



## Foot Reflexology positions to control Diabetic foot ulcers

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### ABSTRACT

Foot ulcers are a typical inconvenience of diabetes. They are most predominant under your enormous toes and also the bundles of your feet. Ulcers structure as an aftereffect of skin tissue separating and uncovering fundamental layers. These bruises can influence your feet down to the bones. Reflexology is a well known comprehensive & reciprocal treatment that advantages and enhances general wellbeing and in addition assuaging push and agony in different parts of the body. Reiterative foot reflexology graphs reflect your self-perception. These graphs are in light of zones to mirror your body in scaled down on your feet. In this paper a hybrid method which combines the reiterative foot chart with image processing technique is proposed. The image of affected foot is enhanced using colour image segmentation technique and then processed using reiterative foot chart.

**Keywords:** Foot ulcer, reiterative foot chart, diabetic ulcer, Reflexology, image segmentation.

### INTRODUCTION

Foot diseases are a typical and genuine issue in persons with diabetes. Diabetic foot diseases (DFIs) ordinarily start in an injury, frequently a neuropathic ulceration. While all injuries are colonized with microorganisms, the vicinity of disease is characterized by  $\geq 2$  exemplary discoveries of aggravation or purulence. Administration of the diabetic foot obliges exhaustive information of the real hazard elements for removal, incessant routine assessment and careful preventive upkeep. The most widely recognized danger variables for ulcer arrangement incorporate diabetic neuropathy, structural foot deformation and fringe blood vessel occlusive ailment. A careful substantial examination, reinforcement by monofilament testing for neuropathy and noninvasive testing for blood vessel deficiency, can distinguish patients at danger for foot ulcers and properly arrange patients who as of now have ulcers or other diabetic foot muddling [1]. Quiet training in regards to foot cleanliness, nail consideration and legitimate footwear is essential to decreasing the danger of a damage that can prompt ulcer development.

Reflexology is an old practice which has demonstrated to cure and treat numerous ailments in the body. As of late picking up, prominence this treatment is exceptionally full of feeling and key for physical and enthusiastic cures. It has a particular effect on a couple of organs of the body. The vast majority of these reflex focuses are found in the hands and feet. These territories are the visualizations in general body. Subsequently by animating the reflex focuses on the hands and feet, we can see the impact on all the organs. Reflexology for Diabetes is an extremely powerful treatment, as it serves to control glucose levels.

The paper proposes Reiterative reflexology foot model to identify the organ affected with disease using image segmentation and texture analysis methodology. Reflexology for diabetes has ended up being truly successful. Diabetes as per reflexology can be controlled with the correct utilization of reflex focuses. Some reflex focuses

found in the feet can animate and parity the working of the entire body. In a course of time, the body can be restored. It serves to evacuate the poisons and supports healing. On the off chance that the weight is connected in the right way on these reflex focuses, it will go about as a help to diabetes.

#### I. Traditional methods

Ulcers are moderate recuperating wounds on the skin. Diabetic foot ulcers [2] happen on the feet of individuals with sort 1 and sort 2 diabetes. Diabetic foot ulcers normally happen on the base of the foot. Diabetes can harm the nerves of the legs and feet. This may make it hard to feel a rankle or sore. On the off chance that you couldn't care less for a sore it may get to be bigger and contaminated. Diabetes additionally can result in issues with blood stream. Poor blood stream can make it hard to recuperate. The ulcer itself is normally created by Monotonous injury or weight on the foot, cut wound on the foot and Protests in the shoe that can harm the skin. Figure 1 shows the manifestations of diabetic ulcer include Injuries, ulcers, or rankles on the foot or lower leg, Torment, Trouble strolling, staining in feet: dark, blue, or red, Fever, skin redness, swelling, or different indications of disease.

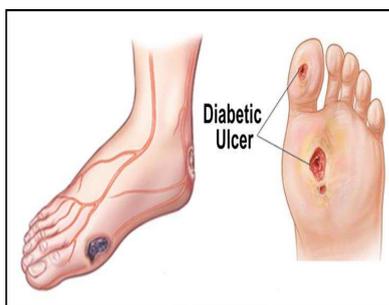


Figure1 illustrates the image of diabetic ulcer

The routine medicines for diabetes incorporate doctor judgments which prompts admission of Insulin (constantly in type 1 and now and again in type 2, Monitoring glucose levels and Oral medication (type 2). The gathering of manifestations termed diabetes in traditional prescription has been dealt with for a large number of years with the arrangement of Traditional Chinese Medicine (TCM). TCM takes a gander at signs and side effects in the connection of the entire individual. Particularly this framework takes a gander at examples of disharmony, and patients' enthusiastic and mental reactions.

Dissimilar to ordinary pharmaceutical, TCM does not concentrate on deciding or controlling the glucose levels, yet rather individualizes an arrangement to reestablish harmony and concordance, contingent on the way of the diagnosed awkwardness. The most usually utilized helpful strategies in TCM incorporate needle therapy, moxibustion, Chinese natural prescription, diet treatment, psyche/body works out (Qigong and Tai Chi), and Tui Na (Chinese rub).

In 1997, the National Institutes of Health discharged an accord articulation saying that the utilization of needle therapy in the treatment of diabetes was named "viable, yet additional proof obliged." It is critical to recognize that the agreement explanation alluded to investigations of needle therapy just, and not of the whole systemic methodology. Needle therapy has been demonstrated to lower glucose levels and has been exhibited to enhance fringe neuropathy and neuropathic torment, a standout amongst the most widely recognized muddling of sort 2 diabetes.

Numerous Chinese herbs [3] and details have been utilized securely for centuries; on the other hand, great information on herb/drug associations is constrained. Furthermore, the FDA does not manage the readiness, solution, or appropriation of herbs. Along these lines, it is essential to work with a dependable and reliable hotspot for home grown items. Overwhelming metal pollution is sympathy toward items become in China. Probably the most regularly utilized herbs as a part of diabetes include: Panax Ginseng, Momodica charantia, Lagenaria siceraria, and Psidium gnajava. These herbs seem to improve how glucose is metabolized in the body.

**II. Reiterative reflexology foot charts**

The reiterative reflexology foot outlines really have scaled down drawings of your body organs. This is the reason they are simpler to peruse than Chinese diagrams which just have diverse hues for every territory and reflex point. There are reflex focuses everywhere on your feet. They can be found on soles, on toes, additionally on the upper piece of the foot. Graphs normally demonstrate your feet from numerous purposes of perspectives, so focus and don't get befuddled. Verify you see precisely which focuses are on the sole and which ones are on the upper feet. More than that, some reflex focuses are spotted on the sides of your feet. This is for occasion the instance of spine. Its reflex point is on the internal side of the foot. Figure 2 describes the Chinese foot chart and Figure 3 shows the Reiterative reflexology foot chart.

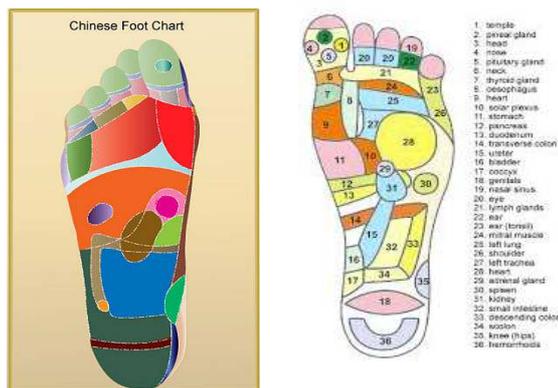


Figure 2 Chinese Foot Chart

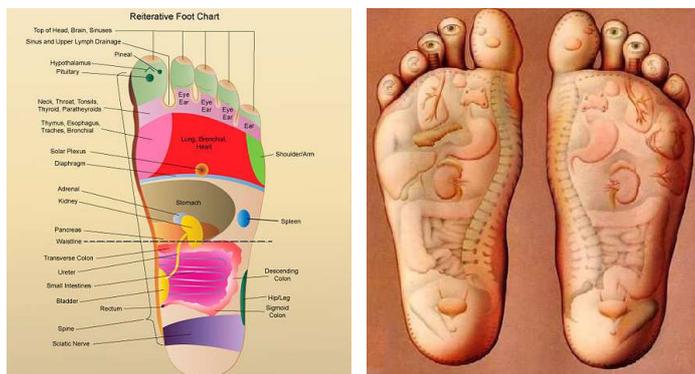


Figure 3 Reiterative reflexology foot charts

**III. Proposed Model**

Restorative conclusion utilizing the foot is an extraordinary and imperative demonstrative technique for Traditional Chinese Medicine (TCM). Then again, the clinical uses of foot analysis have been executed with foot judgment is in light of the limit of the eye for detailed discrimination and the precision of foot conclusion relies on upon the experience of doctors. Conventional foot conclusion is constantly committed to the recognizable proof of disorders other than infections. To address these issues, we show a Foot Computing Model for the analysis of Diabetic ulcer in view of chromatic and textural measurements. These measurements are registered from genuine nature foot pictures by utilizing suitable systems of picture handling.

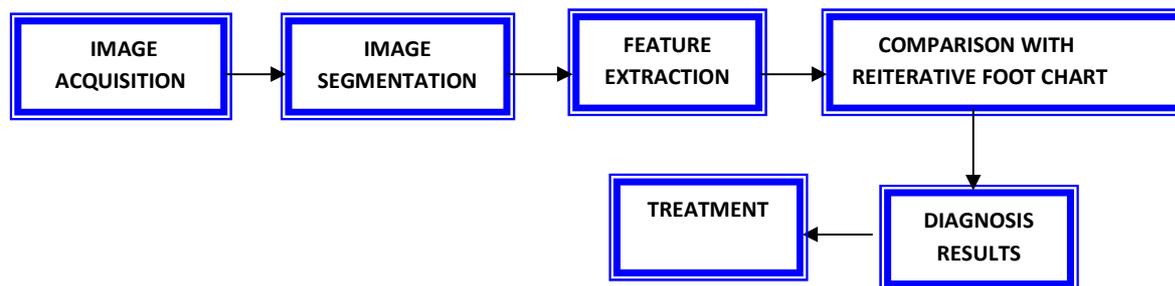


Figure 4 Proposed Models

Foot pictures are the rudimentary gimmicks for conclusion of different illnesses. For the simplicity of the determination, the foot pictures ought to be handled unmistakably and legitimately. As we talked about prior, foot picture preparing is truly a intense undertaking because of the foots specific peculiarities like, its unpredictable shape, obstruction with the lip, covering of hues, predominance of one shading, and so forth. So it's hard to get a viable finding of maladies without a successful foot picture handling. The principle emphasizes that are utilized for diagnosing the foot incorporate shape, shading, pimples, breaks and composition of the foot. The side effects of any of the body issue, for example, heart related issues, kidney related issues, and so forth will be reflected as anomalies in any of the gimmicks. Along these lines, the majority of the illnesses can be located effortlessly by the examination of the foot. For definite investigation of the foot, we utilize the foot pictures; with the assistance of the acceptable foot pictures a definite finding of foot can be conceivable.

The Human foot is that piece of the body which is presented the most to climate irregularities. Unreasonable introduction to water, mud and earth in this manner ends up being unsafe for human feet. The Foot drenches up water and always gets presented to soil and mud amid storms. This predictable moist condition brings about foot soreness and breaks. At that point grimy water adds to your burdens, since this welcomes parcel of germs and microbes. These outcomes results in serious irritation and redness which if left untreated, frequently takes the state of genuine skin anaphylaxes.

An alternate normal foot affliction from which numerous endure amid rainstorm months is the competitor's foot. A blend of bacterial and parasitic contamination, the sickness begins from toe partition and spreads slowly. Those whose feet stay wet for extended periods and that too with messy water are more vulnerable to this foot illness. Player's foot brings about staining of the influenced share. Basically the foot turns greenish or whitish with steady irritation. In extreme cases, foul smell and discharge are watched as well. To identify the diabetic ulcer from the foot, the image of foot has to undergo a proper image segmentation and texture analysis as mentioned in figure 4.

## RESULTS AND DISCUSSION

The foot image is taken using Digital imaging acquisition tool. The term is often assumed to imply the processing, compression, storage, printing, and display of such images. The foot image of an infected person is captured using Iphone as shown in figure 5.



Figure 5 shows the image acquisition device



Figure 6 Foot with beginning stage of ulcer and intermediate stage

The image of a diabetic patient is shown in figure 6. This image is sent to image segmentation tool based on colour segmentation. Image Segmentation is subdividing an image into its various objects i.e. set of pixels, pixels in a district are comparative objects as per some homogeneity criteria, such as colour, intensity or texture so as to locate and identify boundaries in an image [4]. Morphological strategies are connected to expel the commotions far from pictures which connected to smooth a few spots on uniformed examples. Shading space changed strategies are utilized to change other shading space to RGB. The normal intra-group separation based strategy is a conventional system petitioned change. For discovering the exact position using a proper group number and section pictures in shading spaces K mean calculation is used. The bunch with the most extreme normal change is part into new groups [5].

The output of colour segmentation as shown in figure 7 is fed to the feature extraction tool. Feature extraction begins from a starting set of measured information and manufactures inferred qualities (gimmicks) expected to be enlightening, non excess, encouraging the resulting learning and speculation steps, now and again prompting better human translations. Characteristic extraction is identified with dimensionality decrease. Scale-invariant Feature transforms (or SIFTS) is a calculation in PC vision to discover and portray nearby gimmicks in pictures. The calculation was distributed by David Lowe in 1999 [6].

SIFT key points of items are initially removed from a set of reference images and put away in a database. An article is perceived in another picture by separately looking at each one gimmick from the new picture to this database and discovering hopeful matching peculiarities taking into account Euclidean separation of their peculiarity vectors. From the full set of matches, subsets of key points that concede to the article and its area, scale, and introduction in the new picture are recognized to channel out great matches. The determination of steady groups is performed quickly by utilizing an effective hash table usage of the summed up Hough change. Each one group of 3 or more peculiarities that concede to an article and its stance is then subject to further itemized model confirmation and in this way anomalies are tossed. At last the likelihood that a specific set of gimmicks shows the vicinity of an item is registered, given the exactness of fit and number of plausible false matches [7]. Object matches that finish all these tests can be recognized as right with high confidence



Figure 7 Colour Image segmentation and Texture Analysis

The position of infected area is highlighted and compared with the reiterative foot chart. The organ which is related to the affected region is identified. The possible symptom which has caused the infection is analyzed from the database stored.

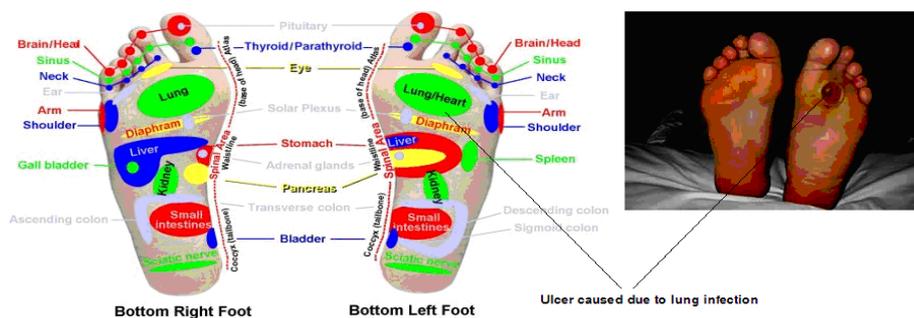


Figure 8 Comparison Analysis

### CONCLUSION

The base of our feet could control different zones of our body. Each foot includes 7,000 nerve endings called reflexes that compare to each organ and framework inside your body. By pressing on these impulse focuses, we can empower the sensory system and open vitality pathways that may be blocked or congested. In this paper, a detailed study of the foot reflexology chart is explained with illustrations to avoid diabetic foot ulcer. Along with reiterative foot chart method the application of image processing can be combined to have a better result. The same process when executed manually there might be parallax error along with misguide of analysis. This problem is successfully overcome in our method and the patient can be benefited with an ease.

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