# Digital Image Segmentation based Worm Count and Identified Diseases of worms in Human

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***Abstract—*** This work has presented a framework for identifying disease of worms in human and has proposed a packed set of Region Props for quantifying worm's characteristics for worm detection. The worm's classification accuracy was improved when concatenating a set of KNN approach and connected component algorithm. Routine recognition of disease of worms in Human using WCE is a tough task. It aims to reduce the amount of images a clinician needs to review.This work may lead to more clinically helpful for identifying disease of worms in human intestine within a short period of time. A bounding box is an uncomplicated and trendy communication hypothesis considered by many existing interactive image segmentation frameworks. To view the whole gastrointestinal tract, wireless capsule endoscopy (WCE) has been used. The k-nearest neighbouring technique is used to classify the worms. The performance analysis shows the accuracy in the detection of worms, worm count and their related diseases with reduced time.

*Keywords:* worm; wireless capsule endoscopy; Computer-aided detection; worm classification.

## 1. INTRODUCTION

Medical Imaging mainly focuses on internal parts of the body to identify the diseased part [1]. The internal or affected part is matched with the medical records for abnormalities [2].

Clustering can be considered the most important *unsupervised learning* problem; so, as every other problem of this kind, it deals with finding a structure in a collection of unlabelled data. [5] A cluster is therefore a collection of objects which are "similar" between them and are "dissimilar" to the objects belonging to other clusters [6].

## 2. OVERVIEW

The wireless capsule endoscopy (WCE) video are taken as input and pre-processing is being carried out which can be used for enhancing the video and appearance of the video for further processing. Then segmentation is carried out to eliminate the unwanted objects in video and worms can be extracted from them for future process. By using the connected component algorithm and region props are used for extracting the features in worms. Extracted features are used for training the data for classification of worms using KNN (K-Nearest Neighbor) Classifier. These trained data can be used for testing the WCE data. Finally, worms can be classified with their counts and diseases of worms in human are identified in WCE videos.

## 3. PROPOSED SYSTEM

The proposed system consist of the following modules

- **Preprocessing**
- **Segmentation**
- **Feature Extraction**
- **Classification**

Overall system architecture of the proposed system is given below:

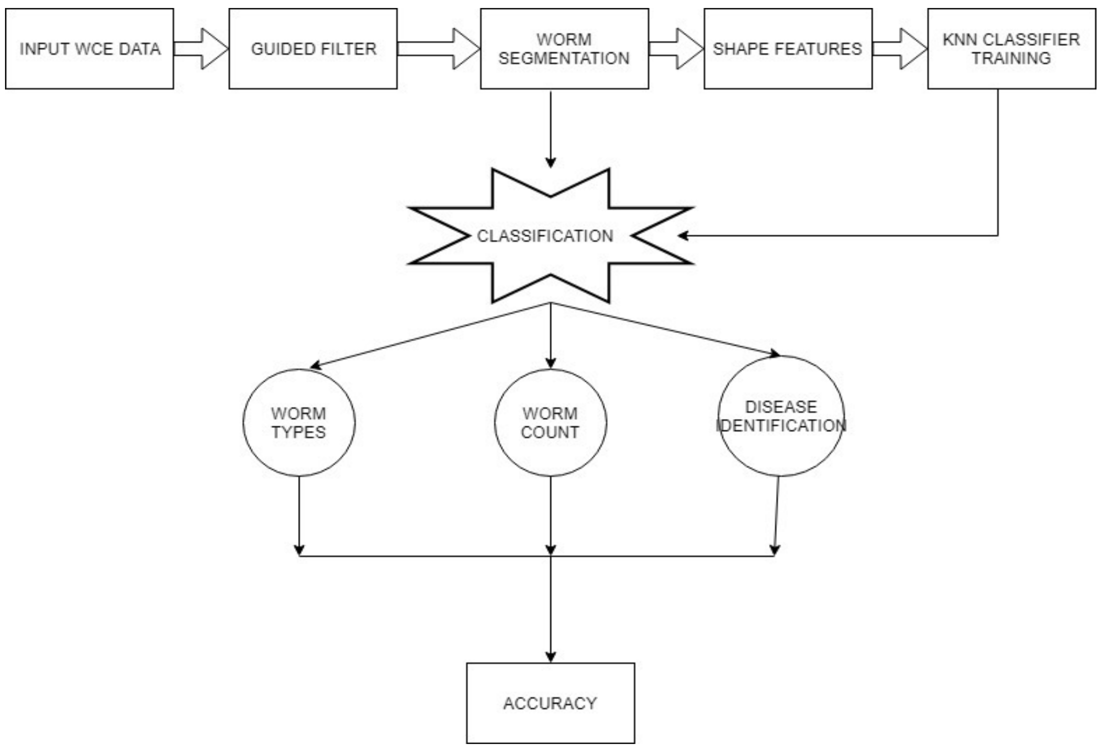


**Figure: 3.1 Overall System Architecture**

### Preprocessing

The internal parts of the human are monitored and all the edges are discovered. Through the edge-ware weighting, all the edges are determined. The edges that are dull are highlighted. Then, the image enhancement is carried through the guided filter.

### Segmentation

Thresholding is an vital strategy for picture division. Since the fragmented picture gotten from thresholding has the advantage of littler capacity space, quick handling speed and ease in control, compared with a gray level picture containing 256 levels, thresholding methods have drawn a part of consideration amid the final few a long time. The point of an compelling division is to partitioned objects from the foundation and to distinguish pixels having adjacent values for moving forward the differentiate. Otsu's strategy is one of the way better edge determination strategies for common genuine world pictures with respect to consistency and shape measures. Multilevel thresholding is a prepare that sections a gray level picture into a few unmistakable locales. This method decides more than one edge for the given picture and fragments the picture into certain brightness locales, which compare to one foundation and a few objects. The strategy works exceptionally well for objects with colored or complex foundations.

**Feature Extraction**

**Connected component**

A graph is constructed with the edges and vertices from the input data to determine the neighbours. An algorithm is used to traverse every path in the graph to ensure the connectivity. The connectivity can be 4 connected or 8 connected.

**Region props**

Region Props are utilized here for extricating the property of picture locale as the shape highlight.

**Classification**

The k-nearest neighbors calculation (k-NN) is a non-parametric strategy utilized for classification and relapse. In both cases, the input comprises of the k closest preparing illustrations in the highlight space. The yield depends on whether k-NN is utilized for classification or regression.

## 4. EXPERIMENTAL RESULTS

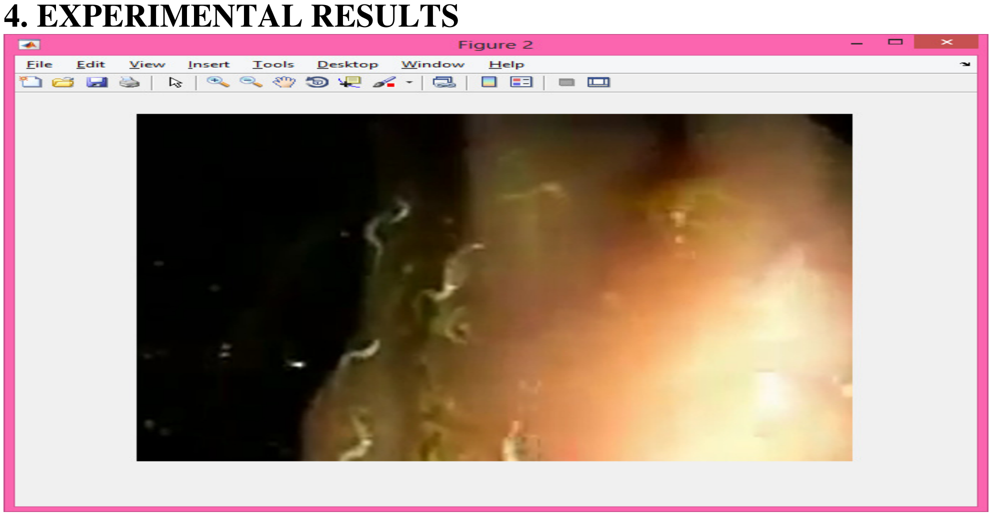


Figure: 4.1 An input image representing the occurrence of various worms which is captured using WCE cameras.

## TRAINING STAGE

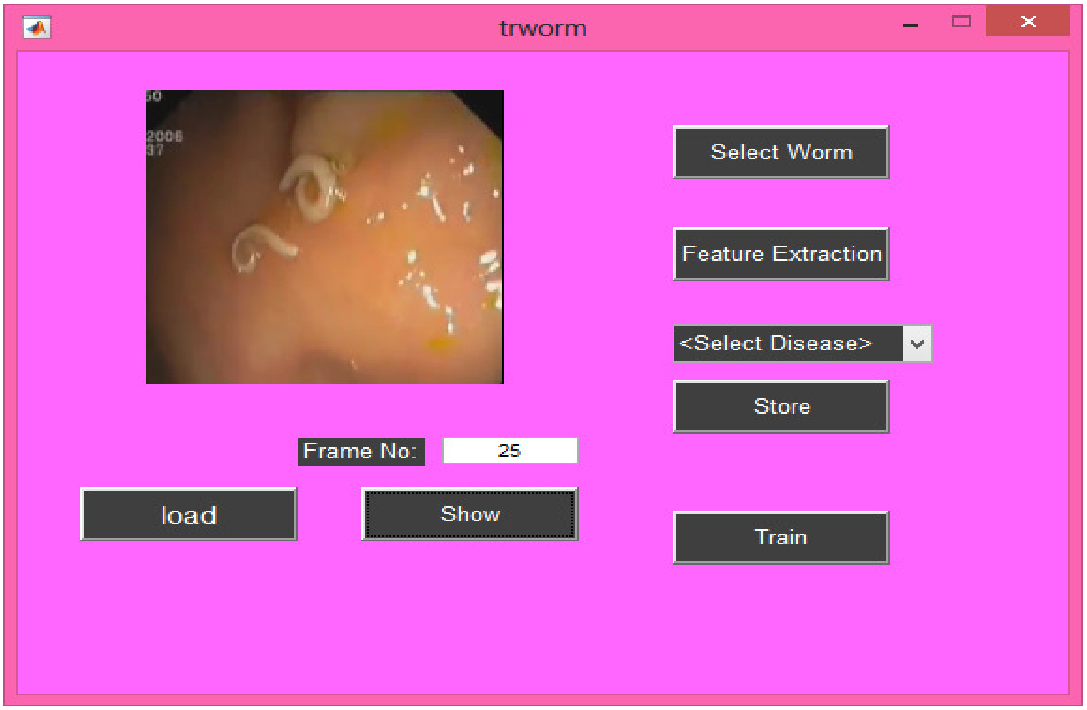


**Figure: 4.2 Load WCE Video**

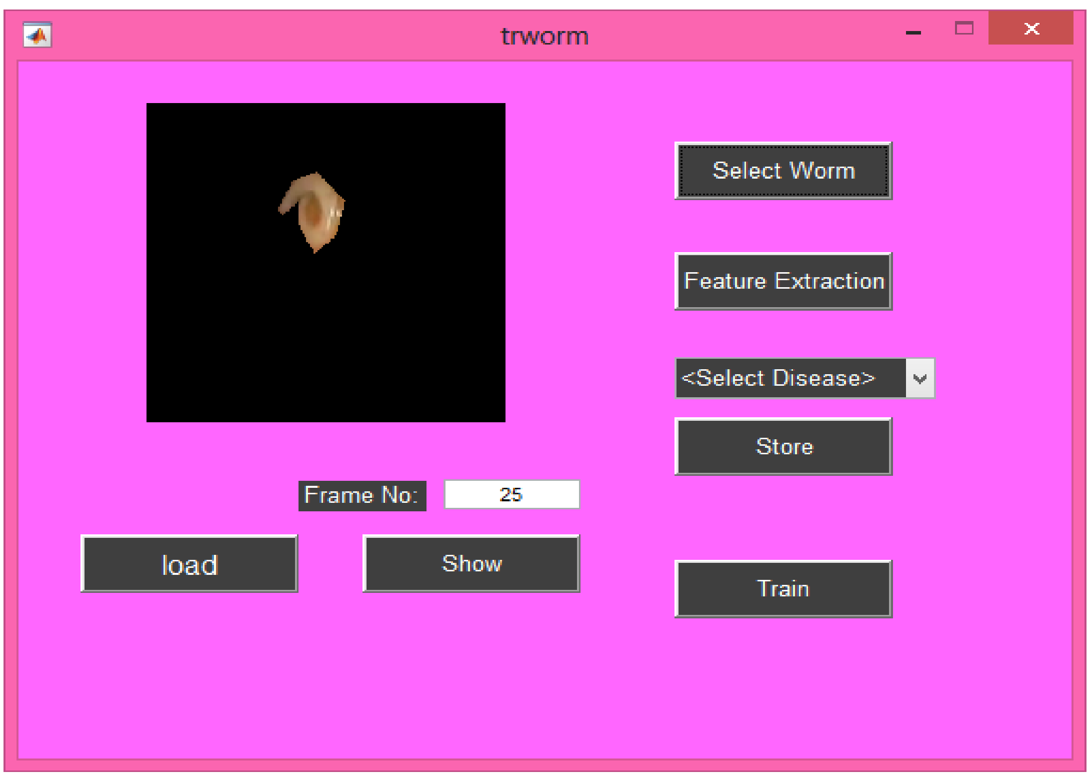


**Figure: 4.3 Select the worm**

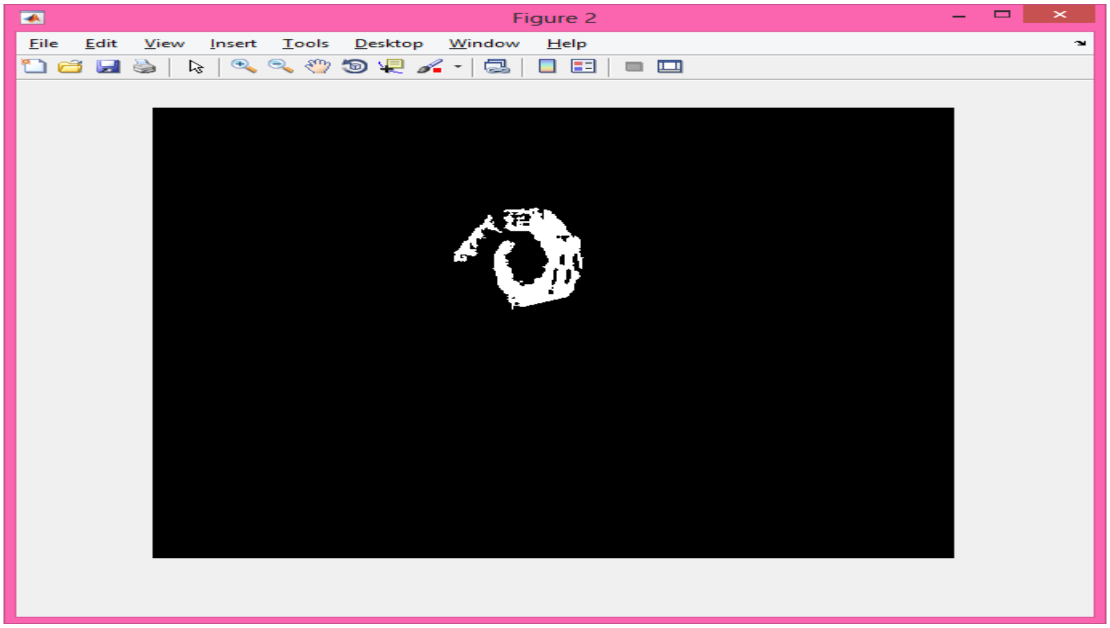


Figure: 4.4 Segmented image after using Multilevel Thresholding and Vector Quantization

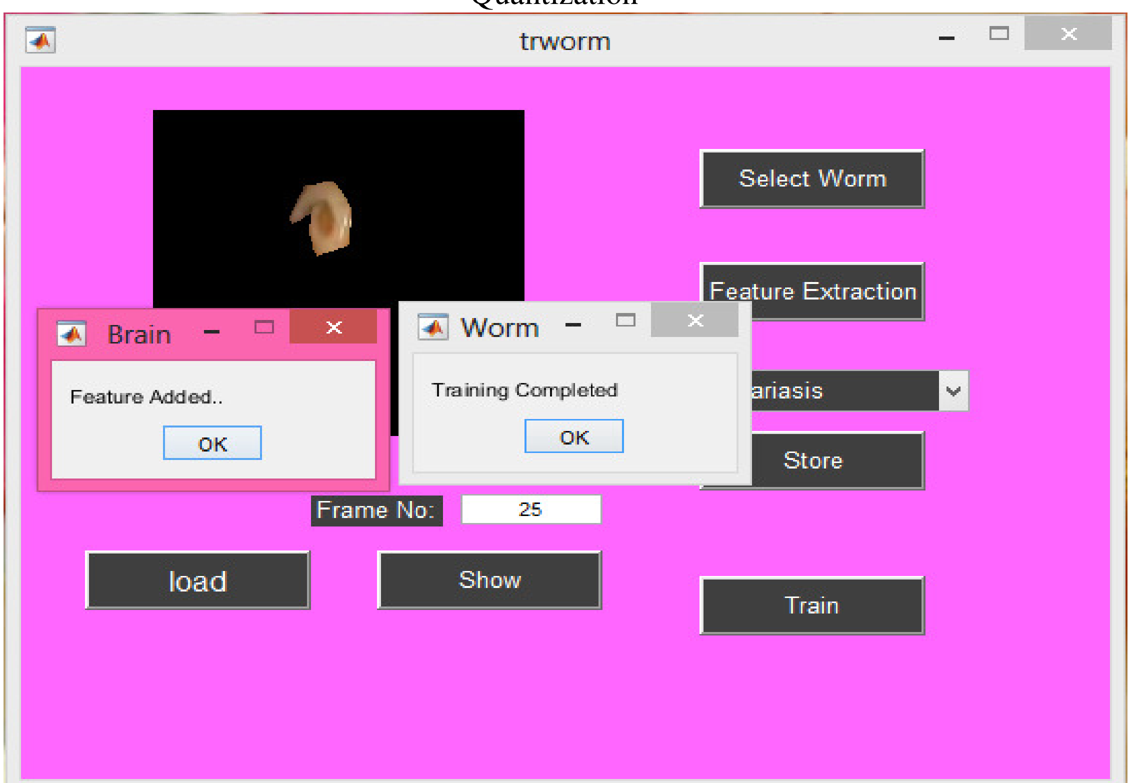


Figure: 4.5 Feature Extraction for the corresponding segmented image using Region Props which is used for Training

## TESTING STAGE

After Training the Worms using K-Nearest Neighbour (KNN) Classifier, WCE video can be used for Testing. During Testing Stage, we obtained Types of worms, Worm Count and Identification of Diseases of Worms in Human .The obtained results is shown below:

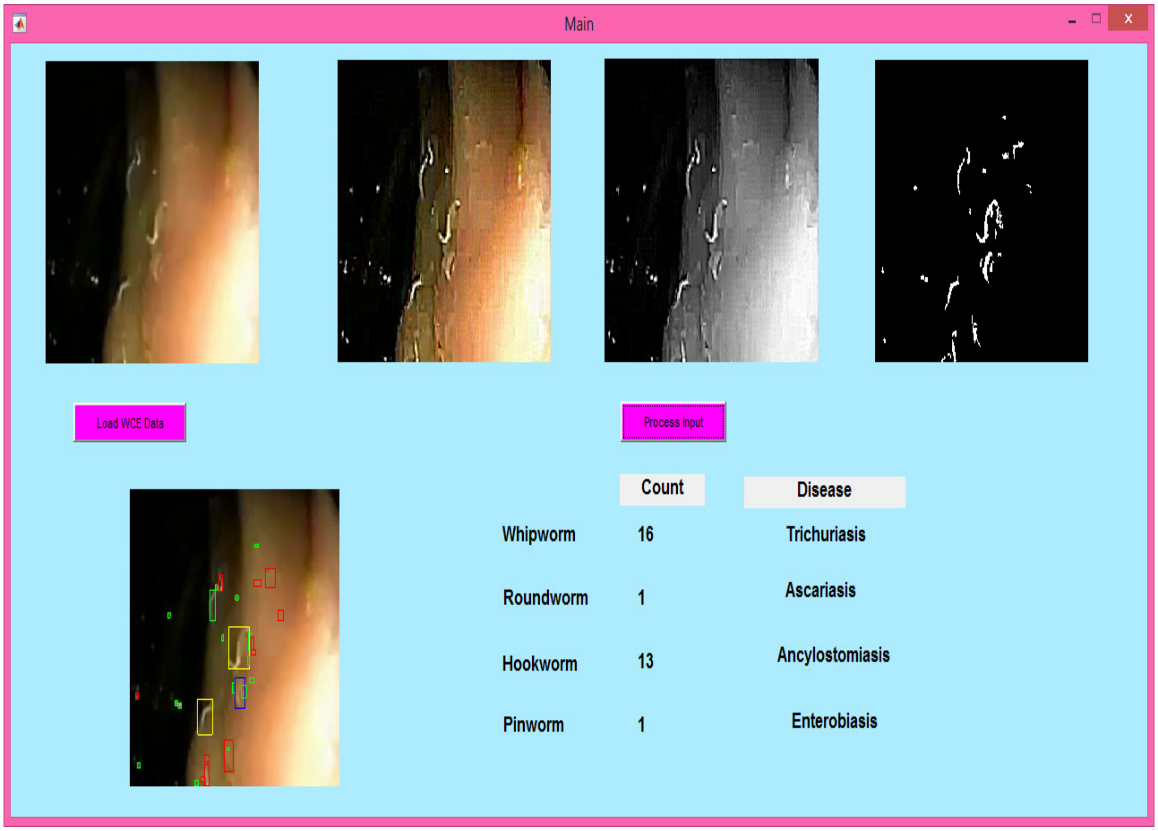


Figure: 4.1.6 Final Output consists of Worm Count and Identified Diseases of worms in Human

## 5. CONCLUSION:

This work will lead to more clinically helpful for identifying disease of worms in human intestine within a short period of time. A bounding box is an uncomplicated and trendy communication hypothesis considered by many existing interactive image segmentation frameworks. By using this, Computational speed is increased. The crucial goal is that automatic detection system can be used in a real condition to assist endoscopists, and can even acquire more precise judgement than skilled endoscopists.

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