Fabrication of Voice Operated Motorised Exo Skeleton Arm

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Abstract— In this paper, we propose the design of an efficient and comfortable option to exoskeletons. Exoskeleton here refers to any wearable framework on the human body which eases and supports the muscles to perform work with lesser strain and greater comfort, using mechanical actuators and electrical power. The design proposed shall be capable of sensing the incentive to perform basic work procedures and routines making it natural and comfortable for the user to interact with and utilize this device, increasing its effectiveness and efficiency. It is aimed to reduce strain developed in muscles while doing work, thus increasing the wearer's capabilities of lifting heavy weights and loads. Furthermore, it can be said that it virtually increases the strength of the human arm by providing an external torque to counter the load force. Exoskeletons can be used for wide and diverse purposes, but are restricted due to its expensiveness. A cost-effective solution of the same will prove to be of great use in all fields including industrial work, medical technology and military power. The design prototype proposed will be based on the dimensions of an average built human being. Once successfully made, this can be extended to a larger scale and domestic uses as well.

Indexed Terms— Exoskeleton, actuators, effective, medical technology and Upper extremity.

I. INTRODUCTION

The designing of fully functioning MOTORISED prosthetic arm with coordinating speed of response and strength is the aim of upper extremity prosthetics research. Unfortunately, current prosthetic arms and collaborating techniques are still a long way from this aim. Exoskeleton is an outer framework that can be worn on a biological arm. It is powered by actuators and can provide assistance or increase the strength of the biological arm, depending on the power of the actuator. Electromyography (EMG) is the suitable approach for human-machine interface with the help of exoskeleton.

Many efforts may tooh in this filed for pneumatic prosthetic like a upper limb replacement, and current exoskeleton arms are limited to be used as a tools. The major factors limiting pneumatic prosthesis to tools are practicals due to the heavy weight, less power, and size of the component. the difficulty in finding appropriate control sources to control the number of degrees of freedom. The result, upper- limb prosthetics research is dominated by considerations of appropriate controls for controlling the degrees of freedom. Still, the importance of better pneumatic actuators and better multifunctional mechanisms cannot be ignored. Current motorised prosthetic arm are of single degree of freedom. Generally, vision is the primary source of feedback for the device, the number of functions that are controlled in parallel at one time is two. Otherwise, the mental loading becomes excessive and impossible. Switch, pneumatic actuators, control valves are the primary modes of control for today's upper-limb prosthetic arms. The upper limb prosthetic arms are developed according the tasks they need to perform or according to type of person whom it is wore by. The pneumatic prosthetic exoskeleton used for giving additional strength to normal people in order to make them do extreme work. Therefore, pneumatic prosthetic arm has found its applications in military personnel and heavy industry personnel. The

exoskeleton also finds its application in physically weak people to regain their power they lost after stroke.

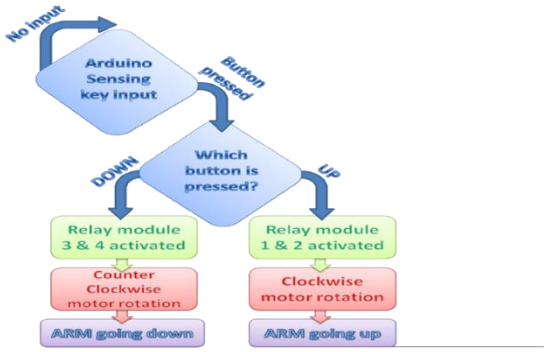
The medical field is also a good one to select the exoskeleton technology. It will help each and everone who has suffered from losses of their lega and hands, this arm will help those people to give relief from paralysis. And this is a cost less and uses is good. The main aim in this exoskeleton arm is to improve their overall health and qualitty life.

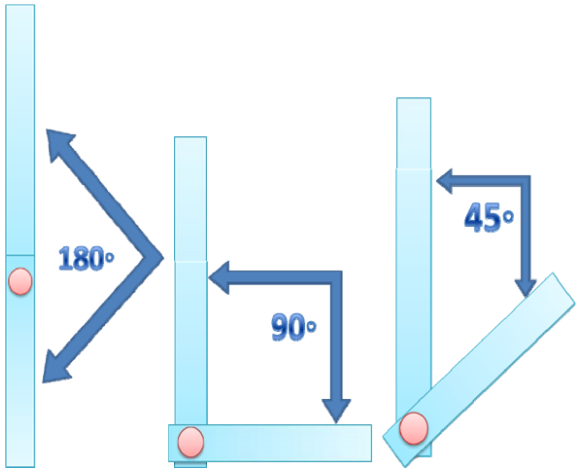
II. COMPARISION WITH EXISTING TECHNOLOGY

The main application between the design detailed in this paper and the existed one is that power assist typed exo arm its been selected compare than o more expensive power and amplification device. The cost required to design and manufacture of such device was reduced. But the main difference is apparent through the selection and control of McKibben air muscles as the main power actuator. Some implementations, which use hydraulic actuators, need internal combustion engines are used to compress the non-compliant fluid.

This one is used a limited supply of pressurized, complaint gas, which is reduces the power consumption by a considerble amount. The major difference is the use of McKibben muscles provide the high power to weight ratio than an exoskeleton arm using the Dc motors. Finally the implementation of the all combination of flex and EMG sensors, allows the monitoring of the given signals sent to the muscles, and its potentially reduces the effort required to activ ethe sensors.

It will carries the heavy objects with using the robotic limbs is already implemented in Asia, Europe, and North America. Best companies and factories are also worked on it and implemented a good and effective one . In the world there are already use robotic limb carrying heavy objects with so many bmajor cities in the United States like Washington D.C., Chicago, Boston and San Francisco are also implementing or planning to implement this technique. Industrial injury or physical disability due to sickness is very very common in now a days. Physical treatment or taking any form of medicines cannot guarantee fully recovery. These Robotic exoskeletons can provide them a certained strength which will helps them to lead a normal life.





III. METHODOLOGY

This one adopeted to carry total project is as it follows:

1. Problem definition.
2. Available data.
3. Assumptions.
4. Solution.
5. Material selection.

IV. PROBLEM DEFINITION

The Designing of a good mechanical structure with having single degree of freedom which can be wear on hand.This structure can sustaion with 1 kg mass.

V. APPLICATIONS

The devices which are rechargeable having batteries include automobile starters portable devices and lights

including automobile shutters and the portable consumer devices the light vehicles and the tools and the power supplies as well as the battery storage power stations and emerging applications These are in hybrid internal come compassion battery as well as electric vehicles those are drive the technology and reduce cost, weight, size and include all the lifetime.

So, the older rechargeable batteries self-discharge relatively rapidly and as well as the required charging before first use some new newer flow service charge NiMH dynamics batteries Older rechargeable batteries self-discharge relatively rapidly, and require charging before first use; some newer low self-discharge NiMH batteries hold their charge for many months, and are typically sold factory-charged to about 70% of their rated capacity.

The battery storage power stations are the rechargeable batteries for EU for using load leveling as well as used for the nano renewable energy uses load leveling reduces the maximum power which Are generated from photovoltaic arrays during the day to be used at night and low level reduces the maximum power which plant must be able to generate and reducing a capital cost and need for peaking power plants.

The USA national electrical manufacturer association is estimated in 2006 that the US demand for rechargeable batteries was growing twice as fast as a demand for disposables.

Small rechargeable batteries can power portable electronic devices, power tools, appliances, and so on. Heavy-duty batteries power electric vehicles, ranging from scooters to locomotives and ships. They are used in distributed electricity generation and in stand-alone power systems.

VI. CHARGING AND DISCHARGING

The during charging of any material the positive and active is oxidized , producing the electrons, and gives the negative material is reduced, and the consuming electrons .These are the electrons constitute the current flow in the external circuit .The electrolyte of MSR as a simple buffer for internal ion flow between the electrodes as in lithium ion and nickel cadmium cells or it may be an active participant in the electrochemical reaction as in lead acid cells.

Whatever the energy used to charge rechargeable batteries usually comes from a battery charger using an AC mains electricity, on throw some equipment to a vehicle 12 Volt DC power outlet .

By giving some voice commands as well as the some keys we want to move the limb up and down and whatever the voice command you give and let that software you can use like for up for one and two for Dover and three for right and four for something so it will be moving on.

Technical specifications:

Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13

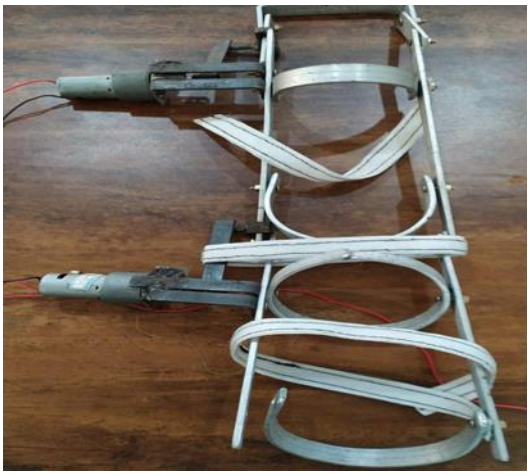
Length	68.6 mm
Width	53.4 mm
Weight	25 g

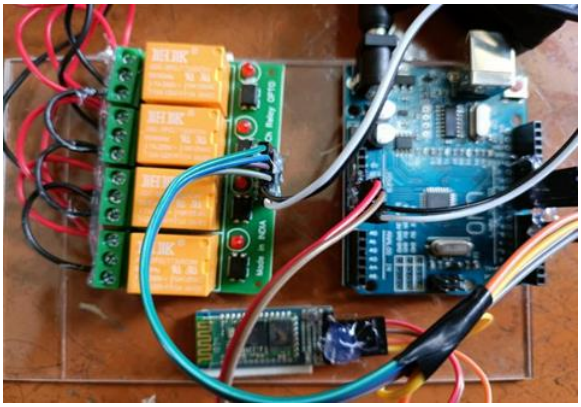
VII. EMBEDDED C

The embedded C programming language is used to do with the microcontrollers. The embedded C programming is a general purpose programming language it provides the code efficiency, elements of structured programming and a rich set of operations .And then Brad C is not a big language and it's not designed for anyone particular area of application .It's generally combined with its absence of restrictions as well as makes embedded C A convenient and effective programming solution for a wide variety of software tasks There are many complications can be solved more easily and effectively with embedded C then with other more specialized languages .The embedded C language on its own is not capable for performing operations that would normally were Intervention from the operating system instead, these capabilities will help to provide as a part of standard library .Because these are the functions are separated from the language itself, embedded C especially suited for producting code that is portable across wide platforms.

Advantages of Embedded C

- High code efficiency
- Applicable in any platforms
- Easy to compile





VIII. CONCLUSION

So let's I conclude it it can be seen from the survey that most of the advanced work in this exhaust Skelton field as we've done in recent decades and many of the outcomes have been demonstrated in wired environments .Because not all of the technical components are developed enough or packaged for using daily life and in outdoor applications, a combined amount of co operative work and user resources from medical technology, biomechanics, engineering and as well as the product development are required to use this one .and the development of power source technologies and reliable wireless technologies so that is comfortable for outdoor chores must be resolved .ensuring the portability of the pneumatic hand exorse skeleton arm system is possible the most challenging part of the development in this review it is found that the focus is on a single DEO of at a single joint, while a look at the system design of four upper extremity and even carry out a whole body suit exoskeleton is needed. No matter how many DOFs are included in the exoskeleton, the exo skeleton is benefiting the human. Further review of is needed on exoskeleton control systems so that it might be understand more about the exoskeleton in further days.

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