PROJECT TITLE: MOTION BASED RECOGNITION IN NEURO-STIMULATOR FOR DIABETIC FOOT PAIN

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BATCH: 2009-2013

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"MOTOROLA FAER SECOND PRIZE WINNER"

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Diabetic foot pain is a major problem that affects people with diabetes. This type of nerve pain can affect both type 1 and type 2 diabetes sufferers .Nerve pain ,also known as neuropathic pain , is a result of one of the complication of diabetes, called peripheral neuropathy or diabetic neuropathy. Diabetic foot pain most commonly occurs when a person with diabetes has prolonged spells of high blood sugar levels. Due to this high blood glucose it affects the nerves by damaging the blood vessels which supply them .diabetic foot pain symptoms can include:

- Pricking or tingling feelings
- A burning sensation
- Sharp , stabling or shooting pains

These can range from mild to extreme. In serious cases the whole area may become numb. Neurostimulator is a device which is used for treating diabetic foot pain. Neurostimulator delivers small electrical stimulation to the nerve endings. Some patients find that these electrical stimulation can provide pain relief. Neurostimulator are small and easy to use . Most patients can self administer neuro-stimulation treatment in home, without a great deal of medical supervision.

Due to the diabetic foot pain it leads to change in walking pattern which is represented by gait analysis and stride analysis method . The theme of the project is to develop a technique that not only reduces the foot pain but also involves the gait analysis. By which the amount of stimulation is detected and provided accordingly for the better therapy. In this technique the markers called the " Helen Hayes markers set "is designed using LED's and connecting wires. These are fixed in the lower extremity of the leg (Hip,Knee,Ankle,Sacrum,Toe and Heel). Then the video is recorded using high resolution " SLR camera" with 50 frames. The data's are analyzed using MATLAB coding then the stimulation is provided using "Neurostimulator" device according to gait changes . Thus an exact stimulation is provided for diabetic foot pain for the better therapy . In this the walking pattern of both diabetic and normal subjects are acquired using SLR camera. Then using TVC (Total Video Converter) the videos are converted to avi format. Using Virtual Dub Software the videos are converted into frames. Then the one gait cycle of each subject is selected from the converted frames. Then using mat lab software the coding is done for hip,ankle,knee.Thus the change in gait pattern and other gait parameters are deduced using stride analysis and stimulation is provided at the exact location of pain in the foot using neurostimulator.

PROJECT TITLE: DESIGN AND IMPLEMENTATION OF HUMAN MACHINE INTERFACE FOR ARTIFICIAL LEG

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Research works on Brain computer interface (BCI) has been going on for the past four decades. The main criteria of this project work is to combine the brain computer interface with the robotics and image processing system to come up with an efficient wheelchair that can be operated by the mental thoughts of any severely disabled subjects including subjects with locked-in syndrome. By detecting and classifying ERD patterns of motor imagery of hand/foot movements, a virtual control module is developed, which in turn, helps to interface with the wheelchair. An image processing based automated object detection and avoidance mechanism is designed in real time and once an object is deducted it can be updated in the virtual monitor. Six ultrasonic sensors are also incorporated with the wheelchair as for the secondary collision resistant mechanism. When all these systems are integrated, we get a wheelchair which is controlled by the classified cortical activity of the brain with automatic collision avoidance mechanism.

NOVELTY

The main novelty is combination of image processing system with BCI. We mount 2 cameras which give a binocular vision to the wheelchair. The automated object detection and avoidance helps as human eyes. Here we use only three active electrodes. So, it makes the subject less inconvenient.

APPLICABILITY

- Can be used for patients who are completely to partially paraplegic and patients who has locked-in syndrome
- This includes the combination of both neural networks and wavelet/Hilbert transform, so gives a better classification than the existing works
- This project includes the combination of real time video processing with the brain computer interface, thereby, a highly efficient wheelchair can be designed

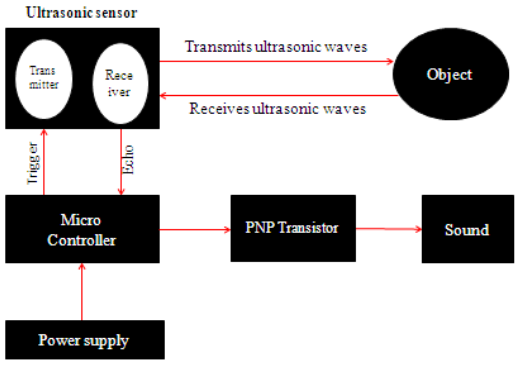
Project Title :OBSTACLE DETECTION FOR THE VISUALLY IMPAIRED
Name of the Students : V.CHAMUNDESWARI, S.K. NANDHINI
Project Guide: Mr.Sundar Babu
Batch : 2009-2013
Work Place : Appaswamy Associates

ABSTRACT: The system is an efficient methodology for aidingthe blind and the visually impaired in their navigation. In this the user will be indicated about the nearing obstacle with in closer ambiance. This system detects the nearest Obstacle via a stereoscopic sonar system and sends back vibro-tactile feedback to inform the user about its localization through a vibration feel and with the detected sound. This system covers an angle of 180 degree and senses any kind of obstacle nearing them. This model also includes different sound frequencies according to the objects that are nearing them. An added advantage is that this system also provides the direction from where the obstacle is nearing which helps the blind people to have a safer navigation. The system also aims at increasing the mobility of visually impaired people by offering new sensing abilities.

Method Of Working:

•Switch ON the battery supply.
•Ultrasonic sensor transmits the ultrasonic waves and receives the ultrasonic waves.
•A trigger pulse is given from the microcontroller to the sensor and when the obstacle is detected it sends the echo pulses to the microcontroller.
•From microcontroller the output is given to the PNP transistor.
•The PNP transistor then generates the beep sound via sound buzzer.

Block Diagram:



Device Description:

Battery Supply:

A battery of about 1.2 volt is being used. Battery of four numbers are used within the casing to produce a power supply of about 5 volt.

Sensor specification:

•An ultrasonic sensor of model HC-SR04 is being used.
•It cover a distance of upto 0.3 to 4 meters.
•Low cost and light weight compared to other ultrasonic sensors.

Project Title :Low Cost palm Dorsal Vein Pattern Recognition
Name of the Student : B.Divya, K.Jeyanthi, L.Sathya
Project Guide: Mr.S.Vinurajkumar
Batch : 2009-2013
Work Place : CLRI

ONE PAGE WRITE UP

The aim of the project is to develop a contactless, low cost authenticating system which uses the vascular pattern of palm dorsal as the personal identification factor. Palm vein system is the only biometric with the liveness detection i.e., it will give only to live objects. It has very low False Acceptance rate and False Rejection rate than any other system because the patterns fof the individual will differ, and it will even for the twins also. The vein patterns are extremely difficult to forge by means of forging, tracing etc., since it is internal to the body. And to design a simplest algorithm for palm vein pattern recognition in Mat lab and Java Applet