

# Identification of PAP Smear Image Using Image Processing Techniques

K. Deepa<sup>1</sup> and K. Priyanka<sup>2\*</sup>

<sup>1</sup>Assistant Professor, Department of Computer Science and Engineering, M. Kumarasamy College of Engineering, Karur, Tamil Nadu, India. Email: [deepak.cse@mkce.ac.in](mailto:deepak.cse@mkce.ac.in)

<sup>2</sup>Student, Department of Computer Science and Engineering, M. Kumarasamy College of Engineering, Karur, Tamil Nadu, India. Email: [skpriyanka1994@gmail.com](mailto:skpriyanka1994@gmail.com)

\*Corresponding Author

**Abstract:** Nowadays medical image processing is a very important activity of the current techniques and it helps to diagnosis the different types of diseases. In image processing various steps and different techniques are used to retrieve the required image. The main objective of this paper, to discuss about the segmentation techniques, feature extraction methods and image classification techniques. These techniques are helps to select the appropriate method and provide a high accuracy and sensitivity of the given image. Particularly cervical images take to retrieve the data, which cervical cancer is the second most cancer among the world. So this type of image retrieval is help to decrease the women death due to cervical cancer.

**Keywords:** Accuracy and sensitivity, Classification, Feature extraction, Medical image processing, Segmentation.

## I. INTRODUCTION

Image retrieval technique specially helps to retrieve the medical images for cures different types of diseases. Image retrieval process has following steps like that image processing, segmentation, feature extraction, feature selection and image classification techniques are used to carry out of retrieval technique. In each step has utilizes the different techniques which suitable one. Pictures are fundamentally used in field of software engineering for removing significant data [1]. Picture preparing has a huge scope of utilizations in each field. In restorative, it is utilized recognizable proof of sicknesses through MR pictures. Division is a methodology of isolating a picture into unmistakable parts. This serves to enhance or change the general introduction of a photo into such data which is more vital and less difficult for a system to analyze. Purpose behind isolating a photo is to additionally separate every one of these subparts or sub-pictures with the goal that some propelled data can be removed. Sometimes picture de-noising is completed before division to enhance the photo and improve the nature of the procedure. Highlight extraction techniques are

named low-level element extraction and High-level element extraction. Low-level element extractions depend on finding the focuses, lines, edge, and so forth while abnormal state include extraction techniques utilize the low level component to give more noteworthy data to additionally handling of Image examination [3]. For the most part abnormal state highlight extraction strategy utilizes the Artificial Neural Network (ANN) to separate the component in various layers. Highlight extraction strategy is utilized to remove the highlights by keeping however much data as could reasonably be expected from expansive arrangement of information of picture. Proficiency and viability of highlight choice and extraction are extreme test these days. Precise ID of the highlights present in a picture is the real target of picture arrangement. Picture grouping utilizes both managed and unsupervised characterizations. For administered grouping, we make utilization of a prepared database alongside human mediation. On account of unsupervised grouping, human mediation isn't by any stretch of the imagination required as it is completely PC worked.

## II. RELATED WORK

In image processing is an important work of the image retrieval at current issues. In this paper discuss about the segmentation techniques, feature extraction technique and image classification techniques are briefly explained. Picture division is a procedure of partitioning a picture into various arrangements of pixels [2]. Division is required to separate the area of enthusiasm from the picture. In picture characterization, the nearby highlights of the picture are used to recognize the diverse pictures. These highlights are categorised on the different key part of picture information like shading force, edges of the articles present in picture, surface, and so forth. The productivity of highlight extraction strategy improves the further preparing of a picture as it were. These highlights can be utilized in picture coordinating, design acknowledgment and recovery. These applications require the conservative and pertinent data to accomplish high level of exactness.

### III. SEGMENTATION TECHNIQUES

#### A. Gradient Based Method

The main subsidiary for picture  $f(x, y)$  is known as an angle and furthermore, there is a sudden change in the power in the parts shut to edges [1]. Focuses with sudden or unexpected change in powers of two locales have bigger estimation of angle. These focuses are known as edge pixels and can be associated together to structure shut limits. Laplacian of Gaussian (LOG) administrator, sable administrator, Laplace administrator, and shrewd edge administrator are used in slope strategies. By and large vigilant edge administrator is used, yet it takes extra time when contrasted with sober administrator. For all intents and purposes, an edge location calculation needs an adjusted procedure of distinguishing exact edges and decrease of clamor. On the off chance that the level of accuracy is too high, different additional and counterfeit edges will be recognized because of commotion. Further, in the event that we lessen the level of clamor in an awesome measure, the accuracy of edges might be decreased and some valuable edges won't be distinguished. Henceforth, edge identification calculations are ordinarily appropriate for the clamor free and basic pictures.

#### B. Region Based Segmentation Methods

At the point when contrasted and division in view of edge discovery, the procedures in light of areas are direct and are more impervious to commotion [1]. Instead of edge based division systems that section pictures as per sudden changes in the forces of neighboring pixel, locale based division separates a picture into districts that are practically identical as demonstrated by a predefined criteria.

##### *Region Splitting and Merging:*

As per past determined methods, locale creates by choosing a game plan of seed focuses. Then again, in this method, the picture is subdivided into an arrangement of arbitrary isolates districts and joins together or breaks the locales according to the condition of the tree in which each hub has definitely four branches. This fuses the accompanying advances:

- Initiate the part of area into four branches.
- Unite or consolidation any district when no more part is possible. Stop when there is no probability of consolidating.

### IV. FEATURE EXTRACTION TECHNIQUE

#### A. Text Based Feature Extraction

Surface based element extraction can be named spatial and unearthly surface in view of their different preferences to use in the picture handling [8]. Spatial surface is anything but difficult to utilize and can be separate data from any

shape. These component are exceptionally delicate to clamor and contortions. Ghostly surface is hearty and requires less calculation. For effective component ghostly surface require square area with adequate size. Gabor channel is broadly used to separate the surface component for picture characterization. Gabor channel or wavelets describe a picture by acquiring the inside recurrence and introduction parameter. An element vector is made by catching the vitality at a particular recurrence and bearing.

#### B. Shape Based Feature Extraction

Shape highlight extraction techniques can be ordered into two gatherings as Contour based and District based strategies [8]. Form based system ascertain shape include just from the limit and district based technique extricates highlight from the whole locale. These techniques include two kind of methodology. First is ceaseless methodology which does not isolate shape into subpart. It utilizes the fundamental limit to determine the component vector. Second is Discrete (Global) Approach isolates the shape limit into sub part and register the multi-dimensional component vector. The Shape descriptor includes ascertaining region, circularity, whimsy, significant hub introduction, and bowing vitality. Basic techniques for limit decay depend on polygonal estimate, shape decay and bend fitting.

### V. CLASSIFICATION TECHNIQUES

#### A. Convolutional Neural Networks

A convolutional neural system (ConvNet) is a profound learning model containing different back to back stages, in particular convolutional, non-linearity and pooling layers, trailed by more conv and completely associated layers [10]. The contribution of the ConvNet is the crude pixel force picture (for our situation, the picture acquired by subtracting the mean picture over the preparation set from the first picture). The yield layer is made out of a few neurons each relating to one class. The weights (W) in the ConvNet are upgraded by limiting the arrangement mistake on the preparation set utilizing the back propagation calculation.

#### B. Hidden Markov Model (HMM)

With a specific end goal to perform square based order, the picture is subdivided into squares [9]. At that point an element vector is created for each square by gathering insights got from the square. This system relies on the square size. We should not pick a huge square size as this causes rough characterization. When we are picking a little square size, just the neighborhood properties which have a place with the little square are inspected. Consequently, the inconvenience is that data about the encompassing areas is lost. Gee are of sorts 1D-HMM and 2D-HMM.

## VI. CONCLUSION

In this paper, different picture division procedures are depicted. Picture division has a favorable future and has applications in each field. Following quite a while of investigation, there is still no inside and out recognized picture division calculation. Study demonstrates that when include extraction strategy are connected for the picture investigation district based shape highlight are more hearty as these strategies separate all the shape data. In these techniques are used to choose the correct algorithm for reduce the degree of dysplasia.

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