

**DEPARTMENT OF COMPUTER SCIENCE**

**NIE FIRST GRADE COLLEGE**

**#65, VISHWESHWARANAGAR MYSURU-570008.**

**PROJECT SYNOPSIS**

**ON**

**CANCER CELL DETECTION**

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**Introduction**

Cervical Cancer is one of the most common cancers among women worldwide. Few concerns have arisen such as the shortage of skilled pathologists leading to increase in burden on them. This requires a need for efficient and accurate method that diagnoses cervical cancer without human intervention. In this Paper, an automated system is developed for diagnosis of cervical cancer using image processing techniques. MATLAB image processing toolbox is used to extract features from cytology images that are used for discriminating various stages of cervical cancer. The dominant features used for diagnosis are Nucleus to cytoplasm ratio, shape, and color intensity along with nucleus area, perimeter and eccentricity.

1. Nucleus-to-Cytoplasm ratio: It is seen that this ratio is high for cancerous cells and less for noncancerous cells, because of the larger nuclei.
2. Shape: Depending on the intensity of the cancer, the cancer cells are of two types, Low-grade and High-grade. Low-grade cells are mostly circular in shape whereas high grade cells are tapered and possess spindle like structure.
3. Colour intensity: Colour intensity is referred to colour pixel distribution in a cell. The larger nuclei area indicates the bigger proportion of darker pixels in the cell. Cancerous and non-cancerous cells have distinctively different colour intensity distribution.

The cytology cells were then successfully classified as non-cancerous, low- grade and high-grade cancer cells.

Cervical cancer in women is one of the most common cancers worldwide, next only to breast cancer. Middle- aged women between the ages of 40-55 years are mostly affected by this cancer. Every year cervical is diagnosed in about 500,000 women globally and is responsible for more than 280,000 deaths annually. Nowadays there is a wide variation in the number of cervical cancer cases across the globe. Risk factors include smoking, unprotected sex or having HIV infection, prolonged use of birth control pills. 80% of the new cervical cancer cases occur in developing countries, like India, which reports approximately 1/4th of the world’s cases of cervical cancer each year. This cancer is caused by a virus called Human Papilloma Virus (HPV).

Two popular screening tests which help in the early detection of cervical cancer or prevent cervical cancer are: (i) Pap test (or Pap smear)-looks for pre-cancer cell changes on the cervix. (ii) HPV test- looks for the HPV virus that causes the cell change. Another popular screening method is the Liquid Based Cytology (LBC). LBC is a way of preparing cervical samples for examination and diagnosis in the laboratory.

This paper presents an efficient and proficient method for the diagnosis of cervical cancer using Digital Image Processing from cytology images.

**Existing System**

Lassouaoui, Hamami, and Nouali (2007) discuss morphological description of Cervical Cell Images for the pathological recognition. This may be used to develop a computer system which can help doctors in tracking the cervical cancer. It includes various algorithms for detection of the cellular components and the stage of discriminating the abnormal signs of cells. The descriptions are ratio core cytoplasm, the nuclear deformity, the cytoplasm deformity, the heterogeneous texture of each cell component and anisocariose. The obtained characteristic vectors of each cell are the input of the recognition stage of computer system of tracking the cervical cancer.

**Proposed system**

Cervical Cancer is one of the most common cancers among women worldwide. Few concerns have arisen such as the shortage of skilled pathologists leading to increase in burden on them. This requires a need for efficient and accurate method that diagnoses cervical cancer without human intervention. In this paper, an automated system is developed for diagnosis of cervical cancer using image processing techniques. The system is developed using Cytology images taken from Bangalore based cancer pathologist. MATLAB image processing toolbox is used to extract features from cytology images that are used for discriminating various stages of cervical cancer. The dominant features used for diagnosis are Nucleus to cytoplasm ratio, shape, and color intensity along with nucleus area, perimeter and eccentricity. These features are used to train the neural network using Back-propagation algorithm of supervised training method. The cytology cells were then successfully classified as non-cancerous, low- grade and high-grade cancer cells.

**Objective**

* To develop an automated system that enable proficient and effective detection of Cervical Cancer that can be implemented for commercial purpose.
* Making use of image processing toolboxes of MATLAB
* Pathologists can use this method as a decision support in detecting cancer. This will reduce the workload on clinicians and makes the diagnosis of cancer faster, economical and more accurate.
* Different features explored in various works are considered along with new significant features in this work and extracted to increase the efficiency of Cancer diagnosis system

**Flow Diagram of Methodology**

**INPUT**

**GAUSSIAN FILTER**

**GRAY SCALE CONVERSION**

**GROUPING AFFECTED CELLS**

CELLSCCCELLS

**BRIDGE AND HOLE FILLING**

**CANNY EDGE DETECTION**

**DETECTION OF CANCER CELLS**

**Requirement Specification**

**Software Requirements**

Tool : MATLAB

Operating System : Windows 7 (higher version)

Coding Language : MATLAB Code

**Hardware Requirements**

Processor : I3

Hard disk : 100 GB

RAM : 2 GB Above

**Conclusion**

Cervical cancers are screened manually by using the Pap smear test and LCB take a look at which does not deliver correct classification results in classifying the regular and unusual cervical cells in the cervix location of the uterus. The manually screened technique suffers from high fake price due to human errors and also cost effective to be achieved by using the skilled cytologist. In this paper, a method is achieved for the automated detection of cervical cancer using image processing techniques. The automated techniques are done to supply correct outcomes and to make powerful classification of normal and abnormal cells.

**Future Enhancement**

The project has covered almost all the requirements. Further requirements and improvements can easily be done since the coding is mainly structured in nature. Improvement can be appended by changing the existing system.

This system is designed for Cervical Cancer detection to provide accurate stage of cancer. Which have been implemented in Medical field and though it will be implemented more in future.

This feature can be enhanced in future like as following:

* In future this system can provide other Cancer like Blood Cancer ,Lung Cancer.
* Our future work includes classifying the cancerous cells further as low grade and high grade cells. This can be done by applying various machine learning algorithms. The same system can be done by using Neural Networks instead of Image processing which is of higher accuracy.