DESIGN IMPACT MOVEMENT PRODUCT SHOWCASE WORKBOOK

VISION MOBILITY

A Social Initiative
by Titan Company Ltd.

EYE DIRECTIVE WHEEL CHAIR:

An eye-controlled wheelchair designed for individuals with limited mobility, using advanced eye-tracking technology for intuitive navigation.

KEY FEATURE
- Utilizes specialized cameras or sensors to track eye movement, allowing users to navigate the wheelchair by looking at specific points on a screen.
- Models are designed to be portable or compatible with various wheelchair types for easier integration.
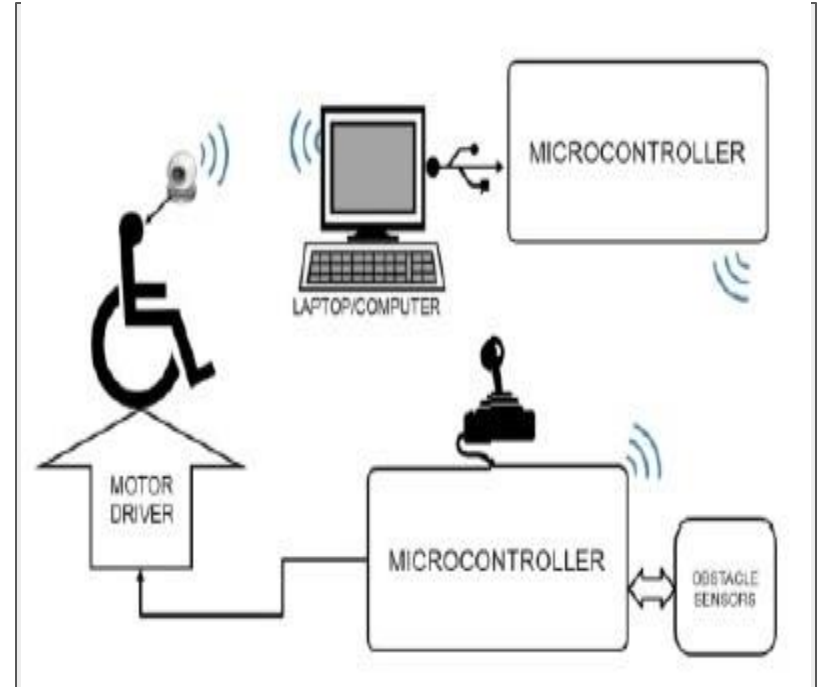
EMPATHY:

Disabled person with amyotrophic lateral sclerosis (als).

DESIGN:

DESIGN AND SPECIFICATIONS:

In Image Capturing Module, images are captured using wireless camera and are sent to the base station (computer/ laptop) for further processing. In Microprocessor Interfacing, the generated electric digital output from the base station is used to direct the motors of the wheelchair. Microprocessor also takes care of the obstacles and the user inputs.

IMAGE CAPTURING DEVICE:

The images are captures using a Pin-hole wireless camera. It offers effective surveillance protection. It has an operative range of 150 feet, providing full motion, real-time, color video with no delay.

MICROCONTROLLER;

The system uses two microcontrollers. The Transmitting Microcontroller is connected to the processing unit. This microcontroller converts the information received from the processing unit into signals and transmits them wirelessly over to the receiving microcontroller attached to the wheelchair. The Receiving Microcontroller receives signals from the transmitting microcontroller wirelessly and accordingly initiates the movement in the required direction. This microcontroller is mounted on the wheelchair and is connected to the motor driver. It is also connected to the object sensors, joystick control and the emergency stop button. This microcontroller can start the motion, change the direction and even stop the system on receiving commands from the above mentioned attachments.

WORKING:

The series of images taken by the camera is transmitted to the base station (computer/ laptop). The images are processed using Open Source Computer Vision Library (OpenCV), where they are converted into .xml file. OpenCV processing yields the length and width of the detected object(pupil). The length and width of each quadrant is prescribed in the OpenCV algorithm. The position helps to calibrate the quadrant in which the pupil lies, which helps us to find the direction in which the eye is pointing. The processing basically divides the image in three quadrants (left, right and center). If position of the pupil lies in the right quadrant then the wheelchair moves left. If it lies in the left quadrant, wheelchair moves right. If the object lies in the center the wheelchair moves straight.

Modes of Operation:

Mode I:Eye directed mode:

The transmitting arduino then transmits the information wirelessly to the receiving arduino which is mounted on the wheelchair. The receiving arduino on the wheelchair is connected to the motor driver. The system has been enabled with four ultrasonic sensors which will help avoid collision in the left, right and forward direction respectively. The fourth sensor has been provided for ground clearance.

Mode II:Joystick mode:

Joystick mechanism has also been provided as an additional feature to ensure movement in case of tired vision. A stop button is provided on the wheelchair which will cease the working at the very instance it is pressed

TECHNOLOGY STACK	DEPENDENCY
8-bit Atmel AVR microcontroller **AI MACHINE LEARNING** **Wireless Communication:**Implement a wireless communication module (Bluetooth, Wi-Fi, etc.) to transmit the control signals from the processing unit to the wheelchair's motor control system**.** **Motor Control System:**Integrate a motor control system to drive and control the wheelchair's movement based on the received commands. **Power Supply**:Include a reliable power supply system to ensure continuous operation of the wheelchair**.**	**FLAT SURFACE** **RECHARGEABLE BATTERY-(3hrs charging time 6hrs useage)**