

SOLAR GARBAGE COLLECTING ROBOT

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Abstract
The main aim of this Project work is to reduce the pollution of rivers which are dumped with high amount of sewages, factory wastes, etc. Govt of India has made huge investments in various river cleaning projects. Nowadays most of the manufacturing process is being automated so as to deliver the products at a faster rate. Automation plays a vital role in production. In this project we've fabricated the remote operated river cleaning machine, the primary aim of the project is to cut back the the manpower, time consumption for cleaning the river. Here we've automated the functioning of river waste cleaning with the assistance of a motor and conveyor drive arrangement. Here hc-5 Bluetooth module provide to control the cleaning machine.
Keywords: solarmodule, fabrication, L293d, Beltmotor, MC ATMEGA328.

INTRODUCTION

Nowadays, the environment problems arise in many towns in India these problems come along by developing activities like construction of homes, offices, and other business areas. TheEnvironmentproblemsoccurbecauseofseveral reasons they're the lowbudgetallocationon environment management and public awareness in protecting the environment. The Environment issue which comes up from year to year and still can not be solved is about garbage and waste fromvariousplaces dispose into rivers. That waste can clog water flow, induce the water become dirty, smelly, and sometimes over flow so then give effect floods. Traditional methods used for collection of floating waste are done manually by humans or by means of waste collecting boat, thrash skimmers etc. and deposited near the shore of rivers. The above mentionedmethodsarecomplex,needslotoftimeandmoney.The main problem associated with cleaning the chemical wastes is that it cancause respiratorydiseases anditplays a challengingproblem for the municipality workers. Currently, we can see automation process in all major fields but still using automation for cleaning sewages and debris's is a challenging task. The municipality workers have to get down into the sewage sludge to wash the wide sewage. It affects workers health badly and also causes skin diseases.[1]

LITERATURE SURVEY

Given the definition of embedded systems earlier is this chapter; the first such systems could not possibly have appeared before 1971. That was the year Intel introduced the world's first microprocessor. This chip, the 4004, was designed for use in a line ofbusinesscalculatorsproducedbytheJapaneseCompany Busicom. In 1969, Busicom asked Intel to design a set of custom integratedcircuits-oneforeach oftheirnewcalculatormodels.The 4004 was Intel's response rather than design custom hardware for each calculator, Intel proposed a general-purpose circuit that could be used throughout the entire line of calculators.Intel's idea was that the software would give each calculator its unique set of features. The microcontroller was an overnight success, and its use increased steadily over the next decade. Early embedded applicationsincludedunmannedspaceprobes,computerizedtraffic lights, and aircraft flight control

systems.In the 1980s, embedded systems quietly rode the waves of the microcomputer age and brought microprocessors into every part of our kitchens (bread machines, food processors, and microwave ovens), living rooms (televisions, stereos, and remote controls), and workplaces (fax machines, pagers, laser printers, cash registers, and credit card readers).[13]

PROPOSED METHOLOGY

Everyembeddedsystemconsistsofcustom-builthardwarebuilt around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded. The softwareresidingonthememorychipisalsocalledthe‘firmware’. The embedded system architecture can be represented as a layered architecture as shown in Fig. The operating system runs above the hardware, and the application software runs above the operating system. The same architecture is applicable to any computer including a desktop computer. However, there are significant differences. It is not compulsory to have an operating system in every embedded system.[2]

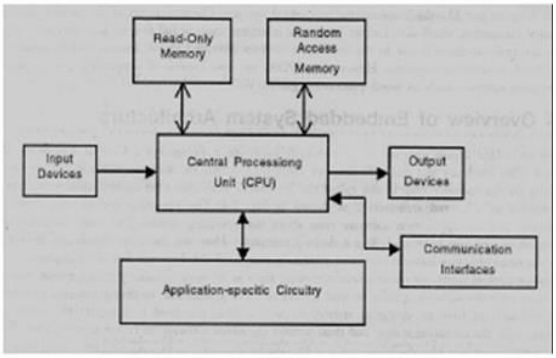

Fig1:Architecture of Embedded System

For small appliances such as remote control units, air conditioners, toysetc.,thereisnoneedforanoperatingsystemandyoucanwrite only the software specific to that application. For applications involving complex processing, it is advisable to have an operating system.Insuchacase,youneedtointegratetheapplicationsoftware withtheoperatingsystemandthentransfertheentiresoftwareonto the memory chip. Once the software is transferred to the memory chip,thesoftwarewillcontinuetorunforalongtimeyoudon’tneed to reload new software.

WORKING

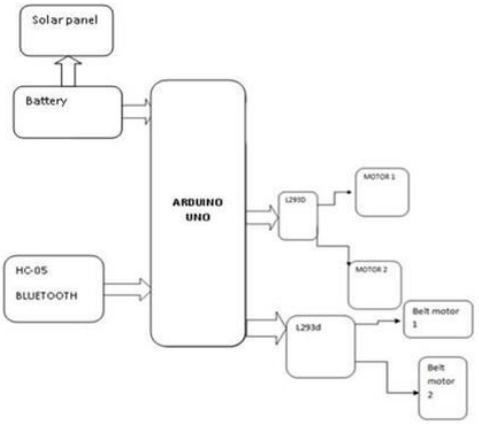

Fig.2 : Block Diagram

Overview The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 [4]digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16

MHzceramicresonator,aUSBconnection,apowerjack,anICSP header,andaresetbutton.Itcontainseverythingneededtosupport the microcontroller; simply connect it to a computer with a USB cableorpoweritwithaAC-to-DCadapterorbatterytogetstarted. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serialconverter.Revision2oftheUnoboardhasaresistor pulling the 8U2 HWB line to ground, making it easier to put into DFU mode. Revision 3 of the board has the following new features:1.0 pinout: added SDA and SCL pins that are near to the AREF pin and two other new pins placed near to the RESET pin, the IOREF that allow the shields to adapt to the voltage provided fromtheboard. In future,shieldswill becompatiblebothwiththe board that use the AVR, which operate with 5V and with the Arduino Due that operate with 3.3V. The second one is a not connected pin, that is reserved for future purposes. Stronger RESET circuit. Atmega 16U2 replace the 8U2. "Uno" means one inItalianandisnamedtomarktheupcomingreleaseofArduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino,movingforward.TheUnoisthelatestinaseriesofUSB Arduinoboards,andthereferencemodelfortheArduinoplatform; foracomparisonwithpreviousversions,seetheindexof Aurdino Boards .

LIST OF COMPONENTS

1. MicrocontrollerATmega328
2. OperatingVoltage5V
3. InputVoltage(recommended)7-12V
4. InputVoltage(limits)6-20V
5. DigitalI/OPins14 (ofwhich 6providePWM output)
6. AnalogInputPins6
7. DCCurrentperI/OPin40 mA
8. DCCurrent for3.3VPin50mA
9. Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader
10. SRAM 2KB (ATmega328)
11. EEPROM1 KB (ATmega328)

The name "H-Bridge" is derived from the actual shape of the switching circuit which control the motion of the motor. It is also known as "Full Bridge". Basically there are four switching elements in the H-Bridge as shown in the figure below. [3]

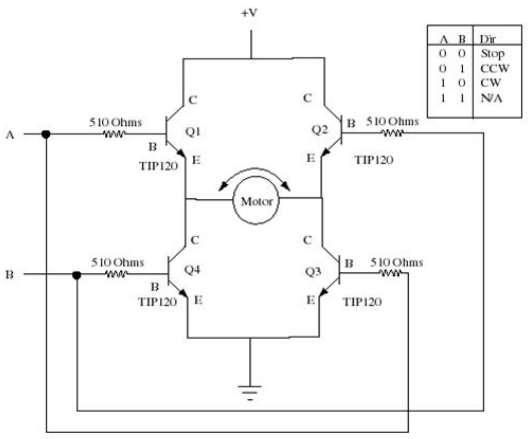

Fig.3: H-Bridge Circuit

As you can see in the figure above there are four switching elements named as "High side left", "High side right", "Low side right","Lowsideleft".Whentheseswitchesareturnedoninpairs motorchangesitsdirectionaccordingly.Like,ifweswitchonHigh sideleftandLowsiderightthenmotorrotateinforwarddirection, ascurrentflowsfromPowersupplythroughthemotorcoilgoesto ground via switch low side right. Similarly, when you switch on low side left and high side right, the current flows in opposite directionandmotorrotatesinbackwarddirection.Thisisthebasic working of H-Bridge. We can also make a small truth table according to the switching of H-Bridge explained above.

Off	On	On	Off	Motor runs anti-clockwise
On	On	Off	Off	Motor stops or decelerates
Off	Off	On	On	Motor stops or decelerates

As already said, H-bridge can be made with the help of trasistors aswellasMOSFETs,theonlythingisthepowerhandlingcapacity ofthecircuit.Ifmotorsareneededtorunwithhighcurrentthenlot ofdissipationisthere.Soheadsinksareneededtocoolthecircuit. Now you might be thinking why i did not discuss the cases like HighsideleftonandLowsideleftonorhighsiderightonandlow side right on. Clearly seen in the diagram, you don't want to burn your power supply by shorting them. So that is why those combinations are not discussed in the truth table.[6]

L293dMotorDriverIc:

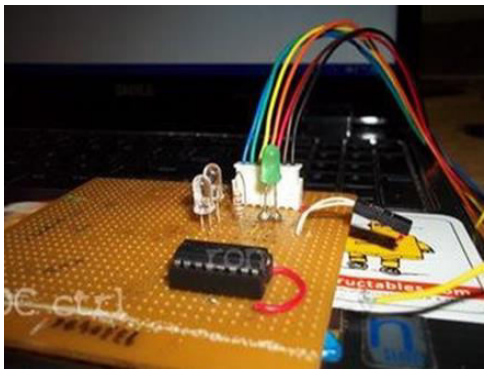

Fig4 : L293d Motor Driver Ic

replacementfunction.[9]Typicallythemodulecouldinterfacewith a host through the UART port. ThemodulecouldbeusedinmanydifferentapplicationsExample:

- Handheld terminals
- Industrial devices
- Point-of-Sale systems
- PCs

- PersonalDigitalAssistants(PDAs)
- ComputerAccessories
- AccessPoints
- AutomotiveDiagnosticsUnits

We supply module with 9600 baud rate in ready to use with PC. You will need a USB Bluetooth Adapter at PC side or Bluetooth EnabledLaptoptoconnecttoourBluetoothmodule.Module supplied by us with this setting: 9600 baud rate, Pair Code: 0000 TheBluetoothmoduleworkson3.3Vlevelonly.Highvoltagelike 5V will permanently damage the module, so please take care in using it. If your application requires to be operated at 5V then use a LM1117-3.3 regulator to convert the 5Vlevel to 3V3 level as required by module. Also protect the RXD pin against 5V TXD signalbyinserting1KresistorinseriestomoduleRXDpin.Ifyou wish to connect thismoduletoPC'sSerialportwhichisatRS232 level,thenyouneedtoaddMAX232circuitasshownabove.Status LEDflashesatdifferentratestoindicatedifferentstatuslike searching, config, connected. [5]

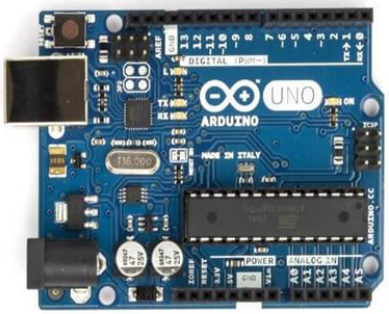

Fig5 :Circuit Panel Board

L293D isa typical Motordriveror Motor Driver ICwhich allows DCmotortodriveoneitherdirection.L293Disa16-pinICwhich cancontrolasetoftwoDCmotorssimultaneouslyinanydirection. It means that you can control twoDC motorwith a single L293D IC.DualH-bridgeMotorDriverintegratedcircuit(IC).Thel293d can drive small and quiet big motors as well, check the Voltage Specification at the end of this page for more info.You can Buy L293DICinanyelectronicshopveryeasilyanditcostsaround70 Rupees (INR) or around 1 $ Dollar (approx Cost) or even lesser cost. You can find the necessary pin diagram, working, a circuit diagram, Logic description and Project as you read through.[7]

BLUETOOTH:

This module enables you to wireless transmit & receive serialdata. Itisadropinreplacement forwiredserialconnections allowing transparent two way data communication. You can simply use it for serial port replacement to establish connection between MCU or embedded project and PC for data transfer. Bluetooth Core V2.0 compliant module with SPP. The module is designedtobeembeddedinahostsystemwhichrequirescable

SOLAR PANEL

Solar panels are basically solar cells which convert light energy fromsunintoelectricalenergy.Thisconvertedelectricalenergyis stored in battery and then it is available for user applications. The most commonly used material in[8] solar panel is silicon crystal. As we know, when light energy or photons from sun strikes these siliconcrystalstheelectricalenergy(DC)isgenerated.TheRatings of solar panel used is18 volts and 23

watts.

Fig.6: Solar Panel

BATTERY

Batteriesare a collection of one or more cells whose chemical reactions create a flow of electrons in a circuit. All batteries are made up of three basic components: an anode (the '-' side), a cathode(the'+'side),andsomekindofelectrolyte(asubstancethat chemically reacts with the anode and cathode). Whentheanodeandcathodeofabatteryisconnectedtoacircuit,a chemicalreactiontakesplacebetweentheanodeandtheelectrolyte. This reaction causes electrons to flow through the circuit and back intothecathodewhereanotherchemicalreactiontakesplace.When the material in the cathode or anode is consumed or no longer[10] able to be used in the reaction, the battery is unable to produce electricity. At thatpoint,yourbattery is "dead." Batteries thatmust bethrownawayafterusareknownas**primarybatteries**.Batteries that can be recharged are called **secondary batteries**.

Fig7:LithiumPolymerBattery ARDUINO – INSTALLATION :

Step1: ChoosetheArduinoboard.
Step2: DownloadArduinoIDE Software.
Step 3: Power up your board. **Step 4**: Launch Arduino IDE. **Step5:**Openyourfirstproject.
Oncethesoftwarestarts,youhavetwooptions: Create a new project.
Openanexistingproject example.
Tocreateanewproject,selectFile -->New
To openan existing project example, select File-> Example-> Basics -> Blink.
Step6: SelectyourArduinoboard.
Step7: Selectyourserialport.
Step8: Upload theprogramtoyour board.

Fig8: USB Connector

RESULTS

By using the mobile and blink Bluetooth terminal HC-05 app we can move the boat in various directions like forward ,backward , right and left. We also can operate the front motors which is connectedtothenetforgarbagecollectionandwehavetoconnect the conveyor belt to the front motors so it will collect the garbage from the water and this collected garbage will be sent to the container which is connected backside of the conveyor belt.

CONCLUSION

Thisprojectemphasizessupplyflexibilityinoperation.Thisis often easy to operate and the price of maintenance is low.

Hencethis project Remote Controlled Unmanned Floating River Cleaning Machine is usually designed to form a system considerably economical[15] and helpful to get rid of water impuritieslikeplastics,trashes,waterdebriswhichisfloatingon river and pond surface.This is mainly very useful maintaining humanhealthandforincreasingthelifetimeofaquaticanimals.

FUTURESCOPE

Nowdaybyday theworldisfacingthebiggestproblemoffloating garbage. And it's increasing in tremendous amounts so it's very difficult to wash all this floating garbage due to more requirement of manpower. so, in future this remote operated floating river cleaning machine has more scope to remove large capacity of garbage automatically as fast as possible. And by making modifications during this machine, this is used for automatically removing the garbage from beaches also.[12]

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