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Literature review on identification of Malignant Region in human body

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Abstract - *In medical science, abnormal growth of any cell is called cancer. This abnormal growth of the cancer cell can find the any part/location of the body. This different location is called malignant region. In this paper we focus on the different types of malignant region detection using Thermal Infrared Image. We analyzed different Images like thermal imaging, x-ray imaging, magnetic resonance imaging (MRI), optical imaging of abnormal cell in human body. Derive and explain the advantages and the important of thermal imaging as compare with other imaging technique.*

Keywords: *Medical Imaging, Malignant, Thermal Imaging, Cancer Biomedical*

1. INTRODUCTION

A disease caused by an uncontrolled division of abnormal cells in a part of the body it is known as cancer. Cancer is multi stage process in which the normal cells will transform in to the pre-cancerous lesion to a malignant tumour. WHO, through its cancer research agency, International Agency for Research on Cancer (IARC), maintains a classification of cancer-causing agents. Ageing is another fundamental factor for the development of cancer. The incidence of cancer rises dramatically with age, most likely due to a build-up of risks for specific cancers that increase with age. The overall risk accumulation is combined with the tendency for cellular repair mechanisms to be less effective as a person grows older.

The causes of the cancer's mostly apart from genetic factors it may also includes 3 external agents like physical, chemical, and biological carcinogens. Type of cancer which is occurring due to ultraviolet and ionizing radiation from various sources is called physical carcinogens. Smoke, tobacco, asbestos, food and water contamination due to certain chemical components is called as chemical carcinogens and infections from viruses, parasites or bacteria are biological carcinogens.

Approximately 70% of deaths from cancer occur in low- and middle-income countries.

1.1 TYPES OF IMAGING

- X-RAY IMAGING

The mammograms for any specific abnormality hunts by radiologist expert. Biopsy and anxiety for the patient involved due to human factor error. To overcome this problem use computer-aided detection (CAD) system to reduce the human factor involvement and to help the radiologist to find out the mammograms automatically.

- MAGNETIC RESONANCE IMAGING (MRI)

The data of MRI is important but, it may affect on normal human body. MRI is an advanced technology which gives the rich information about human self tissue anatomy.

Different teachnic to detect the cancer cell using the MRI :-

i) Dynamic contrast enhances MRI.

ii) Proton magnet resonance spectroscopy.

For detecting and clinical management of breast cancer used the dynamic contrast enhances method. Nowadays major health disorder is breast cancer.

It can cause death when it is not treated According to statistics a total of 1,660,290 new cancer cases and 580,350 cancer deaths are projected to occur in the United States in 2013.About 234,580 cancer are detected as in Cancer Journal for Clinicians.

The sensivity of Mammography for breast cancer detection is moderate (75%) and even reduced in women with dense breasts is 62 %.X- mammography has a 22 % false positive rate in women under 50. The mammography cannot identify whether the cancer is malignant tumors.

Drawbacks of MRI and Ultrasonic is

a) It is high cost,
b) Low throughput
c) Low sensitivity.

Because of this drawback of MRI system, rarely used this system for the detection of the breast cancer. After this many techniques/methods comes out to detect breast cancer such as elastography, tomosynthesis, dedicated computer tomography (CT), positron emission tomography (PET) , photo acoustic imaging and optical imaging,

1.2 Imaging of Breast Cancer

To detect or diagnosis the cancer, the image of the breast is important aspect.

Different technique is used for imaging/detecting breast cancer are following:-

(a) Volumetric X-Ray Imaging Techniques
(b) Stereoscopic Digital Mammography
(c) Optical Imaging
(d) Infra Red Image
(e) Thermal of The Human Body
(f) Optical Imaging Of The Breast
(g) Visible range lages

INFRA RED IMAGE is used to detect cancer. It pennetartes into significant depth that depth range is 600-100nm. False positive rate for the diagnostics can be overcome by this imaging process.

THERMAL OF HUMAN BODY, according to the changes in temperature of the human body we can detect diseased.

Cancer cell, the abnormal growth of cells is nothing but cancer cell, this cell consumes the less oxygen and utilization of glucose is 5-10 times higher than the normal cell.

Some parameter of the cancer cell, which is not follow the normal growth to cell:-

i) Metabolism is different
ii) Consumption of oxygen is different
iii) Utilization of glucose is more.

OPTICAL IMAGING, the optical term is relates with the light signal. It is totally depends on the light signal passes through the cell. That signal get absorb and then scatter through the cell. According the amount of light absorb and sctter form the cell. We need to identify weather the cell is growth is abnormal or not. Means weather the light signal is passes through the cell is cancer cell or normal cell.

VISIBLE RANGE LAGES, this method is relates with the face identification method. To identify the face become very difficult task in many application but some places or some application we used this teachnique like security , defence & intelligent machine.

1.3 THERMAL IMAGING

Nowadays thermal imaging teachnic is used in different medical operation to detect cancer. It is used particular assessment of human cell. This gives the advanced advantage than the infrared imaging.

The thermal imaging is detect the different body temp of human cell. According to this we are getting the information of the abnormal cell. If temperature changes according to that we get the abnormal growth of human body.

Steps for processing infrared thermal images in medicine.

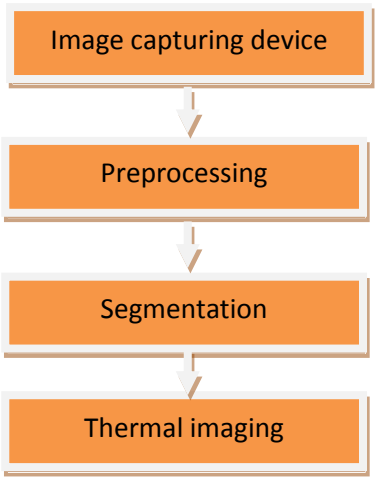

Fig -1: flow chart for thermal image processing

2. THE COMPUTERIZED CANCER DIAGNOSIS COMPRISES OF THREE PRIMARY COMPUTATIONAL STEPS:

Preprocessing

In this image preprocessing tools enhachased the some important feature to required the further processing. Ex. crop the image, remove unwanted image.

Feature Extraction

Feature extraction is one of important tools to extract image parameter that, want the processing and compare with real image.

There are different features extraction techniques, according to study, there are two main important methods:-

I) Thermal image processing
II) Thermal imaging.

Recently the low cost technique used i.e total array detector.

Bryan F. jones study and research on the temp of the human body. In which they takes difference between the image can taken orally & recent actual temp of the body. Comparing with this we find out the problem that affect a patient's physiology. This can happen with the help of infrared image processing.

2.1 THE PHYSICAL PRINCIPLES OF THERMAL IMAGING IN MEDICINE

All objects at temperatures above absolute zero emit electro-magnetic radiation spontaneously; this is known as natural or thermal radiation. The emissive power of a surface is the total energy that streams through the surface from the interior to the surroundings.

Table -1: Skin temperature measurement

Region of interest	Normal	Rheumatoid arthritis
Metacarpals	32.68±0.52	*35.28±0.83
Palm	34.43±0.2	*35.39±0.71 (P<0.001)

THERMOGRAPHY CAMERA

We utilized the infrared camera ThermaCAM S60 (FLIR Systems, International Main Office, Belgium) with the following main features: thermal sensitivity 0.06 Cat30 C and 50/60 Hz, spectral range 7.5–13 m (uncooled microbolometer with (320 240) pixels). The camera was placed on a tripod in our temperature-controlled room and calibrated after thermal equilibrium had been achieved (about 90 min after powering up).

Fig -1: Thermography camera

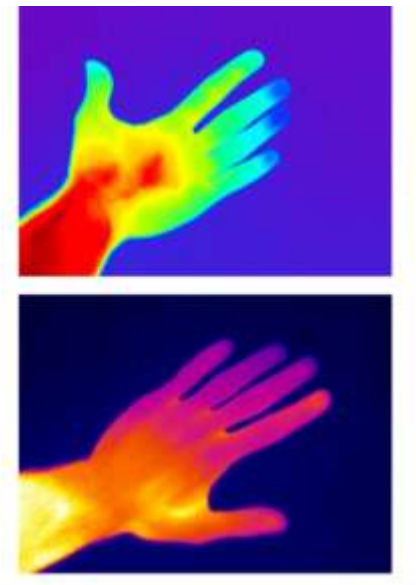

Fig -1: Image capture by thermal camera

3. CONCLUSIONS

We studied and research on all the technique to find the all cancer cell/ abnormal growth cell in human body. With respective to this the thermal image processing is emerging technique to find out the cancer cell in human body.

Thermal infrared imaging holds potential to be of great benefit within several areas of modern clinical medicine as a non- invasive physiological imaging modality. In order to realize this potential, the specific physical mechanisms of TIR emittance from human anatomy must be elucidated. Clinical TIRI must also undergo a rigorous holistic systems analysis, from which objective clinical protocols and contextual best practices may be established

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