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ARTIFICIAL INTELLIGENCE SYSTEM FOR REMOTELY CONTROLLED WHEELED VEHICLE SYSTEM FOR DISABLED PERSON

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ABSTRACT :

The aim of this project is to AI controlling a wheelchair-mounted robotic arm by using microcontroller. This project makes use of a micro controller, which is programmed, with the help of embedded C instructions[3]. This microcontroller is capable of communicating with transmitter and receiver modules of RF module. The sensor detects the path and provides the information to the microcontroller (on board computer) and the controller judges whether the instruction is right movement or left movement instruction and controls the direction respectively. The controller is interfaced with two dc motors to control the direction of the wheel chair and servo motors for arm movements.

Keywords - AI **,** wireless control of powered wheelchairs , wheelchair-mounted robotic arm , ATMEGA16, BLDC motors

1. Introduction :

A wheelchair-mounted robotic arm is designed and built to meet the needs of mobility-impaired persons, and to exceed the capabilities of current devices of this type using AI logic. The mechanical design incorporates DC drive. This project describes the design goals and user requirements for this device; explains the component selection process; discusses details of the mechanical design, electrical system and low-level controller; covers manufacturing concerns; and describes the testing.

BLDC (Brushless DC Motors) for wheeled chair and **servo motor** for arm are controlled by Microcontroller. Microcontroller works on AI logic.

2. Problem Statement :

To make low cost AI system for wheeled chair vehicle with robotic arm to understand path and control it. Our intention is to study and develop AI logic for controlling of Wheel Chair.

3. Methodology :

i. A study of several regulation and guideline concerning the design of a vehicle
ii. A study of path control and assistance to disable person by communicating with main server using AI logic[1].
iii. Design improvement and modification & Testing
iv. Production of final Engineering Drawing & Fabrication

4.Objectives of project.

i. To devlop AI controlled wheelchairs to meet the strength, durability and safety requirements of user(s) in their own environment(s)[2].
ii. To study recommendations that each country develop its own wheelchair standards to ensure a reasonable quality, for instance by using the ISO 7176 series of standards as a basis.

5. Strategy:

i. To design system having DC geared motors . For arm movement servo motors are to be programmed.(Fig.2)
ii. Tests: Maximum speed, Climbing ability, Descending ability, Breaking performance**,** Static stability , Obstacle climbing **,**Turning performance , Traveling performance**,** Fatigue strength
iii. Ergonomics :Basic body dimensions , Seating and support aspects,Reach out distances, Clearances and gaps,Safety during use, The Sensory and cognitive factors,Assistive features for patients
iv. Line Following system (Fig. 1 **Block Diagram)**
v. System algorithum and testing on turbo C++ platform.(Fig. 2,3,4,5,6)

Fig. 3 Nine Stations

Figurs and Flow charts :

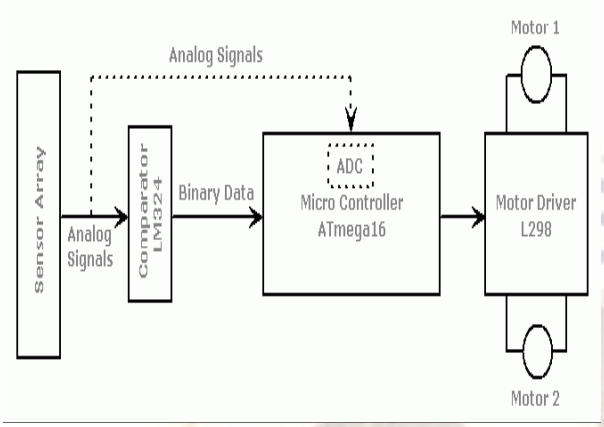


Fig. 1 :Line Following system (**Block Diagram)**

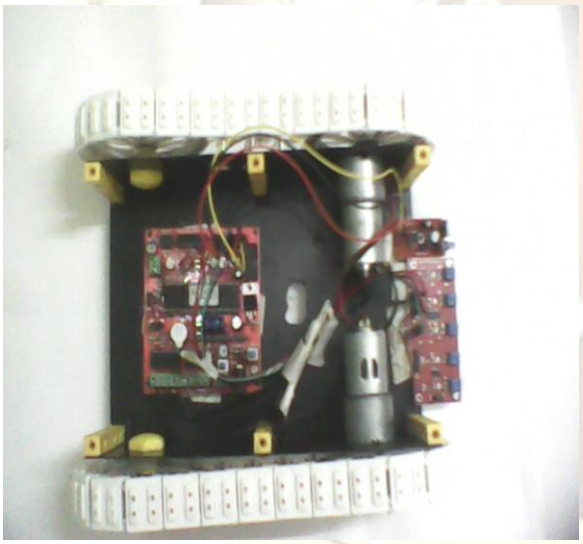
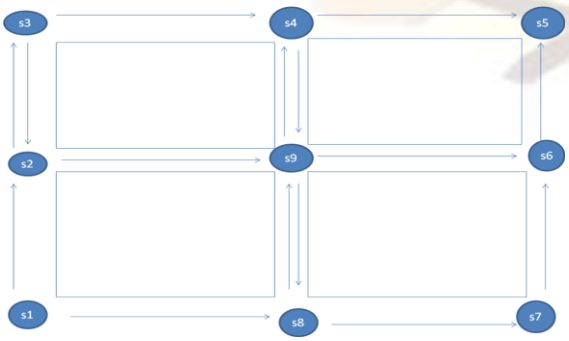


Fig. 2 : Scale model



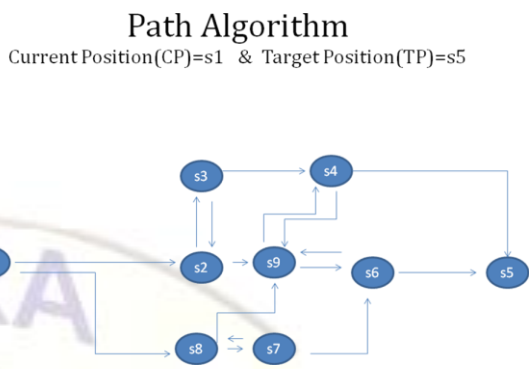


Fig. 4: Posible path to reach station 1 to 5

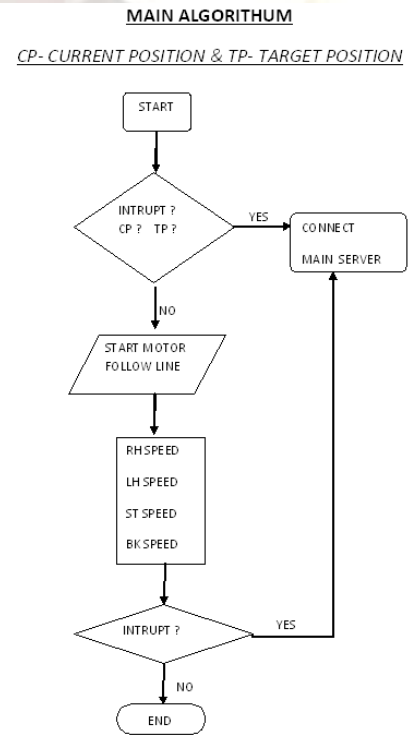


Fig.5: Main Algorithum

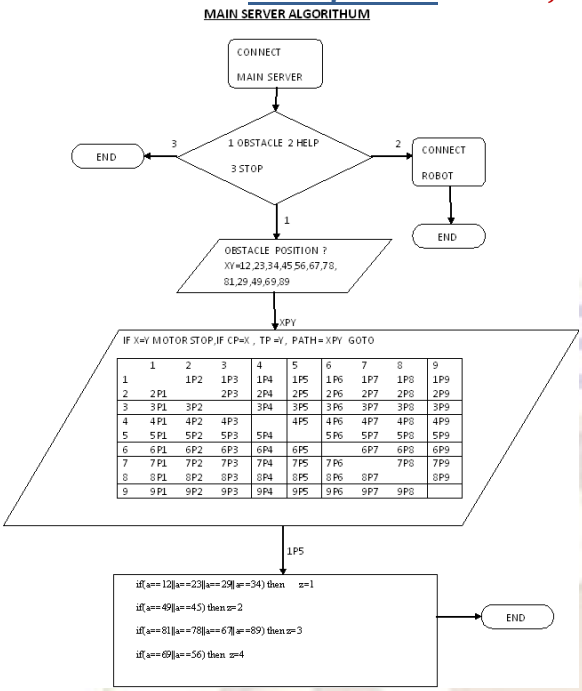


Fig.6: Main Server algorithum

To practice algorithms; here I have used Turbo C++ as platform, which is then we have to convert it in to embedded C . In this we have taken Nine stations. Out of Nine stations ; we have shown one example i.e. current position is First and target position is Fifth. .Now if any obstacles are in their path then machine will connect to main server and communicate with server. Server will give instructions to machine then machine will take decision about path.

```
#include<iostream.h>

    int cp,tp,a,b,c,d,x,y,z,p;

    void main()

    {

    cout<<"ENTER CURRENT POSITON; TARGET POSITION AND OBSTACLE POSITION"<<endl;

    cout<<"GIVE OBSTACLE POSITION IN SEQUENCE 12,23,34,45,56,67,78,81,29,49,69,89 ="<<endl;

    cin>>cp>>tp>>a>>b;

    cout<<"CURRENT POSITION="<<cp<<" and "<<" TARGET POSITION="<<tp<<" FIRST OBSTACLE"<<a<<" SECOND OBSTACLE"<<b<<endl;

     if(a==12||a==23||a==29||a==34)

     z=1;

     else

     if(a==49||a==45)

     z=2;

     if(a==81||a==78||a==67||a==89)

     z=3;

     else

     if(a==69||a==56)

     z=4;

    switch(z)

    {

    case (1):

    {

    if(b==78||b==67||b==69||b==56)

    cout<<"PATH IS 81,89,49,45"<<endl;

    else

    if(b==78||b==67||b==49||b==45)

    cout<<"PATH IS 81,89,69,56"<<endl;

    else

    cout<<"PATH IS 81,78,67,56"<<endl;

    break;

    }

    case 2:

    {

    if(b==78||b==67)

    cout<<"PATH IS 81,89,69,56"<<endl;

    else
```

```
cout<<"PATH IS 81,78,67,56"<<endl;

break;

}

 case (3):

{

if(b==23||b==34||b==45||b==49)

cout<<"PATH IS 12,29,69,56"<<endl;

else

if(b==23||b==34||b==69||b==56)

cout<<"PATH IS 12,29,49,45"<<endl;

else

cout<<"PATH IS 12,23,34,45"<<endl;

break;

}

case 4:

{

if(b==23||b==34)

cout<<"PATH IS 12,29,49,45"<<endl;

else

cout<<"PATH IS 12,23,34,45"<<endl;

break;

}

default:

{
cout<<"OBSTACLE LOCATIONS ARE NOT PROPER"<<endl;

break;

}

}
```

Conclusion :

We feel that this design will surpass previous attempts at building wheelchair mounted robotic arms that are truly useful and convenient. Subsequent testing, and ultimately the market, will determine project value . This project considers the development of a wireless control of powered wheelchairs, which would be of great help to the physically disabled people.

4. Scope of the Project :

Use of AI system will change the life style of disable person. Algorithms shown can implement for future modern mechanical machine which will work not only intelligently but also fix life standard of disable person.

7. Requirement Analysis :

Hardware requirements :

i. ATMEL AT Mega 16 microcontroller with 16 kB flash memory working at 16 Mips
ii. 2 on board dual full H bridge motor driver (L293D) for 4 DC motors.
iii. On board regulated power supply, RF module.
iv. On board LCD connector ,Line following Sensors and Obstacle sensor..

Software requirements :

i. win RAR
ii. Proteus 7.7 SP2 portable
iii. Dev C++
iv. Turbo C++

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