Enhancing Assessment Of Peripheral Neuropathy Using Foot Anthropometry

P.Muthukumaraswamy[1], K.Ananthanisha[2], P.Esther jeba[3], K.Gayathiri[4]

[1]Assistant Professor, [2,3,4] UG Students
Department of electronics and communication engg .
Kings Engineering College, Irungattukottai, Chennai-602117

ABTRACT:This project is fully concentrated on Type-2 diabetes. Regular testing is required to avoid ulceration or other damage to patient's feet. Peripheral neuropathy is a condition in which the peripheral nerves or the nerves in the extremities are damaged. This condition is a progressive disease that may come and go or may become severe and debilitating. In most cases, the patient who is suffering from neuropathy in the feet is diabetic. It affects sensations, not movement, and is caused by poor control of diabetes over the course of several years. Burning, stinging pain can be felt in both feet. To find the pressure points in foot that is helpful to treatment of the neuropathy. Here by using effective convex hull algorithm is used to find pressure points from ulceration Image. Region Segmentation is the high accuracy methodology to detect the Pressure Points. This project is very helpful to Acupuncture treatment.

INDEX TERMS:Ulcerationimage,Convex hull algorithm, pressure point.

I.INTRODUCTION

This project depends upon the digital image processing. The term digital image refers to processing of a two dimensional picture by a digital computer. In a broader context, it implies digital processing of any two dimensional data. A digital image is an array of real or complex numbers represented by a finite number of bits. An image given in the form of a transparency, slide, photograph or an X-ray is first digitized and stored as a matrix of binary digits in computer memory. This digitized image can then be processed and/or displayed on a high-resolution television monitor.

Diabetes is a number of diseases that involve problems with the hormone insulin while not everyone with type2 diabetes is overweight and obesity and lack of physical activity are two of the most causes of this form of diabetes. It is also responsible for nearly 95% of diabetes cases in the United States according to the CDC.

This article will give you a better understanding of the causes of Type2 diabetes occurs and specific health problems that increase the risk of type 2 diabetes.In a healthy person,the pancreas(an organ behind the stomach)releases insulin to help the body store and use the sugar from the food we eat. Peripheral neuropathy, also called symmetric neuropathy or sensorimotor neuropathy,is anerve damage in the arms and legs.Feet and legs are likely to be affected before hands and arms.Many people with diabetes have sign of neuropathy that a doctor could note but feel no symptoms themselves.peripheral neuropathy include a tingling,burning,or pickling sensations,extreme sensitivity to touch,even light touch,loss of balance and coordination.Peripheral neuropathy affects the nerves in our toes,feet and legs.peripheral neuropathy also cause muscle weakmess and loss of reflexes especially at the ankle,leading to changes in the way of a person walk.Foot deformities,such as hammertoes and the collapse of the midfoot, may occur.Blisters and sores may appear on numb areas of foot because pressure or injury goes unnoticed.If anaffection occurs and is not treated promptly,the infection may spread to the bone,and the foot may then amputated.Many amputations are preventable if minor problems are caught and treated in time.

II.LITERATURE REVIEW

A)*An efficiently identify the diabetic foot was based on Foot anthropometry using hyper spectral imaging*

This system is efficiently and automatically identify the diabetic foot ulcer and provide the accurate result using foot anthropometry and hyper spectral

imaging.here the drawback is,it is a time consuming process,

B)*Automatical peripheral neuropathy of diabetic patients using optical images and binary processing technique*

This approach is to automatically identify the area of intereston a given patient's foot via optical image processing.

C)*Binary image*:It have two values denoted 0 and 1 but oftenpixel value range is 0 to 255 representing black and white.Here the drawback is simplest to process but they are such an impoverish representation of images information that their use is not always possible and causes pressure points on any plantar contact area. [2] proposed a system in which this study presented the implementation of two fully automatic liver and tumors segmentation techniques and their comparative assessment. The described adaptive initialization method enabled fully automatic liver surface segmentation with both GVF active contour and graph-cut techniques, demonstrating the feasibility of two different approaches.

D)*Automated peripheralneuropathy assessmentusing optical and foot antropometry :*

Previous anthropometric studies of foot shape and foot dimensions have used differing protocols and measurement devices. Additional studies have devised physical foot measurementplatforms.Previous work presented by the authors covered pressure point detection by plantar contact area using optical imaging.An optical scanning technique obtained the human plantar surface and specific skincolor space was usedtodetectthePressure points.Outer boundary and HSV process to measure the pressure points.Pressure Point measured only on 3 and 5 points.

III.PROPOSED SYSTEM

A large proportion of individuals who live with type-2 diabetes suffer from plantar sensory neuropathy in Foot.Regular testing and assessment for the condition is required to avoid ulceration or other damage to patient's feet.To find the pressure points in foot that is helpful to treatment of the neuropathy.Hereby using advanced and Effective Algorithm for to find pressure points from ulceration Image.Region Segmentation is the high accuracy methodology to detect the Pressure Points.This project is very helpful to acupuncture treatment also.

A) Introduction

Peripheral neuropathy is a condition in which the peripheral nerves or the nerves in the extremities are damaged. This condition is a progressive disease that may come and go or may become severe and debilitating**.**In most cases, the patient who is suffering from neuropathy in the feet is diabetic.It affects sensations, not movement, and is caused by poor control of diabetes over the course of several years. Burning, stinging pain can be felt in both feet.Diagnosing Neuropathy in Feet-Magnetic Resonance Imaging tests, which can examine your muscles and detect damage to the foot nerves.The proposed method performs a Filtering process (Median Filter)and Black and White images from foot image is followed by active contour algorithm.Convex Hull Process is for 2-D or 3-D computations due to better robustness and performance.Region Segmentation are greatly improved of Object detection and multi-class image segmentation. In Proposed method will find up to nine pressure points in feet.The algorithm was successfully applied on 70 participants with a 100% success result, regardless of the patient's race, age, or gender.To detect nine foot pressure points this method is very useful to acupuncture Lesser time taken by segmenting.High accuracy.

Software Requirement:

Tool   : Mat lab 2013

Toolbox   : Image Processing

Front End :GUI (Graphic User Interface)

Dataset   : Image Dataset

Hardware Requirements:

SYSTEM   : Pentium IV 2.4 GHz

HARD DISK : 80 GB

RAM   : 2GB

IV.BLOCK DIAGRAM

Input Data of Foot

Pre-Processing

Median Filter

Active Contour Algorithm

Convex Hull process

Region Segmentation for Detecting pressure point
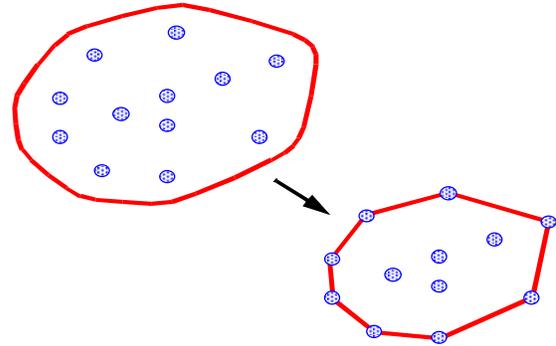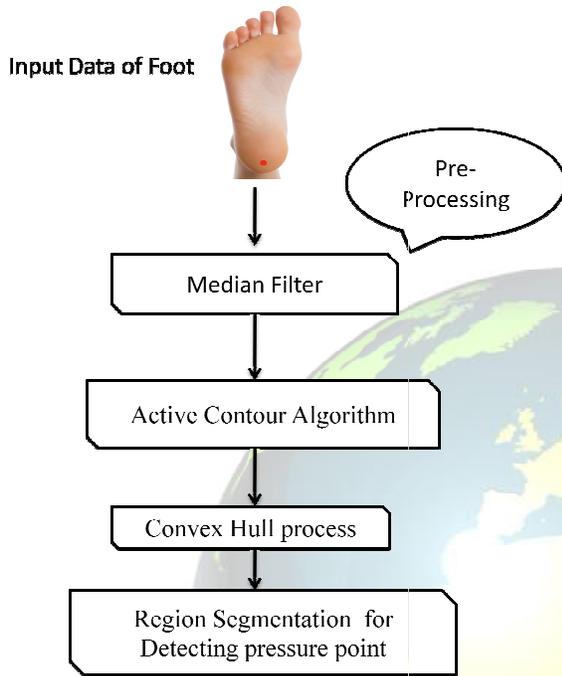
ActiveContourAlgorithm:To perform the task of Image Segmentation.Subdividing or partitioning an image into its constituent regions or objects.The desire is to find a method that looks for any shape in the image that is smooth and forms a closed contour.Active contour is mainly used for Shape recognition.

V.RESULT

Preprocessing:RGB image is converted into Resizing and Grayscale ImageGray Scale Conversion Involves Threshold value of binary values.Filtering Process will be perform for the purpose of image noise reduction.Median Filter is anadvanced technique of Low pass filter and Gaussian filter.

Median Filter:In median filtering, the neighboring pixels are ranked according to brightness (intensity) and the median value becomes the new value for the central pixel Median filters can do an excellent job of rejecting certain types of noise, in particular, "shot" or impulse noise in which some individual pixels have extreme values.In the median filtering operation, the pixel values in the neighborhood window are ranked according to intensity, and the middle value (the median) becomes the   output value for the pixel under evaluation.

Convex Algorithm: The convex hull is the smallest convex polygon that contains all the points.
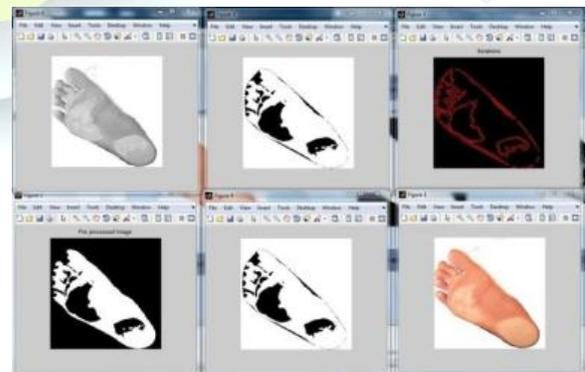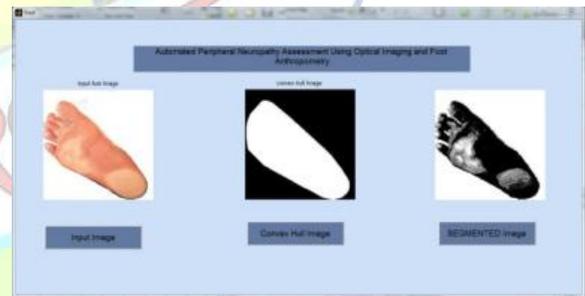
VI.CONCLUSION

For the first time as far as the authors are aware, an automated pressure-point detection system for PSN assessment of adiabetic patient's plantar surface using an optical imaging and foot anthropometry process is presented. The proposed methodperforms a thresholding process and bounds the foot image in a Rectangle followed by contours. Plantar pressure points are then obtained using a combined approach of optical imaging over the HSV 3-D color space and plantar anthropometry.Thealgorithm was successfully applied on 70 participants with a 100% success result, regardless of the patient's race, age, or gender.

VI.REFERENCES

[1] NHS. (2012, Nov. 6). Failings in diabetes care cost thousands of lives. [Online]. Available: http://www.nhs.uk/news/2012/11November/Pages/ Failings-in-diabetes-care-cost-thousands-of-lives.aspx

[2] Christo Ananth, Karthika.S, Shivangi Singh, Jennifer Christa.J, Gracelyn Ida.I, "Graph Cutting Tumor Images", International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), Volume 4, Issue 3, March 2014,pp 309-314

[3] S. R. Shah and K. M. Patil, "Processing of foot pressure images and display of an advanced clinical parameter PR in diabetic neuropathy," in *Proc. IEEE EMBS 2nd Int. Conf. Neural Eng.*, Arlington, VA, USA, 2005, pp. 56–59.

[4] C.Hile andA.Veves, "Diabetic neuropathy and microcirculation," *Current Diabetes Rep.*, vol. 3, no. 6, pp. 446–451, 2003.

[5] M. Bharara*et al.*, "Thermography and thermo-metry in the assessment of diabetic neuropathic foot: a case for furthering the role of thermal Techniques," *Int. J. Lower Extremity Wounds*, vol. 5, no. 4, pp. 250–260, 2006.

[6] NICE. (2014, Apr.). Pressure ulcers: Prevention and management of pressure ulcers. [Online]. Available: http://www.nice.org.uk/guidance/cg179