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SKIN CANCER SEGMENTATION, DETECTION AND CLASSIFICATION USING HYBRID IMAGE PROCESSING TECHNIQUE

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Abstract: Skin cancer is one of the most dangerous forms of all cancers that occur in human beings. Among all Sorts of skin cancers Melanoma is the most deadly, which accounts for more than 40% skin cancer Death all over the world. Even though many skin cancers are deadly, but can be treated successfully. If detection early stages. Many computer Based automated detection techniques are developing using image processing for early detection and Prevention of this deadly disease. The author in this work proposed a unique method of using artificial intelligence tools in combination of image processing, to improve detection and prevention accuracy rates. This unique method use image processing techniques to compute ABC parameters. Whereas A denotes Asymmetry, B denotes Border Irregularity, and C denotes Colour variance in tumor region. These work also takes in to account other factors that vary skin cancer risk, broadly categorized in seven parameters namely Age, Sex, geographical location, complexion, Ethnicity and occupation. Artificial intelligence is used in evaluation of ABC parameters along with these and even parameters to train neural networks, the thereafter trained neural network are able to classify/segment and predict skin cancers with high precision and accuracy.

Keywords: Skin Cancer, Melanoma, Image Processing, Artificial Intelligence.

I. INTRODUCTION

An accumulation of strange cells in our body is name as disease. In people malignancy can begin anyplace in the body and spread into the encompassing tissues which is comprised of trillions of cells. Typically, human cell develope and partition to frame new cells as per the prerequisite of the body and it fluctuate individual to individual. At the point when malignancy begins to create in the body the procedure of reproduction of new cell stops and the cell turns out to be increasingly strange and another cell shape which is not required. That additional phone develops without halting and called as tumors. Harmful tumors are dangerous. This implies they can develop and spread into close-by tissues. In short an illness in which irregular cells isolate wildly and decimate body tissue coming about tumors namely Cancer is a gathering of infections including anomalous cell development with the possibility to attack or spread to different parts of the body. Not all tumors are destructive; benevolent tumors don't spread to different parts of the body. Conceivable signs and indications incorporate an irregularity, unusual dying, delayed hack, unexplained weight reduction and an adjustment in defecations. While these side effects may show growth, they may have different causes. More than 100 growths influence people. [2] [3] These days, skin tumor has been progressively distinguished as one of the real reasons for deaths. Research has demonstrated that there are various sorts of skin growths. Late reviews have demonstrated that there are around three ordinarily known sorts of skin tumors. These incorporate melanoma, basal cell carcinoma (BCC), and squalors cell carcinomas (SCC) However, melanoma has been considered as a standout amongst the most perilous sorts as in it is destructive, and its commonness has gigantically expanded with time. Melanoma is a condition or a confusion that influences the melanocyte cells consequently hindering the combination of melanin. A skin that has insufficient melanin is presented to the danger of sunburns and additionally hurtful ultra-violet beams from the sun. Scientists assert that the sickness requires early mediation keeping in mind the end goal to have the capacity to distinguish correct side effects that will make it simple for the clinicians and dermatologists to anticipate promote contamination. This issue has been turned out to be unusual. It is portrayed by improvement of injuries in the skin that change fit as a fiddle, size, shading and texture. Though a great many people determined to have skin malignancy have higher opportunities to be cured, melanoma survival rates are lower than that of non-melanoma skin growth. As more new instances of skin malignancy are being analyzed in the U.S. every year, a mechanized framework to help in the avoidance and early identification is exceptionally sought after. Taking after are the estimations of the American Cancer Society for melanoma in the United States for the year 2014. [4] [5]

II. LITERATURE REVIEW

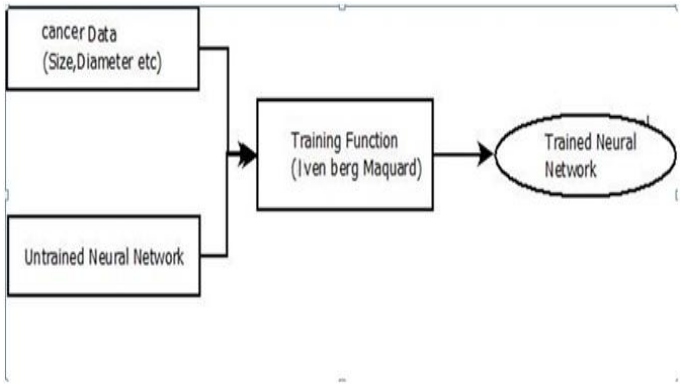
It is trying to build up an insightful operator based or mechanical framework to lead long haul programmed wellbeing checking and powerful proficient illness determination as self-ruling e-Careers in genuine applications. In this examination, we plan to manage such difficulties by introducing a clever choice emotionally supportive network for skin sore acknowledgment as the underlying stride, which could be installed into an astute administration robot for wellbeing observing in home situations to advance early finding. The framework is created to recognize kind hearted and threatening skin injuries utilizing numerous means, including pre-preparing, for

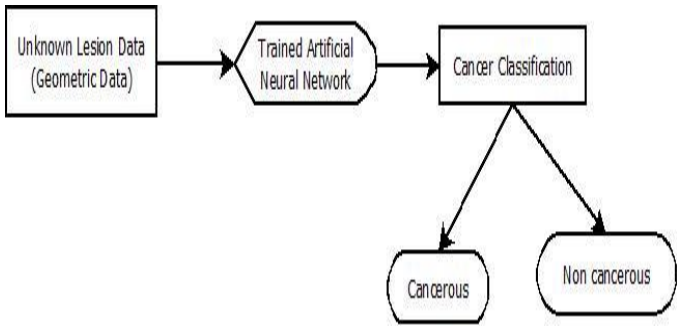
example, clamor evacuation, division, and high light extraction from sore locales, highlight choice and arrangement. Subsequent to extricating a huge number of crude shape, shading and surface elements from the injury ranges, a Genetic Algorithm (GA) is utilized to distinguish the most separating noteworthy element subsets for solid and destructive cases. A Support Vector Machine classifier has been utilized to perform kind and dangerous injury acknowledgment. Assessed with 1300 pictures from the Dermofit dermoscopy picture database, the observational outcomes demonstrate that our approach accomplishes better execution in correlation than other related research detailed in the writing. Schmid has used numerous techniques to distinguish injury outskirts and broke down the measurement of symmetry in a skin sore pigmentation PC helped analysis (CAD) framework. In their work, a sore picture is first handled by rendering the external layer of skin translucency utilizing Epiluminescence microscopy (ELM), otherwise called amplified oil inundation bioscopy. At that point the sore is identified either utilizing picture division or an outskirt recognition strategy. Once the injury is found, and its components were removed, which were then utilized for characterization. Threatening sores and the histopathology were then put away locally which are utilized as a kind of perspective database. In this exploration, we utilize the Edinburgh Research and Innovation (Dermofit) dataset for framework assessment. This dataset comprises of 1300 pictures of injuries with 850 kindhearted and 450 melanomas pictures. A large portion of the 1300 pictures are 8-bit red green-blue (RGB) shading pictures in an assortment of resolutions. Since the vast majority of them, in any case, comprise of 720 pixels in the longest measurement, different pictures that did not meet this standard were resized to 720 pixels in the longest measurement, with the viewpoint proportion being kept up. For each situation, the sore shows up in the focal point of the picture with non-injury skin noticeable toward the edges of each picture. This required a mean run-time in the vicinity of 5 and 10ms, in spite of the fact that this will shift contingent on which base SVM model is used. When all is said in done, this framework can perform proficiently and stretch around 30 fps on i7 quad-center CPUs with 16GB RAM. In this exploration, we utilize 1200 pictures for preparing and 100 pictures for testing from the above database. In spite of the fact that the GA is similarly prevalent in its conveyed results, the tests additionally uncovered deficiencies, because of the trouble of worldwide maxima finding, the presence of which will be the subject of further research. The GA approach has been connected in this exploration to choose applicable and solid variables and do skin injury classification. The aftereffects of the analyses were contrasted and those gotten for related research, for example. [1]

III. METHODOLOGY

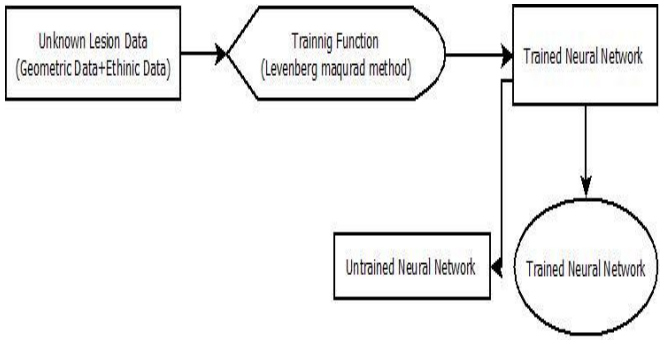
A. System Block Diagram

To segment is taken in flowchart diagram and one is tumor data and cancer data is taken according to size and diameter, and part is untrained neural network and training function and training neural unknown lesion data or cancer data is taken according to geometric position and like as country and age and skin colour etc, is trained artificial neural network and its is classified into two categories one is cancerous and other is non cancerous.





Second we process in block diagram we take geometric data and ethnic data sex, skin colour and ethnicity addition with diameter size and training function with artificial neural network and it will be sent untrained neural network and trained neural network.



Unknown lesion data is classified the data which is cancerous or non cancerous.

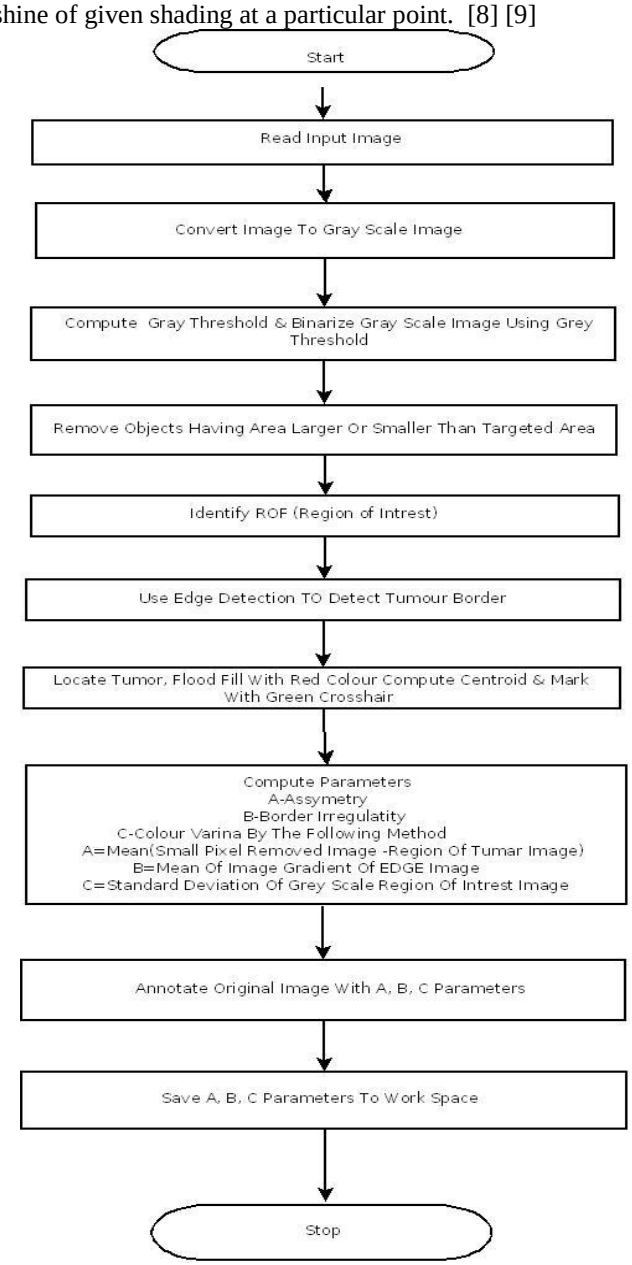
B. Digital Image

Digitization is the way toward changing pictures, content, or sound from simple media (for the most part arrangements or articles that we can see or listen) into electronic information that we can spare, sort out, recover, and reestablish through electronic gadgets into distinguishable surrogates of the first

works. Of the tremendous number of advanced resources that are being made, still pictures, writings, films, and sound recordings prevail. [6] [7]

C. Raster

Raster pictures have a limited arrangement of advanced esteems, called picture components or pixels. The advanced picture contains a settled number of lines and segments of pixels. Pixels are the littlest individual component in a picture, holding old-fashioned esteems that speaks to the shine of given shading at a particular point. [8] [9]



IV. RESULT

In the system, detection of cancer using image processing and artificial intelligence, first we taking a image 15 which is non cancerous and clinical interpretation is will be non cancerous, and image 16 and image 17, image 18, will be same in testing data's and image 19 is cancerous or clinical interpretation is cancerous and image 20 will be same.

Table 1

S. No	Image	A	B	C	Clinical Interpretation
1.	Image 15	.091627	3.8699	23.6309	Non Cancer
2.	Image 16	.018025	13.5512	34.3909	Non Cancer
3.	Image 17	.073465	10.0426	31.9186	Non Cancer
4.	Image 18	.089849	1.5748	17.1356	Non Cancer
5.	Image 19	.063565	2.3544	23.5474	Cancer
6.	Image 20	.062114	1.5888	9.6804	Cancer

In table we take 6 images for artificial neural network results and taking ANN predication value ANN result for image 15 is cancerous and clinical interpretation is non cancerous that's mean error is 1in ANN predication, for image 16 ANN result is non cancerous and clinical interpretation is also non cancerous that mean's error is zero and same result is generating for image 17 and its Ann result cancerous and its clinical interpretation is non cancerous that mean error is 1 again and next for image 18 is cancerous in ANN results and clinical interpretation is non cancerous.

Table 2

S. No	Image Name	A Asymmetry	B Border	C Color	Clinical Interpretation
1.	Image 1	.14746	2.021	12.8142	Non Cancerous
2.	Image 2	.27176	2.337	17.9604	Non Cancerous
3.	Image 3	.14143	1.5638	17.8385	Non Cancerous
4.	Image 4	.18716	4.1598	21.2363	Non Cancerous
5.	Image 5	.18701	3.2431	20.7866	Non Cancerous
6.	Image 6	.089316	4.732	9.5789	Non Cancerous
7.	Image 7	.37833	2.5229	12.3672	Non Cancerous
8.	Image 8	.13989	2.5571	13.9347	Cancerous
9.	Image 9	.094385	8.3179	32.7869	Cancerous
10.	Image 10	.13895	1.4133	15.5269	Cancerous
11.	Image 11	.14706	9.8889	38.1761	Cancerous

Table 3

S. No	Image	A	B	C	Ethnicity	Sex	Skin Color	Clinical Interpretation
1.	Image 15	.091627	3.8699	23.6309	Asia	F	Fair	Non Cancer
2.	Image 16	.018025	13.5512	34.3909	South America	F	Wheatish	Non Cancer
3.	Image 17	.073465	10.0426	31.9186	Africa	F	Wheatish	Non Cancer
4.	Image 18	.089849	1.5748	17.1356	Asia	F	Wheatish	Non Cancer
5.	Image 19	.063565	2.3544	23.5474	Australia	M	Fair	Cancer
6.	Image 20	.062114	1.5888	9.6804	North America	F	Wheatish	Cancer

Table 4

A. Country and continent wise.

s.no.	Continent	Risk factor assignment
1	North America	3
2	South America	2
3	Europe	2
4	Asia	1
5	Africa	1
6	Australia	3
7	Antartica	3

B. Sex wise.

s.no	Gender	Risk factor
1	Male	2
2	Female	1

Table 5

C. Skin color wise.

s.no	Skin colour	Risk factor
1	Dark	1
2	Wheatish	2
3	Fair	3

V. CONCLUSION

Skin Cancer detection and diagnosis using image processing, neural networks and medical features such as A, B, C parameters are implemented. It proves to be a better diagnosis and early warning and prevention tool and eradicates the need for biopsy for skin cancer screening at early stages. A unique method of combining skin cancer risk parameters with tumor/skin region image processing results (ABC parameters) is employed to achieve significantly higher detection and prevention rates. A lever berg maquardt, artificial neural network is Trained using image processing obtained ABC parameters (A mean small pixel removed image: B mean image gradient of edge image: C mean standard deviation of gray scale region of interest image) and statistical parameters that affect skin cancer risk such as. The resultant neural network is highly efficient and can contribute largely in early stage.

VI. FUTURE SCOPE

The author has developed a unique technique of improving accuracy of computerized skin cancer diagnosis techniques, but still there is a lot more to be done to be able to use this technology in medico legal and commercial aspect. One of the most important enhancements requires is on integrated system with image capture device and FPGA accelerated hardware's to effectively provide commercial diagnosis system (s). Also by varying the image processing techniques and training algorithms of neural networks, and method of combination of image parameters with statistical parameters, the accuracy of this system can be improved further. Also with evolving mobile phone techniques and its camera's, this system can be integrated into on app, which common people can use for skin cancer screening. [10]

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