Human Machine Interface for Disabled Person

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Abstract- **Smart Wheelchair is known as a Power Wheelchair that is integrated into multiple sensors, assistive technology, and computers that give the user with a disability such as impairment, handicaps, and permanent injury, the required mobility to move freely and safely. These types of wheelchairs are gradually replacing the traditional wheelchairs; however, their expensive costs are preventing a large size of disabled people from having one. According to the of World Health Organization (WHO), only 5 to 15 out of 70 million disabled people have access to wheelchairs. Therefore, we need to offer a cost-effective Smart that not only minimized the cost but also provides plenty of features that use the latest components and technologies. In the last years, there have been many pleasant efforts that serve this purpose. They have adopted various technologies such as artificial intelligence, where they have designed an autonomous wheelchair that used machine learning concepts to navigate, and some also used Internet of Thing technology to control the wheelchair-using voice recognition system. With maturity, weak bones and weakness these issues may lead to extend risk of falling. For this purpose, we've projected associate degree IoT based mostly good chair which can work as Fall Detection System. This technique uses sensors like Wi-Fi module and a microcontroller that sends the overall info concerning fall. The microcontroller receives all the knowledge from the sensors and constantly transmits and monitors the acceleration and additionally the orientation of the person. Any quick movement or modification among the system which can result from a fall is taken into consideration as a 'fall' and can be reportable. A significant concern would be that not all quick movement might find you from a fall and can be thought as a matter of concern. To avoid this Human Machine Interface Wheel Chair for Disabled Person warning we've provided to snooze the system. This button is pressed before a particular time of 15-30 seconds to stop the system from deed the alert, therefore avoiding any confusion and panic. Inaudible sensors area unit won't to discover obstacles. The example is meant in such how that it is often used severally and expeditiously with less effort. It saves time, reduces price and energy of the users. This technique is mounted to the person's chair.**

Keywords: Wheelchair, Python, IoT Authentication

Introduction
Today in market there are many wheelchairs available in the market but they are not embedded with smart systems if they are available then the cost is ranging from Rs. 3 lacs to 4 lacs.

We are hereby proposing a new advanced smart wheelchair for the physically disabled persons.

We proposed system like automatic obstacle detection, person health monitoring, Wheel chair control using application, live location tracking.

Literature Survey
Design of a Low-cost DIY Moving Wheel Chair using ATmega1284P based on Retina Movement for the Persons Disabled with Quadriplegia

This paper basically provides a real time model of a low-cost wheel chair based on the guiding movement of the retina, for the persons disabled with quadriplegia. This model is expected to benefit the poor paralyzed people as it provides a simplified low-cost model of the wheel chair. The model is realized through MATLAB in serial communication with the special purpose microcontroller IC manufactured by Atmel Corporation, namely as ATmega1284P-IC. The eye movement is detected by a camera, which in reality is captured by a signal called electrooculographic (EOG) signal. The EOG signals are processed so that they can guide the serially interfaced microcontroller, which in turn, controls the wheel chair movements. The serial communication between MATLAB script and the microcontroller is carried out through RS-232 port. An LCD may be placed on the board to display the actions made in accordance with the retina movement.

In-wheel Brushless DC Motor for a Wheel Chair Drive Human Machine Interface Wheel Chair for Disabled Person
A gear-less drive for a wheel chair based on brushless DC motor is presented. The motor has external rotor equipped with neodymium-based permanent magnets and the inner stator is attached to the wheel axle. The performance of the motor is determined using three-dimensional FEM modeling. They are validated by the experimental measurements carried out on the motor prototype.

Wireless Head Gesture-controlled Wheel chair for Disable Persons
This paper describes an indigenously developed hands-free wheel chair for physically disabled persons. The proposed device works based on the Head Gesture Recognition technique using Acceleration sensor. Conventional electric powered wheel chairs are usually controlled by joysticks or hand gesture technology which cannot fulfil the needs of an almost completely disabled person who has restricted limb movements and can hardly move or turn his head only. Acceleration sensor is used for the head gesture recognition and RF (radio frequency) module is used for the smart wireless controlling. With the change of head gesture, data is sent wirelessly to the microcontroller-based motor driving circuit to control the movement of the Wheel Chair in five different modes, namely FRONT, BACK, RIGHT, LEFT and a special locking system to STAND still at some place. The proposed device is fabricated using components collected from local market and tested in lab for successful functioning, test results are included in this paper.

Steering Control in Multi-degrees-of-freedom Two-wheeled Wheel chair on Slope Environment
As the development of electrical transportation systems, two-wheeled mobile robots have been widely studied because of the high mobility. Among them, the two wheeled wheel chair is the wheel chair without caster wheels, and moves and stabilizes with only two wheels. However, wheel chairs cannot move lateral direction in general, and they sometimes fall down and cause into serious accidents. In this paper, lateral directional mode and its control method are proposed to solve this problem, and the validity of proposal is checked through simulations. The results are evaluated by the movement distance and the change of body's pitch angle.

Aim and Objectives
- Today, in market, there are many wheelchairs available, but they are not embedded with smart systems. If they are available, then the cost is ranging from Rs. 3 lacs to 4 lacs.
- We are hereby proposing a new advanced smart wheelchair for the physically disabled persons.
- We proposed system like automatic obstacle detection, person health monitoring, wheelchair control using application, live location tracking.
- To design a system which is user friendly in recent years.
- Salable.
- Reliable.

Motivation
Now a days, many countries are focusing on smart technology. Our Prime minister of India has also started Smart India and Digital India mission for competing with the other countries of the world. In present time, difficulties are not faced by abled person but are being faced by physically disabled and old aged person.

System Architecture

Figure 1: System Architecture Diagram
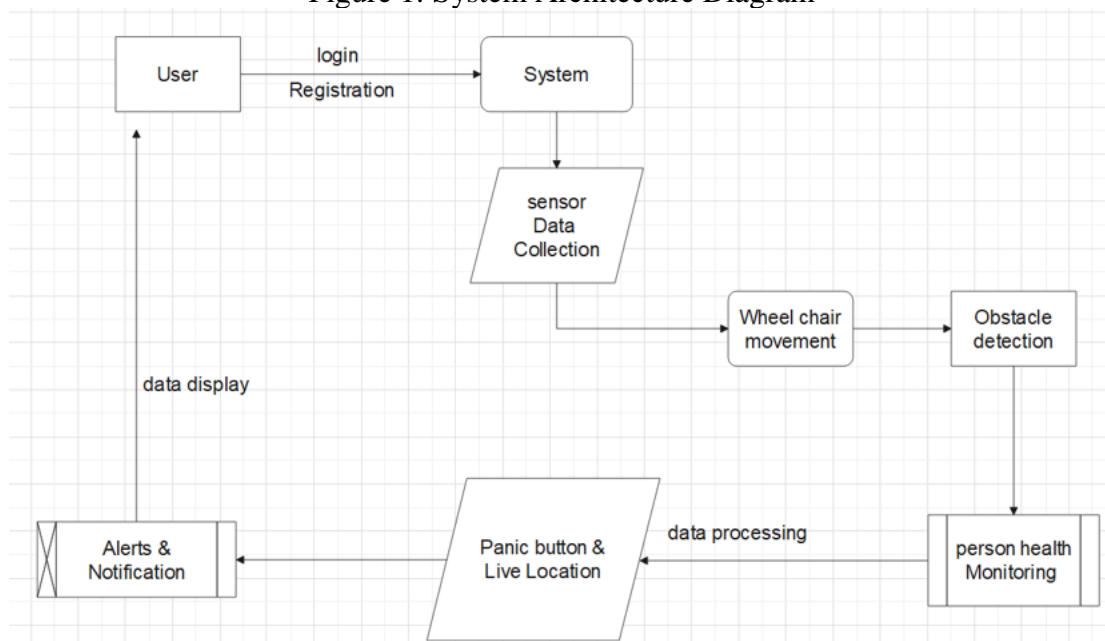
Application
- Hospital
- Health care center

Functional and Non-functional Requirements
Functional requirements may involve calculations, technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements describe all the cases where the system uses the functional requirements; these are captured in use cases.

Nonfunctional requirements (NFRs) define system attributes such as security, reliability, performance, maintainability, scalability, and usability. They serve as constraints or restrictions on the design of the system across the different backlogs.

Functional Requirements
- Registration
- User Login
- Creation of database: Users' mandatory information

Design Constraints
1. Database
2. Operating System
3. Application

Non-functional Requirements
Security
1. User Identification
2. Login ID
3. Modification

Performance Requirement
1. Response Time

2. Capacity
3. User Interface
4. Maintainability
5. Availability

System Requirements
Hardware Requirements
1.   Processor: Intel Core i3
2.   RAM: 4 GB
3.   HDD: 500 GB
4.   Limit switch
5.   Node MCU
6.   Temperature sensor
7.   Heart Rate • Pulse Rate • SpO2
8.   Motors • Motors Drivers
9.   MySQL Database is an open-source relational database management system (RDBMS). It uses a standard form of the well-known SQL data language and works quickly and works will even with huge dataset.
10.   Language: Python is a popular programming language. It was created by Guido van Rossum, and released in 1991. It is used for: (a) web development (server-side). (b) software development.

Conclusion

The design and implementation of a sensible chair for disabled individual's victimization Arduino and Bluetooth module for dominant the motion of a chair designed the look not solely cut back the manufacture value compared with gift market however conjointly can provide nice competitive with alternative sorts of electric chair. This project has several blessings like safety, comfort, energy saving, full automation etc. The technology is increased safely for users World Health Organization use chair, by preventing collision with walls, fastened objects, furnishings and people with the assistance of object device, so all the drawbacks of the assorted sorts of chair area unit overcome by this "smart wheelchair

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