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Intelligent System for Physically Challenged Person in Virtual Prototype Environment

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Abstract

In this paper, a framework is fabricated to authorize the physically tested individual device for controlling the needed thing like lighting the room, electrical gadgets with small power application used in an indoor environment. The indoor application controls the wheelchair utilizing only a couple of fingers to do the work effectively. The MEMS-based accelerometers sensor is designed without any pressure and makes the device highly favorable to a physically challenged person. The accelerometers are the small gadget equipped for distinguishing the quickening of the article to which they are appended in which the accelerometers are connected to the fingers for a particular application. The individual, to whom the accelerometers are attached, can assign the control gadget using the straight forward development tool of the fingers like tapping them on the surface to do one particular application in indoor environment. So the novel system is designed and implement for physically challenged person to operate both in indoor and outdoor environment.

Keyword: *Wheelchair, Physically handicapped, MEMS, Gesture control.*

Introduction

Haptics is a late improvement to practical situations permitting clients to "touch" and "feel" the reproduced objects with which they communicate. Haptics is the investigation of touch. The word from the Greek word haptikos which signify "having the capacity to come into contact with". The investigation of haptics rose up out of advances in virtual reality. Virtual the truth is a type of human-PC connection (rather than console, mouse, and screen) giving a virtual situation that one can investigate through direct cooperation with our faculties. They can cooperate with a domain, and there must be criticism. For instance, the client ought to have the ability to touch a practical question and feel a reaction from it. This kind of criticism is called haptic input. In human-PC collaboration, haptic criticism implies both material and power feedback [1]. Haptics connects to an extensive variety of gadgets. In compelling the accuracy, surgical test system use haptics to give sensible power which imitates the vibe range of proper therapeutic strategy method. In forcing for the size of the input power, the gamers can counter the authentification. Furthermore, the first demonstration of the telephone is vibrating when a call is important and straightforward type of innovation. The clinical aptitudes of restorative experts depend entirely on the feeling of touch, joined with anatomical and analytic learning [2]. Haptic environment produced perceptional properties and human haptic recognition as a valuable tool to restorative examination. The characterization of haptic data, and how it can see, is essential to understand how medicinal experts accomplish the haptics to empower learning and achieve the abnormal amount of execution of man power. Papers which investigate haptic models of the patient, and additionally perceptual or behavioral parts of the haptic methodology are pertinent to therapeutic examinations and strategies, are requested. Haptic frameworks and the role of haptics in preparing and assessing clinical abilities: Haptic test systems address a developing requirement for successfully developing and assessment of clinical attitudes [3]. Such test systems can connect a wide range assortment of restorative callings and ordering the identity, including the surgery part, interventional radiology for monitoring, are the new abilities. Papers that location test system advancement and assessment from these points of view are requested[4].

Background Work: MEMS are comprised of segments between 1 to 100 micrometers in size (i.e.

0.001 to 0.1 mm), and MEMS gadgets covers a broad range in size from 20 micrometers (20 millionths of a meter) to a millimeter (i.e. 0.02 to 1.0 mm). This is often to comprise a focal unit which procedures the information on microchip and a few segments that associate with all surroundings, for example, small-scale sensors. At these size scales, the standard develops of established material science are not generally helpful[5]. Index finger course based robot is a machine that is controlled by a MEMS sensor through Radio recurrence innovation. The sensor which put on our index finger works when the heading of the finger changes. Limited component investigations utilizing human finger model amid element touch demonstrated that spatial data of the textured surface identified the transient recurrence changes at the position of material receptors in the finger print interface [6]. In touch sensor exercises, the people can evaluate one by one by means of relative hand speed between the surface texture and in the investigating finger, of spatial period of the surface can be seen by integrating the transient recurrence of the vibration in sensor mode [7]. So that f=v/p printed on the sensor mode .In counterfeit touch it propagate the signal, while considering innovative methodologies in which mechanical detecting components inserted on skin-like structure elastomeric grid on the surface that copy human skin penetration, such as vibrations analysis sought to be evoked by boost skin interface which releases the effect, by this movement elements are controlled, and by contact mechanics the effect is evoked, and afterwards assembling and detecting the units are situated under the protecting material [8]. Stimuli are the responses, when connected in mean level heads against the surface of the skin tissue -like material of the clusters cells, which may brought about a huge compelling noise of the sensor node component with a unique mark sort surface than that with a smooth surface [9]. A. MEMS Sensor Micro electro mechanical frameworks (MEMS) (additionally composed as miniaturized scale electro-mechanical, Micro Electro Mechanical or microelectronic and smaller scale electromechanical frameworks) is the innovation of little gadgets; it converges at the Nano-scale into Nano electromechanical structures (NEMS) and nanotechnology. MEMS likewise alluded to as micro machines (in Japan), or Microsystems innovation–MST (in Europe) [10].

Material and Method

The figure 1 shows the proposed block diagram for a physically challenged person both indoor and outdoor environment. The proposed block diagram consists of two parts; the first part consists of transmitter section in which the information transmitted through a particular distance with MEMS sensor (micro electronics mechanical system). The mem sensor is controlled by microcontroller through various action of disabled person the output section is controlled. The information is transmitted with antenna through only a small distance the position of antenna alignment is controlled with a particular frequency. The same frequency is controlled by receiver and demodulates the signal according to the input through which it takes the time delay and propagates in the receiving end through which led buzzer and led maintained. The relay is maintained o make the signal low enough and characteristics signal is maintained according to the input. So the wheel chair car controlled in the receiving end also. The proposed block diagram explains about the interferences which is mem sensor both in the transmitting end and receiving end. Further mode the device is completely implement with low cost dynamic system and it takes advantages of reducing the entire size of the hardware with low power dissipation factor. This system can be easy to carry anywhere both indoor and outdoor environment to do particular work and implement in any part of the world for physically handicapped person. The above-shown data are the block diagram implemented in this paper. The entire system divided into two modules; they are the human interface module and the robot interface module. Each one of this module s described below. The MEMS connected to the microcontroller unit which given as a PDA to the physically challenged person. The MEMS placed on the person for the gesture movements which converts the signal level with respect to mean value. Each position of the person holds the MEMS sensor for individual gesture analysis specified. When the person specifies his hand forward or backward or in any direction, that signal received by the microcontroller and sent to the antenna. The robot unit receives the signal obtained from the antenna. This robot unit is nothing but a wheelchair unit. Two relays placed on two wheels which receive the input from the microcontroller. The microcontroller will give the direction to control the motors to move. This direction purely based on the muscle movement of the person which is indeed received by the MEMS placed in them. At the point when the digit on the surface, the movement of the finger identifies the accurate analysis and the same is utilized as a trigger sign to turn an electrical gadget on or off.

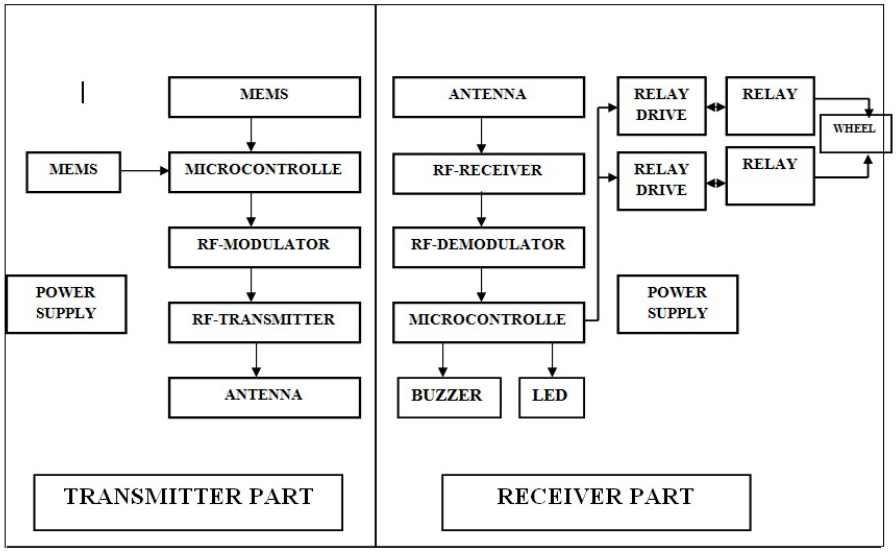

Figure 1 Block Diagram of the Interface Controller for human system

The human machine interface provides a highly visual device with low cost, comprehensive and intuitive design with low power and allow the system to operate efficiently has designed by the designer. For outdoor environment that are very expensive and difficult to observe all the parameters visually. So the proposed system is designed with low cost and low power system device.

Result and Discussions

The figure 2 and figure 3 is implemented with mem based accelerometer is proposed both in the transmitter and receiver end and circuit diagram is also proposed. The hardware device consists of power supply block, microcontroller block, mems sensor and a camera to visualize the entire object both in indoor and outdoor environment. The power supply gives moderate 12.5v to microcontroller mem sensor and camera. The microcontroller revises the voltage and controls the mem sensor and camera to operate the wheel chair car for a physically handicap person. The device can be applicable and implemented all types of physically challenged person

The same trigger sign can use for controlling a wheel seat's development: a microcontroller unit and a drive circuit used for controlling the gadgets. Numerous fingers can use for some such particular reactions from which various devices can control the internal environment. Further, if the individual can control the power of tapping the distinctive intensities of tapping can be utilized to control besides gadgets. Subsequently, the accelerometers are appended to the fingers of a man which can use as a virtual keypad to control any device in indoor environment. Furthermore, the entire framework can be made smaller which gave to remote control gadgets for assembling on a separate sheet. However, this framework can go about as a straightforward and hazel free guide for the physically debilitated.

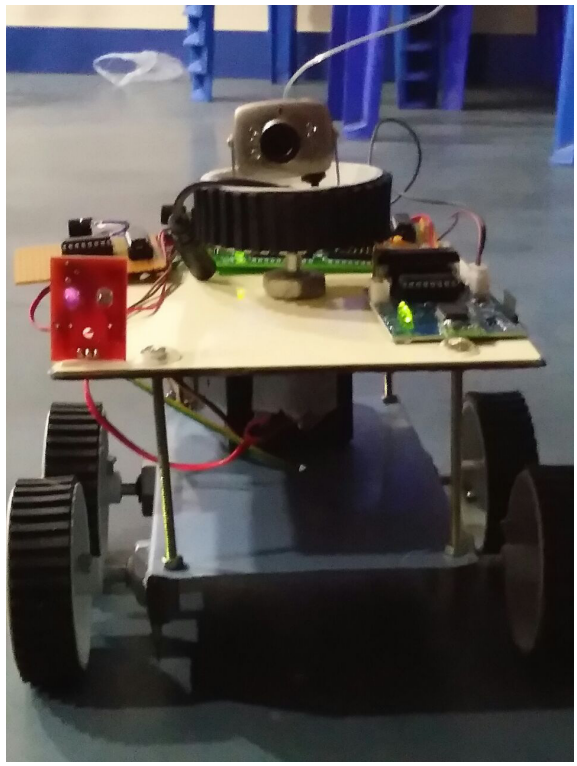

Figure 2. Hardware for Proposed Circuit

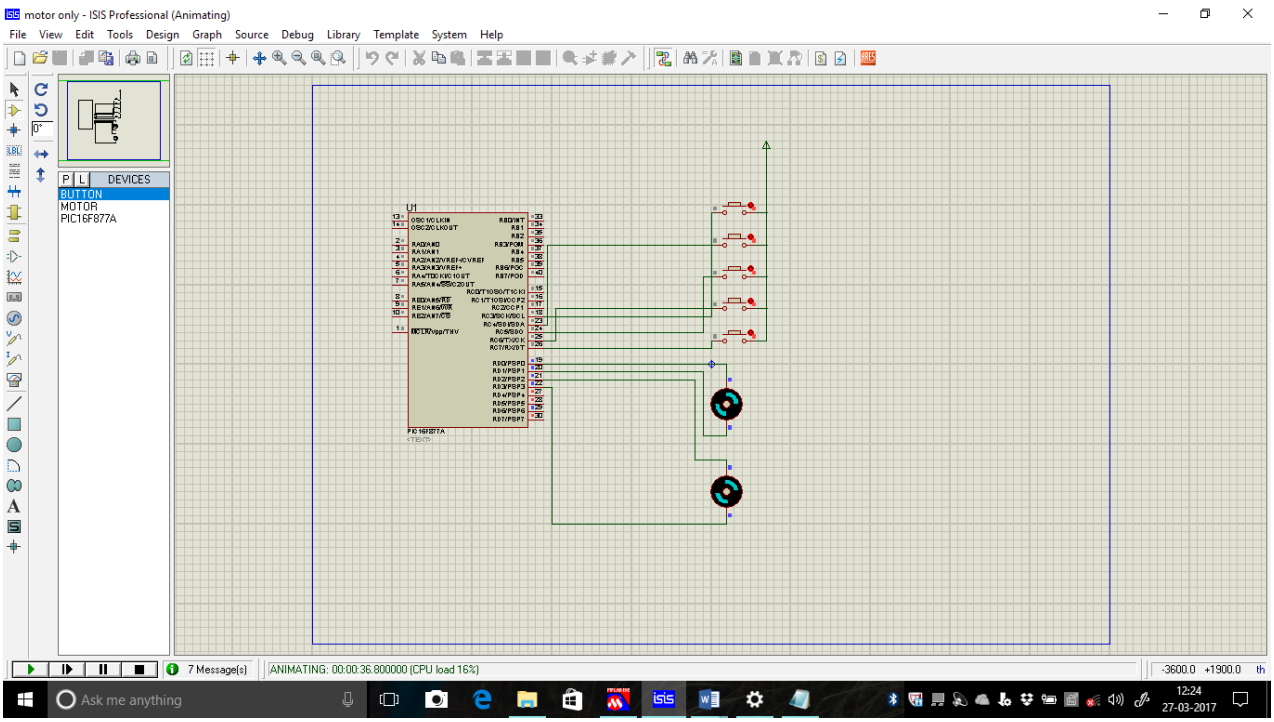

Figure 3: Circuit diagram for the proposed system

Conclusion

The intelligent assisting device designed and implemented to assist the physically challenged people in satisfying their basic needs using MEMS accelerometer sensor. This is accomplished using the physically challenged people who do not depend on others and they are trained by themselves and 60% of their work aligned or motivated using self performance. In future, the same system can e developed in such a way that the height movements of the wheelchair can be adjusted.

Conflict of Interest: There is no conflict of interest assigned in this research paper

Source of Funding: Self

Ethical Clearance: The research work proves in the novelty of the proposed action.

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