is charged per megabyte, speed limited, or disallowed. 2G cellular technology combined with GPRS is sometimes described as 2.5G that is, a technology between the second (2G) and third (3G) generations of mobile telephony. In 2G systems, GPRS provides data rates of 56–114 kbit/second. It provides moderate-speed data transfer, by using unused (TDMA) channels. Time division multiple access. It is used because of its high speed immediate connection and data transfer, superior for all application. Internet Protocol, Point-to-Point Protocol, X.25 connections are the protocols used.

VI. RELAY DRIVER CIRCUIT

A relay driver circuit is a circuit which can drive, or operate, a relay so that it can function appropriately in a circuit. The driven relay can then operate as a switch in the circuit which can open or close, according to the needs of the circuit and its operation. In this project, we will build a relay driver for both DC and AC relays. Since DC and AC voltages operate differently, to build relay drivers for them requires slightly different setup. This is the voltage needed in order for the relay to be able to operate and be able to open or close its switch in a circuit. In order for a relay to function, it must receive this voltage at its coil terminals. Thus, if a relay has a rated voltage of 9VDC, it must receive 9 volts of DC voltage to operate. So the most important thing a DC relay needs is its rated DC voltage

VII.SOFTWARE DESCRIPTION

ThingSpeak is an IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the cloud. ThingSpeak provides instant visualizations of data posted by your devices to ThingSpeak. With the ability to execute MATLAB code in ThingSpeak you can perform online analysis and processing of the data as it comes in. ThingSpeak is often used for prototyping and proof of concept IoT systems that require analytics..

IoT Motor Control

Motor ON Motor OFF



Voltage

0.00

Current

0.00

VIII. CONCLUSION

Thus the webpage is created to control a motor through GPRS .The Arduino receives the signal from webserver either to turn on/off the motor. The motor can be turned on/off through relay driver circuit. The voltage and current sensors are given as a feedback signal to Arduino for the protection of motor.Arduino is programmed in such a way that whenever the current and voltage exceeds above or below the specified value the relay will automatically cut off and the motor stops.

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