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Design and Implementation of Wifi Controlled Robotic Rover based on Raspberrypi and Arduino

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Abstract

The present manuscript deals with controlling a robot over Wi-Fi and maintaining an economical management over a machine. Basically we've got an Arduino (Atmega 8) that we have a tendency to use to attach to 2 motors and manage them. Then we have a RaspberryPi which our iPhone, iPad or laptop can power. The RaspberryPi sends data to Arduino from your computer telling it what to do. The Pi is causing the info through the Wi-Fi electronic device and therefore the management is maintained by a pc running Putty or Telnet.

Keywords; *Arduino, Atmega 8 , iPhone, iPad, RaspberryPi, Putty or Telnet*

I. INTRODUCTION

A Robot is an automated or just about smart agent who will perform tasks independently maybe with some supervision, typically with the assistance of a global leadership A robot is usually a goal-hunting techno-mechanical system by indicating that of computer and digital software. The robots are complete, non-autonomous or are remotely controlled. Drones are being used at times and in an increasingly wide variety of tasks for family appliances, such as clean floors, shoveling driveways, improvement drains, car construction, fighting, and activities that are too costly or too dangerous to be done by humans, such as discovering the area or at the lowest ocean level [1].

The computer software in the application method consists of commands which control the behavior of the robot and provide information pertaining to the necessary tasks. Once a software is written the robot is ready to implement instructions and to bring the specific errands back to the bacon. Coding robots can be complicated and distracting process, and while over the years it has become simpler, the lack of cross-platform business concepts has affected the event of computer code solutions for robotics compared to alternate computer-driven systems such as programmable controllers (PLCs) [2].

II. DESIGN OF THE ROBOTICSTRUCTURE

The robot is designed using a RasberryPi mounted on a Chassis which is retrieved from. The Pi gives directions to the Arduino having ATMEL Atmega 8. The wireless communication is setup through the Wireless fidelity network and the control is established using Putty running on pc or Etelnet app on an iphone [3].

2.1. ARDUINO (ATMEL ATMEGA 8):

Arduino is an approved ASCII text file third-board logic analyzer, successor to the ASCII text file cabling framework built to formulate the interdisciplinary device electronics process. Within the electronics part of the planning phase, a basic open hardware model for the Arduino panel with an Atmel AVR cpu or an aboard input / output system is used. On the contrary, the computer language compiler, which may be a traditional one, and thus

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the windows installer is with the machine code running on the panel. With the aid of the wire-based language (syntax and libraries) almost like C++, Arduino equipment is configured with some exaggerations and adjustments, and a method based mostly on integrated software ATM as shown in figure.1

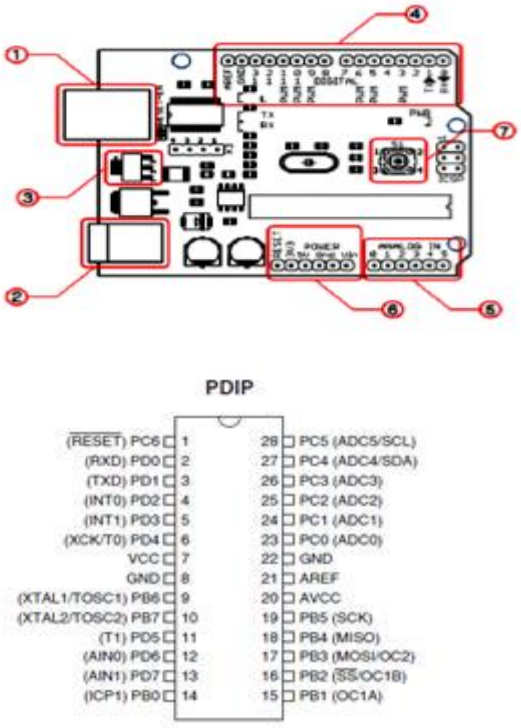

Fig.1 Arduino ATMEGA8

2.2 FEATURES OF ATMEGA 8

ATMEGA is a microcontroller architecture used for interfacing the instrumentation to a system which provides the effectiveness of design a simple circuit for a domestic purpose. The specifications may include Low power, number of channels and programmable serial USART and Master/Slave SPI serial interface.

2.3 RASPBERRY PI:

The RaspberryPi is an advanced version just as in case of Arduino but with high power features a system on a chip (SoC) configuration with a high bit processing capability, Alongside few other features such as VideoCore IVGPU, and with 256-512 megabytes of RAM. It doesn't embrace an integral hard disc or solid-state drive with LINUX ARM distributions for transfer. Tools are there for Python as the main programming language, with support for BBC which can be seen in fig.2

Fig.2 RasberryPi

2.4. MOTOR DRIVER PROTECT:

The chip used for Motor driver protect is L293D. It homes two H-Bridge layouts for dominant two motors at a time. The project is interfaced to the Arduino. Arduino Digital data pins are used for connecting the Input pins of motor driver protect as shown in figure.3 and figure.4 and the terminology on the board can be shown in table.1 below.

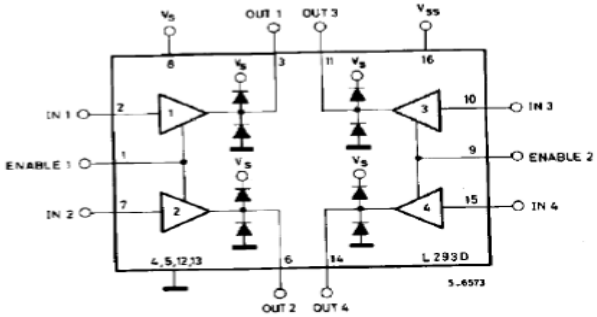

Fig.3 Circuit diagram for Arduino ATMEGA8 with robot

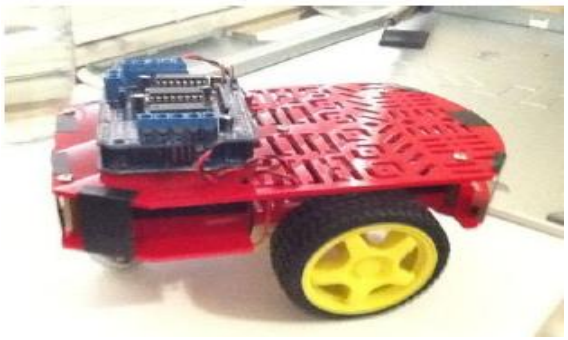

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Fig.4 Robot configuration

Table: 1 Specifications of Micro Controller Board (Absolute maximum ratings)

Symbol	parameter	Value	Unit
V_s	Supply voltage	36	V
V_{ss}	Logic supply voltage	36	V
V_i	Input voltage	7	V
V_{en}	Enable voltage	7	V
I_o	Peak output current	12	A
P_{tot}	Total power dissipation at 80°C	5	W
T_{stg}	Storage and Junction temp.	-40 to 150	°C

III. IMPLEMENTATION PROCESS

3.1 POWERING ARDUINO

The way the wealth is distributed is by cabling the two pair batteries and then splicing wires the two sides left over to the DC connector head that can be plugging in to the Arduino as shown in Fig.5

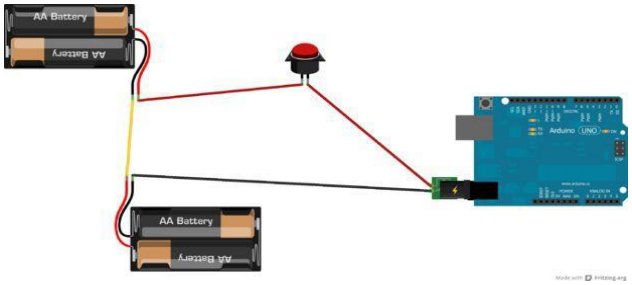

Fig.5 Power supply for Arduino

3.2 POWERING RASPBERRY PI

Powering Raspberry PI can be obtained by using the following. 9V cell clip to control the Pi which holds 6 AA batteries as shown in figure.6 and motor drive in Figure.7. Wired connections are to be carefully adjusted and pulled out two and threaded a wire in their positions so that it didn't fried the RaspberryPi to keep power at an input voltage.

Fig.6 Batteries

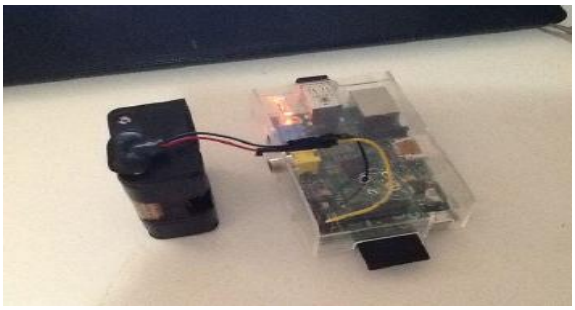

Fig.7 Motor drive

3.3 WIRING THE ARDUINO BATTERIES & MOTORS

The Motors are connected to the Motor Shield having the terminals MOUT1 and MOUT2 for motors and the output/ Instruction for the Motor Driver circuit, given by the Arduino through digital pins which are connected at MIN1 and MIN2 terminals. The setup for running the motors includes Motor driver shield, Arduino and a pair of motors.

3.4 PROGRAMMING THE ARDUINO AND RASPBERRY Pi:

A Python file used to manage the incoming Telnet link to Pi, it will pass the code for our Duino to use Serial data. We used a USB to place it on Pi and transfer the folder over, or it can be installed from the Pi client or from the FileZIlla software and transfer files via ssh. The following connect.py file uses commands which link ours Arduino from our RaspberryPi.

3.5 SETTING UP THE RASPBERRYPI SERIAL/TELNET COMMUNICATION:

TELNET is communicated with COM3 of the system input using raspberryPi and the following serial port shows the established communication with the controller board and system integration with the instrumentation connections that are cited from the published literature. [3-5]

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IV. CONCLUSION

The Rover designed is being controlled over a Wi-Fi routers vary. The management is precise and clad to be expeditiously operating. The project is more being increased for an additional versatile vary that works below GSM management and Wi-Fi. A special video footage transfer unit is mounted on the highest to look at direct video footage which is able to be transmitted through the Pi. Through which robot can be easily controlled and manipulated the direction required.

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