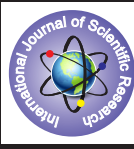


A Hardware-Software interface for controlling robots globally via internet.



Engineering

KEYWORDS: robot, microcontroller, global, internet, control, gsm module, assembly

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ABSTRACT

There are many technologies available in market for implementing the control systems for robots which includes RF modules, Bluetooth or Zigbee modules etc. But one of the facts about them is that they have a limited range of connectivity. On the other hand technologies like GSM module have vast connectivity range. So I have used a SIM 900 GSM/GPRS module for implementing a web based control system for robots which can be accessed globally using an internet connection with the help of a simple web page. Web page is made on PHP and the microprocessor AT89C52 is programmed in embedded C language. Web page has a very user friendly interface where one can login and have can customize the different parameters and the data format as per their requirements. Once the web page is customized the microcontroller is programmed according to the data format of the webpage and then GSM modules is helps to transfer the data between the webpage and the microprocessor. In this way we can control the entire robot by having the control on its microprocessor by sending the signal on the real time from our webpage to the microprocessor of the robot.

INTRODUCTION

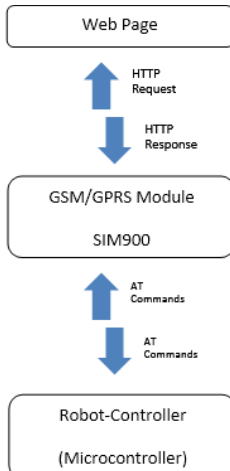
Today our lives are dependent on technology and we have limitless possibilities with today's technology. Technology is not just a machine that we see (i.e. Hardware part) but it is also a brain of machine that is invisible (software part). And all latest technologies are the combination of both of them. We have a very interesting field in this are AKA robotics, where in we have a machine which is capable of performing a specific task.

Earlier we used to make Robots which were controlled by some remote connected by a heavy bunch of wires. Then once we started realizing the limits of wired connection we switched to wirelessly controlled robots. We used technologies such as radio frequencies, Bluetooth modules, Wifi/Zigbee modules etc. These technologies are pretty impressive but all of them share a common weakness i.e. "Limitation of their Range".

Typically they have an average range of 10-1000 meters. In most of the cases this range works fine but sometimes we think what if we could control our robot beyond this range or what if I could control it from anywhere around the world..?

This is the point where I want to explore. And the most robust and affordable system for controlling the robots globally that I could think of is a GSM/GPRS module. So in my research I have used a SIM900 GSM/GPRS module which takes control signals from internet through my webpage and passes on to a microcontroller which in turn controls the robot.

SYSTEM OVERVIEW:



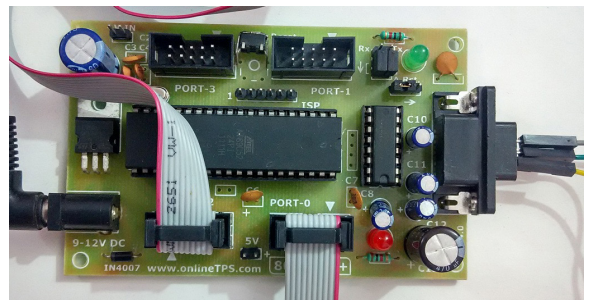
HARDWARE DESIGN:

TX, RX and Ground pin of SIM 900 is connected to TX, RX and Ground pin of AT89C52 respectively. PORT-0 of AT89C52 is connected to the relay control circuit as shown in figure.

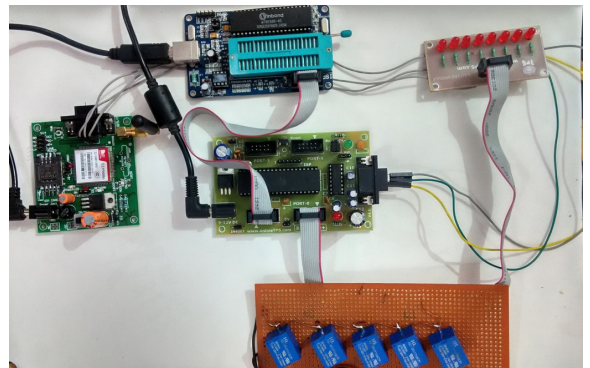
SIM 900 GSM/GPRS module:



Microcontroller (AT89C52) Development Board:



Full Design:




```

    {
        print("AT+HTTPACTION=0^");
        scan(18);d(3);
        if(ok()){ //P2=0x07;

print("AT+HTTPREAD=0.8^");
        scan(31);
        d(1);
        //if(ok()){ P2=0x0b;d(2);}
        //if(buf[10]=='O'){ P2=0x0c;d(6);}
        //if(buf[11]=='K'){ P2=0x0d;d(6);}

        //P1=0;
        if(buf[7]=='1') o1=1;
            else o1=0;
        if(buf[6]=='1') o2=1;
            else o2=0;
        if(buf[5]=='1') o3=1;
            else o3=0;
        if(buf[4]=='1') o4=1;
            else o4=0;
        if(buf[3]=='1') o5=1;
            else o5=0;
        if(buf[2]=='1') o6=1;
            else o6=0;
        if(buf[1]=='1') o7=1;
            else o7=0;
        if(buf[0]=='1') o8=1;
            else o8=0;

        P2=P1;
        st=P1;
        //d(1);
        }else{
            st=P1;
            break;
        }
    }
}

```

CONCLUSION:

We have seen that this system is a powerful implementation of GSM module which removes every boundary of range and can be accessed from any part of the world provided with the internet facility. One can now control the robot just by opening a simple webpage from computer or any other smart device like mobile or tablet. This is a cost effective solution for implementing this king of global application like Home or Industry automation as well. It is a simple yet powerful system. Although there is still a scope of improvement in terms of the speed or response time as this is a limitation of internet as well which is not constant across world. But considering overall advantages this is a very useful design and will be soon cover the future general purpose robotic applications .

REFERENCE

- [1] SIM900A datasheet. [2] Atmel AT89C52 datasheet for learning AT commands. [3] Video tutorials on Youtube [4] Studying about other electronic components on Wikipedia.