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Robot Sensor Companion for the Elderly Care and Home Control

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ABSTARCT:

To reduce the cost of health care and improve the quality of life of older people, more and more robots They are designed to interact with a person to provide the type of care they can traditionally offer Occupational Health Care. The approach is to design a significant "independent robot" to monitor the older person. This design also includes an integrated circuit to control the home appliances, Android sensor and health and safety Security to home. The main automated system is designed using berry b, a low-cost credit card size One computer board. The goal is to prepare a low-cost home robot companion to provide some care for the elderly Someone through the health monitor through the band provided to that person. In the end, the home companion home Be able to navigate independently in typical home environments to perform tasks such as health monitoring of Older, home appliance control, sensors for safety and security, in an emergency have a large cloud access using Internet things (internet Of things). Medical Reminder etc ... The aim of this project is used to control a wheel chair by using EyeBlink technology. Eye Blink Sensor which is a highly sensitive sensor and capable of detecting the EyeBlink of a human This sensor detects the Eye Blink and makes use to change the direction of the wheel chair depending on Number of Eye Blinks based Gesture Controlled Robot is a kind of robot that can be by our hand gestures rather than an ordinary old switches or keypad. In Future there is a chance of making robots that can interact with humans in an natural manner. Hence our target interest is with hand motion based gesture interfaces. An innovative Formula for gesture recognition is developed for identifying the distinct action signs made through hand movement. A MEMS Sensor was used to carry out this and also an Ultrasonic sensor for convinced operation. In order to full-fill our requirement a program has been written and executed using a microcontroller system. Upon noticing the results of experimentation proves that our gesture formula is very

competent and it's also enhance the natural way of intelligence and also assembled in a simple hardware circuit.

INTRODUCTION:

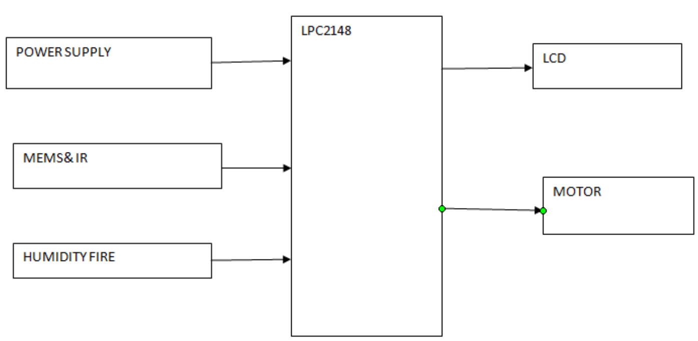
Because of the graying of our today's population, there is a growing necessity for new technologies that can assist the elderly in their daily living. The main arguments for this is that the shortage of staff for health care, also people prefer more and more to live in their own homes instead of being institutionalized. To address these issues, we not only need sufficient health care personnel but also the presence and appliance of high-tech devices. Robotics is developing quickly nowadays to play an important role in assisting the elderly. An autonomous user companion robot might be viewed as a special kind of service robot that is specifically designed for personal use at home. Robots designed for the home are a growing industry from both a research and commercial perspective. Companion robots in the home should ideally be able to perform many tasks such as home surveillance, control home devices, diary duties, entertainment etc... To reduce the cost of health care and improve the quality of life of elderly people, more and more robots are being designed to interact with a human being to provide the kind of care that traditionally can be offered by a health care professional. The approach is to design a sensorized "autonomous robot" to monitor the elderly person. Also this design includes an integrated circuit to control the home devices, the sensorized robot for health, safety and security to the home. The main robotic system is designed using Raspberry pi, which is a low cost credit card sized single-board computer. The goal is to setup a low cost home companion robot to provide some care to the elderly person by monitoring the health through a band provided to that person. Ultimately, the home companion To reduce the cost of health care and improve the quality of life of elderly people, more and more robots are being designed to interact with a human being to provide affordable and robust care at home that traditionally can only be offered by a health care professional. Through interviews with eight single autonomous elderly between 75 and 88 years old and 7 of their close relatives regarding the acceptability of a smart home voice interface, the researchers in France emphasized that a home companion device must try to bring more independence to elderly and avoid creating a less autonomous lifestyle [1]. About ten years ago, a group of researchers at MIT media lab designed a teddy bear alike therapeutic robotic companion called the Huggable that is capable of active relational and affective touch-based interactions with a person [2]. This type of therapeutic robot focuses on affective interaction between human and a robot, which is very similar to the health benefits provided by companion animals. This type of robots is short of the autonomous navigation and interaction with the human. A major goal of the home companion robot research is to engage an elderly person to encourage a subtle but stimulating effect in daily life. This challenge is explored through the design of a playful mobile interface to control a robot companion in a smart home environment [3]. To support independent living, robotic companion and the smart home environment need to be seamlessly integrated to create enhanced usability and satisfaction [4]. A group from Germany presented a real-time method for a mobile robot to understand the user's activities by extracting the user's pose and motion from camera images [5].

OVERVIEW:

Technology is the word coined for the practical application of scientific knowledge in the industry. The advancement in technology cannot be justified unless it is used for leveraging the user's purpose. Technology, is today, imbibed for accomplishment of several tasks of varied complexity, in almost all walks of life. The society as a whole is exquisitely dependent on science and technology. Technology has played a very significant role in improving the quality of life. One way through which this is done is by automating several tasks using complex logic to simplify the work.Gesture recognition has been a research area which received much attention from many research communities such as human computer interaction and image processing. The increase in humanmachine interactions in our daily lives has made user interface technology progressively more important. Physical gestures as intuitive expressions will greatly ease the interaction process and enable humans to more naturally command computers or machines. Now a day's robots are controlled by remote or cell phone or by direct wired connection. If we thinking about cost and required hardware's all this things increases the complexity, especially for low level application. For example, in telerobotics, slave robots have been demonstrated to follow the master's hand motions remotely [1]. Gestures control robots are extensively employed in human non-verbal communication. They allow to express orders (e.g. “stop”), mood state (e.g. “victory” gesture), or to transmit some basic cardinal information (e.g. “two”). In addition, in some special situations they can be the only way of communicating, as in the cases of deaf people (sign language) and police’s traffic coordination in the absence of traffic lights, a real-time continuous gesture recognition system for sign language Face and Gesture recognition. Robots are becoming increasingly useful on the battlefield because they can be armed and sent into dangerous areas to perform critical missions. Controlling robots using traditional methods may not be possible during covert or hazardous missions. A wireless data glove was developed for communications in these extreme environments where typing on a keyboard is either impractical or impossible. This paper reports an adaptation of this communications glove for transmitting gestures to a military robot to control its functions. Novel remote control of robots has been an active area of research and technology, especially over the past decade. For example, a wearable, wireless tele-operation system was developed for controlling robot with a multi-modal display. Remotely controlled robots have been used in environments where conditions are hazardous to humans. Gestures were used to control a flying manta-ray model. A glove apparatus was used to control a wheelchair using robotic technology. Other proposed applications of recognizing hand gestures include character-recognition in 3-D space using inertial sensors [2], [3], gesture recognition to control a television set remotely [4], enabling a hand as a 3-D mouse [5], and using hand gestures as a control mechanism in virtual reality [6]. It can also be used for the improvement of interaction between two humans. In our work, a miniature MEMS accelerometer based recognition system which can recognize eight hand gestures in 3-D space is built. The system has potential uses such it act as a vocal tract for speech impaired people. To overcome the limitations such as unexpected ambient optical noise, slower dynamicresponse, and relatively large data collections/processing of vision-based method [9], and to strike a balance between accuracy of collected data and cost of devices, a Micro Inertial Measurement Unit is utilized in this project to detect the accelerations of hand motions in three dimensions. The proposed recognition system is implemented based on MEMS acceleration sensors. Since heavy computation burden will be brought if gyroscopes are used for inertial measurement [10], our current system is based on MEMS accelerometers only and gyroscopes are not implemented for motion sensing.

LITERATURE SURVEY In the studies included in this review, a variety of effects, or one could say functions, of assistive social robots have been studied. These functions include: increased health by decreased level of stress, more positive mood, decreased loneliness, increased communication activity with others, and thinking and remembering the past. Most studies report positive effects, and the effects are diverse. With regards to mood, companion robots are reported to increase positive mood, typically measured using evaluation of facial expressions of elderly people as well as questionnaires. Further, elderly people are reported to become less lonely with the intervention of companion robots as measured with loneliness measurement scales. With regards to health status, companion robots are reported to alleviate stress and increase immune system response. Some studies report a decrease on existing dementia measurement scales. One study explicitly reports that a companion robot elicited memories about the past. Many studies report positive findings with regards to social ties between elderly in homes as well as between elderly and family. Typically, the companion is the topic of conversation. Studies on social robots in eldercare feature different robot types. First, there are robots that are used as assistive devices which we will refer to as service type robots. Functionalities are related to the support of independent living by supporting basic activities (eating, bathing, toileting and getting dressed) and mobility (including navigation), providing household maintenance, monitoring of those who need continuous attention and maintaining safety. Examples of these robots are ‘nursebot’ Pearl, the Dutch iCat (although not especially developed for eldercare) and the German Care-o-bot. Also categorized as such could be the Italian Robocare project, in which a robot is developed as part of an intelligent assistive environment for elderly people. The social functions of such service type robots exist primarily to facilitate interfacing with the robot. Studies typically investigate what different social functions can bring to the acceptance of the device in the living environment of the elder, as well as how social functions can facilitate actual usage of the device. Second, there are studies that focus on the pet-like companionship a robot might provide. The main function of these robots is to enhance health and psychological well-being of elderly users by providing companionship. We will refer to these robots as companion type robots. Examples are the Japanese seal shaped robot Paro, the Huggable (both especially developed for experiments in eldercare) and Aibo (a robot dog by Sony, see below). Social functions implemented in companion robots are primarily aimed at increasing health and psychological well-being. For example, studies investigate whether companion robots can increase positive mood in elderly living in nursery homes. However, not all robots can be categorized strictly in either one of these two groups. For example, Aibo is usually applied as a companion type robot, but can also be programmed to perform assistive activities and both Pearl and iCat can provide companionship. This review aims to provide a first overall overview of studies that investigate the effects of assistive social robots on the health and wellbeing of elderly. Since the majority of the assistive social robot studies with actual elderly people as subjects involve the robots Aibo, Paro, iCat and 'nursebot' Pearl. In this paper we discuss about a sensorized companion robot for health and home care, which is relevant in many different environments such as elderly care, their health monitoring, safety, security, emergency situation handling and controlling house hold devices.

IMPLEMENTATION:



DESCRIPTION:

ACCELEROMETER An accelerometer is an integrated device that measures proper acceleration, the acceleration experienced relative to freefall. Single- and multiaxis models are available to detect magnitude and direction of the acceleration as a vector quantity, and can be used to sense orientation, acceleration, vibration shock, and falling. Micro machined accelerometers are increasingly present in portable electronic devices and video game controllers, to detect the position of the device or provide for game input. It is a capable of measuring how fast the speed of object is changing. It generates analog voltage as the output which is used as an input to the control system. The accelerometer used in this automated system is ADXL345. It is a three axis accelerometer, which senses the tilt in two directions only. The supply voltage ranges from 2 to 3.6v.

EYE BLINK SENSOR The voluntary and non-voluntary motion can be identified by the eye blink movements. Eye blink sensor senses whether eye is open or closed. The eye-blink sensor works by illuminating the eye and/or eyelid area with infrared light and then monitoring the changes in the reflected light using

MOTOR Motor receives power from the Motor driver IC. This power is utilized to do physical works, for example move the Wheel chair. DC motor orientation, speed and operation can be controlled with microcontroller. We can start it, stop it or make it go either in clockwise or anti clock wise direction. The speed of the Motor is controlled by the help of PWM (pulse width modulation).

MOTOR DRIVER L293D is a dual H-Bridge driver, so with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and a motor with fixed direction of motion. All I/Os are used to connect four motors. L293D has output current of 600mA and peak output current of 1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included IC. The output supply has a wide range from 4.5V to 36V, which makes L293D a best choice for DC motor driver. Driver IC has four switching elements within the bridge. These four elements are often called, high side left, high side right, low side right, and low side left (when traversing in clockwise order). The switches are turned on in pairs, either high left and lower right, or lower left and high right, but never both switches on the same "side" of the bridge.

ADVANTAGES

a. User Friendly

b. Helpful for the paralysis stroke people who don„t have much stamina in the hands.

c. Reduces the human activity.

d. Reduces the physical strain. e. Spontaneous output.

CONCLUSIONS

This project focuses on vision feedback control of a home companion robot. Through our project we assemble, control, and test our robot to carry out two preliminary tasks using vision feedback. The results indicate that the low cost home companion robot can successfully follow feedback signals from our sensor very smoothly. This system can be easily advanced in future, as we think about home companion robot that can follow and track people around and help with different life aspects. The main idea of this prototype robot is to be developed in the future to help and companion elder people and track their health issues. Furthermore, there are many other applications that can be applied to using the prototype robot. Since this robot prototype is still in its first stage and can be improved to fit many tasks we can think about in the future.

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