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Survey on Uterus Cancer and Its Types

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Abstract:
The vital component of the female reproductive system is the uterus. Women are currently dealing with a number of issues pertaining to reproduction. Additionally, the prevalence of cancer is rising daily, with a higher risk of malignant tumors in women. To effectively detect the cancer, a variety of techniques are being utilized, including image processing, machine learning, and datamining. This study describes the various machine learning algorithms used in the diagnosis of uterine cancer.

Keywords: Uterus cancer, Machine learning, Histopathology.

INTRODUCTION

Because it is difficult to forecast when issues may arise, living a human existence is challenging. In general, most women have some sort of issue in their lives.A illness called cancer is characterized by aberrant cell proliferation that has the potential to spread and impact other bodily components

Humans can develop more than 100 different types of cancer. The 2018 Cancer Facts and Figures report from the American Cancer Society projects that 609,640 cancer-related deaths and 1,735,350 new cases of cancer will occur in the US alone. It's also important to note that because ovarian cancer might pose a hazard to women, it has its own section in this year's report.

One of the most dangerous illnesses in the world is cancer. Depending on the location, familial changes, and the cell of origin, it manifests itself in various ways. This disease has spread throughout the entire world as a result of people's changing lifestyles, which include increased tobacco use, poor eating habits, inactivity, and many more. Thanks to medical advancements, the disease is now relatively easy to cure than it was in the past. In essence, the degree of malignancy influences the choice of cancer treatment.

A common method for detecting cancer is radiological imaging. Radiological imaging is used to monitor the cancer's spread and treatment progress. Additionally, cancer is monitored with it. Accuracy and variety in oncological imaging are always improving. Various imaging modalities seek to identify the best course of action for each patient. To gather enough data, imaging techniques are frequently combined. For pathologists and other medical professionals, cancer detection has always been crucial to diagnosis and treatment planning. The process of identifying cancer from microscopic biopsy images is subjective and can differ among experts based on a variety of factors, including the absence of precise quantitative measures to classify the images as normal or cancerous.

The uterus is a hollow organ with a pear-shaped form that is situated in a woman's abdomen between the bladder and the anus. Another name for the uterus is the womb. The child develops in the womb.

The uterus consists of 3 parts:
The middle part, called the isthmus, is wider. The upper part is called the fundus and is domeshaped. Ute rine cancer occurs when normal cells in the uterus grow out of control and form tumors called tumors. T umors formed from cells can be benign.
Cancer cells can spread to other parts of the body. Benign cells can grow and do not spread to other parts of the body. There are two main categories of uterine cancer: Adenocarcinoma: This form of cancer accounts for almost 80% of uterine cancers. It is produced primarily from cells in the endometrium, the lining of the uterus. It is called endometrial cancer because it originates from cells in the uterus. Treatment for this type of cancer depends on how far the tumor has spread. Sarcoma accounts for almost 4% of all uterine cancers. It is composed primarily of cells from the myometrium, the lining of the uterus. It is called uterine fibroid cancer because it originates from the muscle cells of the uterus. Dealing for this type of cancer be subject to the dimensions of the lump.

LITERATURE SURVEY

Visual examination by a pathologist of a Histopathological uterine tissue example is still regarded as a confirmatory test for the diagnosis of uterine cancer. Physical evaluation is dependent on the pathologist's expertise and experience.[1] Therefore, objective analysis is a topic of concern. Structure analysis of the tissue sample is a useful method for the diagnosis,classification of endometrial adenocarcinoma. The ability to detect individual nuclei cells and grasp glandular structure are prerequisites for the efficacy of computer-assisted diagnosis, grading, and classification. The color deconvolution algorithm is used to extract the hematoxylin channel from an H&E stained image. This work uses morphological operation and thresholding to detect nuclei cells and analyze the glandular region structurally. Cell nuclei are removed from the stroma in order to increase system efficacy.
This paper presents a method for segmenting and classifying nuclei from uterine biopsy images using structural analysis of the glandular area. Initially, the H&E stain separation technique was used to separate the stromal and lumen regions in the images. Thresholding is used to transform nuclear images into bi-level images. Next, the connected component is analyzed. The stromal nuclei's tiny sections were eliminated. Morphological operations such as imfill and imopen are carried out in sequence. nucleus's perimeter is used as a reference. Cell nuclei are characterized by markers. By touching nuclei further, it is possible to separate them and analyze their features, such as size, shape, and roundness, to identify cancerous cells.
Numerous diseases have affected the modern world, and new ones continue to emerge daily. However, no other illness has put humankind in greater danger than cancer. It has claimed more lives than any other disease, which is the reason for it.[2] The American Cancer Society estimates that in the US only, 500,000 people will lose their lives to cancer in 2018. In addition, there are numerous varieties of this illness that impact a wide range of individuals of all ages and genders.
Cancer Even so, there is still a chance to cure this illness; what makes it so dangerous, though, is the issue of delayed detection. It is quite easily treatable if caught in its early stages. One of the cancer types with a very poor survival rate is ovarian cancer, which is frequently the result of delayed diagnosis and detection. It suggest a non-invasive sensor device for ovarian cancer prediction. This approach will produce a portable, easily useable device that can be used at home to provide an early diagnosis of ovarian cancer.
In this paper, an OLED-based portable non-invasive method for ovarian cancer detection has been proposed. In this instance, the OLED serves as both a light source and a light detection sensor. Here, an

early diagnosis of ovarian cancer has been made using the difference in fluorescence spectra between the urine samples from a healthy individual and an ovarian cancer patient. OLEDs are used as light detectors because they can distinguish between two distinct emission spectra and detect them. Based on these differences, the OLED generates current.

A urine sample from a healthy individual has more fluorescence, which results in more current being produced. Conversely, patients with ovarian cancer exhibit reduced fluorescence, which results in a smaller amount of current being generated. These two currents allow for easy calibration of the device and the creation of a portable ovarian cancer detection tool.

An automatic recognition and classification method for the identification of cancer from microscopic biopsy images was presented in paper [3]. A program will load a microscopic biopsy image from file. The CNN algorithm is used in image processing to read and segment images. The images are trained and tested using machine learning. It evaluates the photos and outputs a positive or negative result. This approach is faster and more accurate in its predictions.

The SIFT algorithm is used to implement the feature extraction technique. With the aid of variation, task, and positioning forms, the SIFT algorithm extracts features based on key point forms. We use a genetic algorithm to determine the optimal outcome. Three processes—crossover, selection, and mutation—are optimized.[4] We used the fitness function to find the fit value. Subsequently, we execute the CNN algorithm, which involves transferring information between two neurons and filtering the resulting data across multiple layers. In the previous accomplishment

The accuracy obtained with the CNN classifier is 98.8%, and the accuracy obtained with the SVM classifier is 85.01%. The evaluation of the performance metrics in relation to accuracy, specificity, and sensitivity.

Additional treatment options and how Convolutional Neural Networks can be used to classify ovarian cancer tumors.[5] Various ML algorithmsare compared in this research work when it comes to ovarian cancer detection. After comparing the various approaches to cancer detection, it appeared that the Deep Learning Technique produced the best results.

The precise, automatic technique for distinguishing between malignant and noncancerous images is covered in paper [6]. The microscopic images of the uterus under consideration are known as histological images. Every day, thousands of samples are collected, making it challenging for the medical staff to manually assess every sample. The project's goal is to assist medical professionals in automatically distinguishing between images that are cancerous and those that are not.

Model is built using CNN to distinguish among tumorous and non-cancerous images. This model routinely classifies cancerous and non-cancerous images**.**

A CADx method called HIENet, based on a CNN and attention mechanisms, is developed in paper [7]. For four classes of endometrial tissue—normal endometrium, endometrial polyp, endometrial hyperplasia, and endometrial adenocarcinoma—HIENet achieved a 76.91 ± 1.17% (mean ± s. d.) accuracy in the ten-fold cross-validation on approximately 3,300 hematoxylin and eosin (H&E) image patches from approximately 500 endometrial specimens. Additionally, in a binary classification task that identified endometrioid adenocarcinoma, HIENet accomplished an area-under-the-curve (AUC) of 0.9579 ± 0.0103 with an 81.04 ± 3.87% sensitivity and 94.78 ± 0.87% specificity.

Furthermore, HIENet with 84.50% accuracy in the 4-class classification in external justification using 200 H&E image patches from 50 randomly selected females. And demonstrated an AUC of 0.9829 with a sensitivity of 77.97% (95% confidence interval, CI, 65.27%~87.71%) and a specificity of 100% (95% CI,

97.42%~100.00%).

Filter is applied to ultrasound images acquired from organs and theeffectiveness of various methods usin g similarity index is evaluated by comparing itwith various speckle reduction filters such as Lee and Quan filter basedon quality metrics such as PSNR, MSE, RMSE, etc. Sensitivity, accuracy, similarity index, etc**.**

Otsu thresholding algorithm and level set are used to segment endometrial cancer. [8]Out of these, the Otsu method more accurately segments the lesion area than the level set method. To examine the performance constraints of Kuan, Lee, and SRAD, quality metrics such as RMSE, PSNR, and MSE are used.

METHODOLOGY

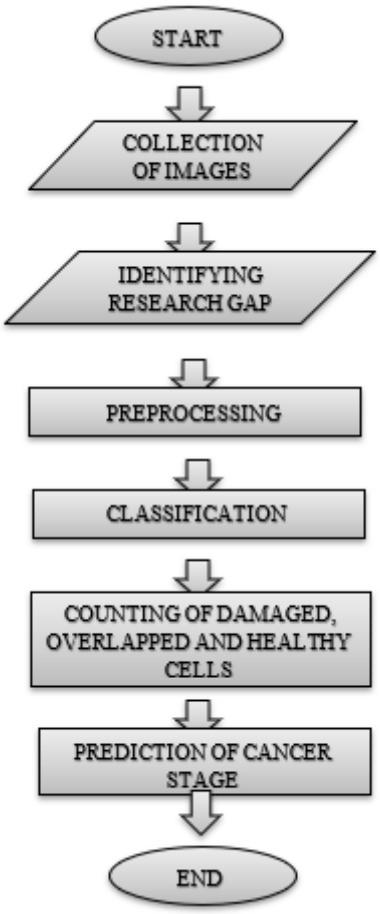

Figure: Proposed Methodology

The proposed methodology aims to fullfil the requirement and Existing research gap, where the detection and identification of damaged and healthy cells are detected,and also overlapped cells are identified and counted.

CONCLUSION

Various techniques are being used to identify, analyze the uterus cancer. Images used in each research will vary based on the type of work that is carried out. Images like histopathology are used in detailed analysis of the cancer. More work needs to be done using histopathology images. Ultrasound images help in tumour identification. And also hybrid classification techniques can be used to classify which gives better and accurate results in prediction of cancer.

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