MUFFAKHAM JAH COLLEGE OF ENGINEERING AND TECHNOLOGY

BLUETOOTH CONTROLLED HUMANOID

TEAM POTHOLE FILLER – ROBOTICS CLUB

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Abstract

The humanoid bot is a robot which replicates the kind of works normal human beings do. The project is aimed at making such bots which will be simplifying the lives of human beings.

The idea behind this project is to minimize the work load on individuals.

Components Used

- ATMEGA 8A
- HC-05 Bluetooth Module
- L293D Motor Drivers
- PVC Pipe

Technical Approach

MAKING OF THE ROBOT:

CHASSIS:

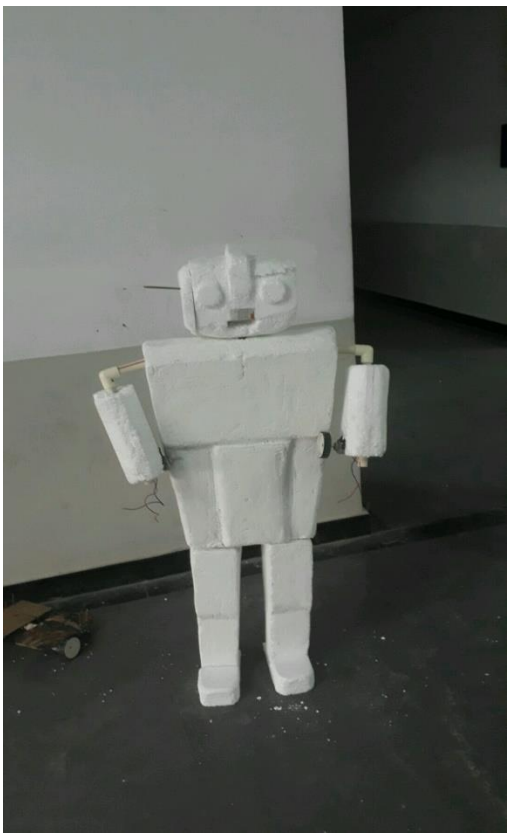
APPARATUS REQUIRED:

- Wood
- PVC Pipe
- Hacksaw
- Drilling Machine
- L Clamps

- Nuts and Bolts

PROCEDURE:

- Two wooden boards of equal dimensions are cut out from the wood using hacksaw.
- The two boards are joined together by fixing a PVC pipe which joins both the centers of the boards. Nuts and bolts are used to tighten the pipe to the boards so that they become stiff. Small amount of M-seal is also used to provide rigidity.
- Four L clamps are fixed to the combination of boards, each at one end. The DC motors are fixed to the L clamps.



BODY:

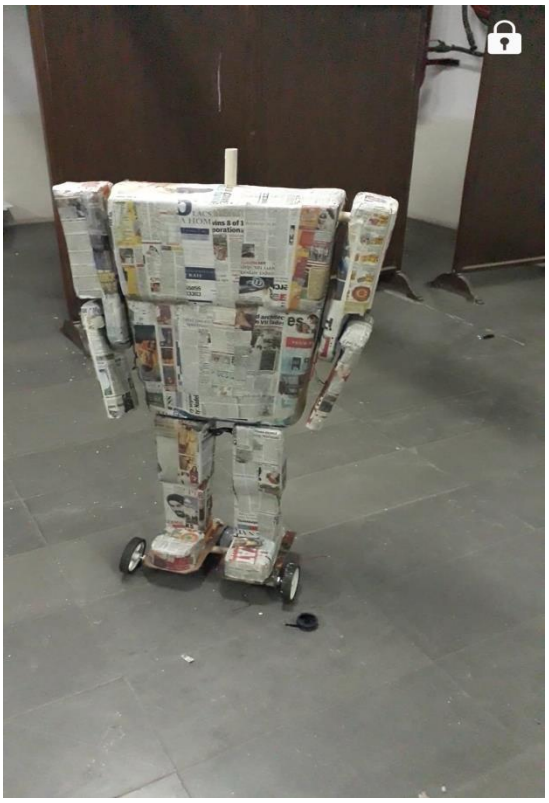
APPARATUS REQUIRED:

- Thermocol
- Fevicol
- Sand Paper
- PVC Pipes
- Putty
- Papers

PROCEDURE:

- Thermocols are cut in equal proportions and are glued one above another using fevicol to provide thickness.
- Initially the thermocols are glued around PVC pipes to provide weight and support. This is done for the whole body.
- Sand paper is used for precise shaping of the body.
- Putty mixture is applied on the body so as to create weight.
- Holes are made on specific parts of the body so as to join all the body parts.
- In these holes the PVC pipes are inserted and are fixed by using small amount of M-seal.
- The legs are glued to the chassis by using a mixture of fevicol and M-seal.

- For finishing purpose, papers are dipped in fevicol paste and are glued to the body.



CIRCUIT DESIGNING:

APPARATUS REQUIRED:

- ATMEGA 8A
- HC-05 Bluetooth Module
- L293D Motor Drivers
- Breadboard
- Connecting wires
- Nickel-Cadmium Battery

- Miscellaneous

PROCEDURE:

- The circuit is rigged up as shown in the circuit diagram on the breadboard.

CODING:

- The Bluetooth module and the motor drivers are interfaced with the microcontroller using CV AVR software.
- A program in C language is written in CV AVR using library functions and syntaxes.
- The program is burnt to the microcontroller using progisp software and a burner circuit which connects the microcontroller to the computer.

DESCRIPTION:

BODY:

The body of the bot is designed and structured in such a way as to provide a balance for the whole body in the state of motion as well as rest. The torso rests on two legs that are equally spaced to provide a well-balanced support. The shoulder part of the bot is connected to a point in the Torso at either side. This shoulder part then extends until the elbow joint. To the elbow joint, there are motors (60 RPM DC Motors) attached on either side to provide a clockwise as well as an anti-clockwise motion from the elbow onwards. The Hands are attached to the wrist side of the elbow on both sides for handling purpose.

CHASSIS:

Coming to the locomotion part of the bot, the legs are planted upon a chassis. The main purpose of using the chassis is to balance the body weight. The chassis consists of two equal wooden cutouts measured to hold and support the legs of the bot. These two cutouts are held together by a PVC pipe that is fixed by M-Seal. Four clamps are attached to the ends of these cutouts, for the motors (60RPM DC Motors) and wheels to be fixed in place. These 4 motors enable the motion of the bot in the desired direction.

WORKING:

The main source of power used for driving the bot is the Nickel-Cadmium batteries, which provide 12 volts. The bot is being operated on the basis of Bluetooth connectivity. The control of the movement of the bot as well as the hands is done by the Bluetooth control app from the smartphone that is paired to the HC-05 Bluetooth module in the circuit. This app sends characters via Bluetooth to the HC-05 module when the motion enabling gestures are used. The HC-05 then receives the characters from the smartphone that signifies the movement of the motors. The HC-05 is connected to the ATMEGA 8A Microcontroller, characters from the HC-05 are then sent to the microcontroller. The microcontroller decodes the character by the help of program burnt in it. The microcontroller which is also connected to two motor drivers (L293D) after decoding the characters gives the required outputs to the motor drivers which in turn gives the desired motion of the legs and hands.

PROGRAM SPECIFIC OUTCOMES:

PROGRAM OUTCOMES	PROGRAM SPECIFIC OUTCOMES
PSO2	We are equipped with microcontroller based system skills and can work as design and verification engineers in the area of Embedded systems.

RELAVANCE TO PROGRAM OUTCOMES:

PROGRAM OUTCOMES	RELAVANCE TO PROGRAM OUTCOMES
PO1	We have used the basic engineering knowledge to identify the components and the properties.
PO2	We could identify the technical problems faced throughout out project and found solutions through research and survey.
PO3	We designed our project system considering public health and environment.
PO4	We used research- based knowledge and research methods including design of experiments, analysis and interpretation of data.
PO5	We used new techniques, programming software's and IT tools.
PO6	Developed sense of responsibility towards professional engineering practice.
PO7	Understood the impact of professional engineering solutions in societal and environmental contexts and demonstrated the knowledge of, need for sustainable development.
PO8	Imbibed ethical principles and commitment to professional ethics and responsibilities.
PO9	Realized the importance of team work and learnt how to function effectively as an individual and as a team

	member.
PO10	Developed skills to communicate effectively with the engineering community and with society at a large scale, being able to comprehend and write effective reports and design documentation, make effective presentation and give clear instructions.
PO11	Expanded knowledge towards management and finance.
PO12	Recognized the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Conclusion

HOUSEHOLD CHORES: The bot can perform basic tasks like fetching a glass of water, or getting something from one part of the house to the other.

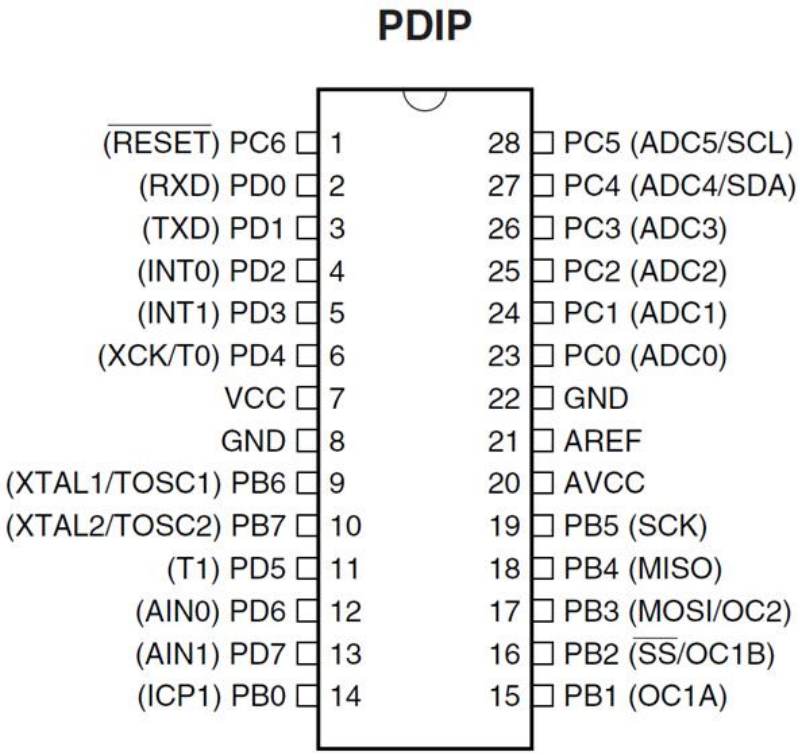
AID FOR THE ELDERLY: The bot can lend a helping hand to the elderly and weak, many of whom are dependent on other people to help them for basic needs.

References

Note : 3-5 references to be added- complete link(if it is a website), details of publication with date of publishing (if it is a magazine), textbook with author, edition and publisher name.

Appendix A:

Pin description and pin configuration of Atmega 8A



1. VCC Digital supply voltage.

2. GND Ground.

3. Port B (PB7:PB0) – XTAL1/XTAL2/TOSC1/TOSC2 Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for

each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port B pins that are externally pulled low will source current if the pull-up resistors are activated. The Port B pins are tri-stated when a reset condition becomes active, even if the clock is not running

4. Port C (PC5:PC0) Port C is an 7-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port C output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port C pins that are externally pulled low will source current if the pull-up resistors are activated. The Port C pins are tri-stated when a reset condition becomes active, even if the clock is not running.

5. PC6/RESET If the RSTDISBL Fuse is programmed, PC6 is used as an I/O pin. Note that the electrical characteristics of PC6 differ from those of the other pins of Port C. If the RSTDISBL Fuse is unprogrammed, PC6 is used as a Reset input. A low level on this pin for longer than the minimum pulse length will generate a Reset, even if the clock is not running. The minimum pulse length is given in Table 30-5. Shorter pulses are not guaranteed to generate a Reset. The various special features of Port C are elaborated in Alternate Functions of Port C.

6. Port D (PD7:PD0) Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port D pins that are externally pulled low will source current if the pull-up resistors are activated. The Port D pins are tri-stated when a reset condition becomes active, even if the clock is not running. Port D also serves the functions of various special features of the ATmega8A as listed in Alternate Functions of Port D.

7. RESET input. A low level on this pin for longer than the minimum pulse length will generate a reset, even if the clock is not running. The minimum pulse length is given in Table 30-5. Shorter pulses are not guaranteed to generate a reset.

8. AVCC is the supply voltage pin for the A/D Converter, Port C (3:0), and ADC (7:6). It should be externally connected to VCC, even if the ADC is not used. If the ADC is used, it should be connected to VCC through a low-pass filter. Note that Port C (5:4) use digital supply voltage, VCC.

9. AREF is the analog reference pin for the A/D Converter.

10. ADC7:6 (TQFP and QFN/MLF Package Only) In the TQFP and QFN/MLF package, ADC7:6 serve as analog inputs to the A/D converter. These pins are powered from the analog supply and serve as 10-bit ADC channels.

Appendix B:

Program Code *(Assembly / C file)*

Note : Appicable if Microcontroller is used

Appendix C:

Financial Report

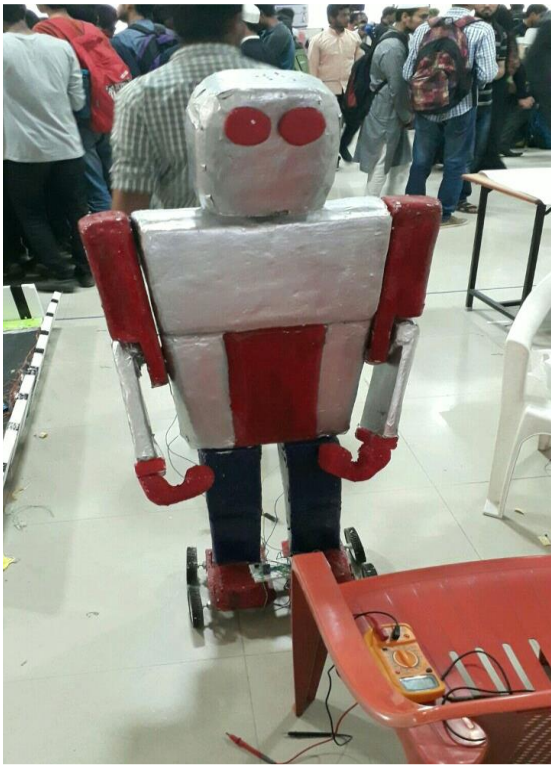
EXPENSES:

COMPONENTS	QUANTITY	COST/PEICE	TOTAL COST
ATMega 8A	2	50	100
Bluetooth HC-05 Module	2	300	600
Motor Drivers L293D	2	150	300
DC MOTORS	6	120	720
Wooden Chassis	2	50	100
PVC pipes	4	50	200
Wheels	6	100	600
Miscellaneous			1000

GRAND TOTAL: 3620/-

Appendix D:

Final product:



Acknowledgement: