An Ameliorated Methodology to Develop a Smart Automative System for Physically Challenged person using IoT

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Abstract: *Independent mobility is a key component in maintaining physical and psychological health of individual .Ubiquitous devices are becoming a part of people's day-to-day life. Ubiquitous devices are becoming a part of people's day-to-day life. Smart devices not only aid to peoples life but also are becoming a crucial part of physically challenged and aged people. Death ratio of handicap people raises rapidly the need for safe and independent mobility for the elderly and physical challenged people is of prime concern. The key issue of handicap people is, they cannot have instance help when they are in any trouble. In market there are many types of wheelchairs available but, they are only useful for move or travel one place to another (like joystick wheelchair, automatic or semi-automatic wheelchair). In our project we provide the primary need to the handicap people. The Key feature of system is to get Instant help to the disable person. Using the Accelerometer sensor we detect the fall of person. We also provide the help button to the wheelchair which is helpful to get instant help to the user or Buzzer is provided to notify nearest people. Android application is use for the all types of notification. Using the GPS the live location of wheelchair is track. The location is display on android application. The main purpose of system to get instant helps to the handicap people and reduces the death ratio of this people.*

Keywords: *Smart Wheelchair, Accelerometer, GPS, Smart Phone, Real time, Buzzer.*

1. INTRODUCTION

With increases in the number of elderly and disabled people, there is growing demand for support devices and care equipment to improve their quality of life. There are thousands of people in India, who are facing disability in movement. They face discrimination on regular basis which takes many forms. These people are considered more as a liability than an asset to the society. Since they encounter discrimination, they tend to alienate themselves from the society as they feel unwanted and rejected. The wheelchair is providing with accident and fall detection system and it also provide an instant help to the handicap people when it needs. Our system is real time system which contains the live tracking of Smart Wheelchair. Smart wheelchair has gained a lot of interests in the recent times. The machines can also be used in old age homes where the old age persons have difficulty in their movements. The devices serve as a boon for those who have lost their mobility.

Different types of smart wheelchair have been developed in the past but the new generations of wheelchairs are being developed and used which features the use of smart devices and hence leaves a little to tinker about to the user who uses the wheel chair. The project also aims to build a similar wheel chair which would have a sort of intelligence and hence helps the user on his/her movement.

Based on our experience, method used and some issues related to the application of the behavior based approach to realize an intelligent wheelchair and possibly other assistive technologies are discussed.

A wheelchair is a chair with wheels used when walking is difficult or impossible due to illness, injury or disability. Wheelchairs come in wide variety of formats to meet the specific needs of their users. They may include specialized seating adaption, individualized controls and may be specific to particular activities, as seen with sports wheelchairs and beach wheelchairs. The most widely recognized distinction is between powered wheelchairs, where propulsion is provided by batteries and electric motors and manually propelled wheelchairs, where the propulsive force is provided.

2. PROBLEM STATEMENT

With increase in the number of elderly and disabled people, there of life is growing demand for support devices and care equipment to improve their quality of life.

3. LITERATURE SURVEY

In [1], In this research, the development and testing of an intelligent wheelchair controller are presented. The system has been designed to help disabled and quadriplegic patients who have lost the ability to control their upper and lower limbs to use an electrical wheelchair without using joystick controller. The controller includes two sub- controllers operating in

parallel which are voice and head tilts controllers. The system design is based on using two different voice recognition modules and two sophisticated orientation detection modules as input sensors, a powerful microcontroller for data processing and decision making, and a traditional electrical wheelchair as an output unit.

In [2] Mobility-assistive device such as powered wheelchair is very useful for disabled people, to gain some physical independence. The three main functions of the proposed system are, wheelchair navigation using multiple input obstacle detection using IR sensors, home automation for disable person. Wheelchair can be navigated through i)voice command or ii) moving head or hand in four fixed position which is captured using accelerometer sensor built in android phone. Using 4 IR sensors we can avoid the risk of collision and injury and can maintain some safer distance from the objects. Disable person cannot stand up and switch on-off the light or fan every time. So to give them more relaxation this system offers home automation by giving voice command to the android phone or by manually swipe the button on the screen. The system can be available at very low cost so that more number of disable persons can get benefits.

In [3], A Survey of Disabled Persons by NSSO (2011) reported that Disability is an important public health problem in India. The wheelchair is topmost used assistive devices for enhancing the personal mobility of disabled people. Power wheelchairs are useful for those unable to propel a manual wheelchair. The disabled people with visual acuity, lack of motor skills and strength find difficult to use a power wheelchair. To solve this problem, several researchers have used mobile robots technologies to create smart wheelchairs. A smart wheelchair typically contains a standard power wheelchair, a computer and a collection of sensors. The recent development in research areas such as computer science, robotics, Artificial Intelligence and sensor technology broaden the range of features in smart wheelchairs. This paper presents designs of different prototypes of smart wheelchairs proposed by researchers. Future research challenges in this field are recognized. Also, Directions for upcoming research are discussed.

4. PROPOSED SYSTEM

The main aim of this project or application is to facilitate and increase the ability of disable people who cannot function or move well. Using this wheel chair will allow handicapped people to move freely and independently without depending on others for their movement as a daily routine. This can be realized and optimized with use the smart phone device as an intermediary or interface. In this project GUI has been designed for interaction with the disable person. This project uses arduino kit Microcontroller circuit and DC motors to create the movement of wheel chair and IR Sensors to detect the obstacles in between wheelchair and the way of direction. This project will provide disability weight innovative solutions to handle the wheel chairs to use android applications. This project describes a wheelchair which can be controlled only by using the android application The main focus of this project is to simplify the movement of the disabled people and old or young people who cannot move properly so with this we can facility them to lead them live freely without any problem.

5. METHODOLOGIES

5.1 IoT Cloud Platform

IOT cloud platforms are specialized cloud-based private or public infrastructure, which is itself is an expensive topic. The IOT cloud platforms are carefully designed for use by edge devices. The IOT platforms usually provide the following fundamental services:

- Web-based administrative console for managing the connection details of devices .Device specific connection points are also known as channels.
- Cloud-based backend database for storing the incoming device data.
- Cloud-based analytic services to operate upon the incoming data and transform the data in the more meaningful desirable forms.
- The data is updated on the server and if any abnormality is found then it will notify to the concern person.
- The user objective is to have the system in a regular wheelchair and alert caretakers in case of abnormality.

5.2 Support Vector Machine

Support Vector Machine are a set of supervised learning methods which learn from the dataset and used for classification. SVM is a classifier derived from statistical learning. An SVM is a kind of large-margin classifier it is vector space based machine learning method where the goal is to find a decision boundary between two classes that is maximally far from any point in the training data. An SVM algorithm builds a model that predicts whether a new ex. falls into one class or the other.

6. MODEL

Let 'S' be the system of wheel chair Where

S= {I, O, P}

Where,

I = Set of input (information of user and location, alert)

O = Set of output (detect accident and inform to nearest police station, user and relatives) P = Set of technical processes

Let 'S' is the system

S = {…… Identify the input data S1, S2, …. , Sn

I = {(current location, alert, accelerometer data)}

Identify the output applications as O

O = {detect accident and inform to nearest user and relatives} Identify the Process as P

Knn for inform to nearest person and relative NOTIFICATION other user in same area.

K-nearest neighbors KNN algorithm:

1. Determine parameter K = number of nearest neighbors.
2. Calculate the distance between the query-instance and all the training samples.
3. Sort the distance and determine nearest neighbors based on the K-th minimum distance
4. Gather the category y of the nearest neighbors.
5. Use simple majority of the category of nearest neighbors as the prediction value of the query instance.

7. SYSTEM ARCHITECTURE

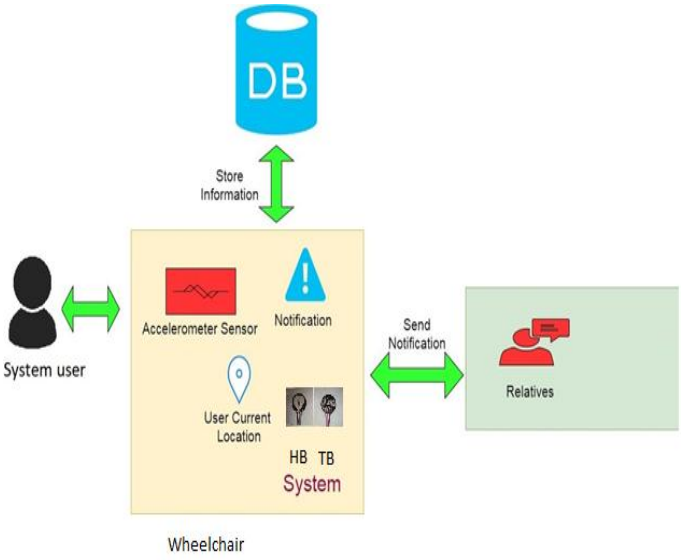

Fig.1: Architecture Diagram

8. RESULT

It is an overall implementation of hardware system. The main components are: Smart Wheelchair, Accelerometer, GPS, Smart Phone, Real time, Buzzer etc. there are particular devices used for interfacing every device with each other perfectly. So that the wheels of the chair move as per the user's requirement

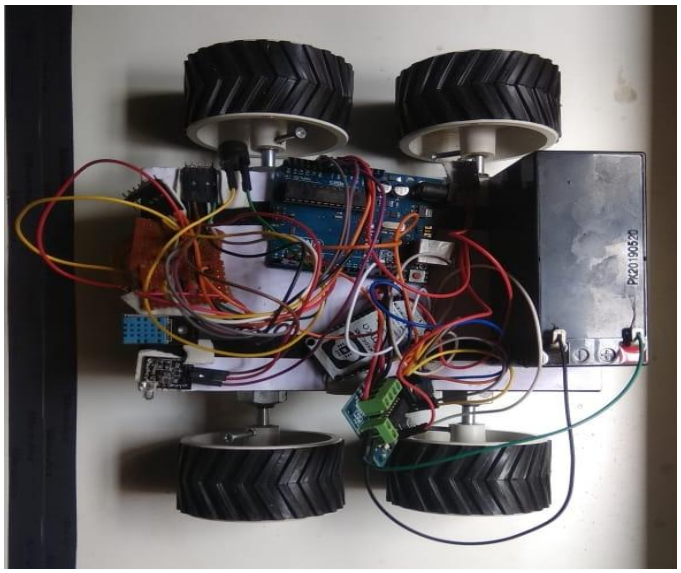

Fig.2: Android based Wheelchair

9. CONCLUSIONS

This paper presented a new intelligent wheelchair (IW) navigation system to help disabled or elderly people travel more safely. New engineering developments offer opportunities to develop smart wheelchair assertive technology that can improve the lives of many people who use wheelchairs. In our work, we are designing

tomorrow's intelligent wheelchairs: we are developing a intelligent wheelchair that is aware of its surroundings so that it can assist its user in a variety of tasks. The goal of this smart wheelchair project is to enhance an ordinary powered wheelchair using sensors to perceive the wheelchair's surroundings.

10. FUTURE SCOPE

Advancement in this wheelchair are possible: -.

1. If the person wants to move somewhere, all they have to do is look in the direction. The user interface trace out the path you want to drive, you would simply wink twice with your left or right eyes and the wheel chair start driving, to stop wink again.

2. Introducing home automation in the system would be an added features of the wheelchair where a disabled person can turn on/off home appliances without getting up from his position.

3. Finding a way to automatically change the battery with the help of motion of the wheelchair.

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