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3.	Department	Computer Science
4.	Name of the Research Guide	Dr. T. Jayamalar
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**Cervical Cancer Detection and Classification in Pap smear Images using
Enhanced Deep Learning Models**

ABSTRACT

Cervical cancer (CC) is the most significant contagious disease possessing women's health by infecting Human PapillomaVirus (HPV) in cervix. Considering, the life daring outcomes of cervical cancer in later stage, early detection is considered crucial. However, past studies employed manual methods like Manual Liquid-based Cytology (MLBC) and Visual Inspection with Acetic acid (VIA) to identify cancerous cells. Meanwhile, the promising limitations including a high error rate, labor-intensive processes, and the need for specialized expertise have been witnessed in existing studies. Furthermore, Artificial Intelligence (AI)-based solutions are explored in this study to overcome the above mentioned shortcomings. Since, AI models are capable of analyzing huge volume of datasets to achieve precise results, it showase more accurate detection and classification of cervical cancer cells. At present, the AI-based solution for cervical cancer detection and classification has reported suboptimal accuracy in their models. The major aim of this research is to enhance the accuracy of AI-based solution for CC detection using enhanced Deep Learning (DL) models. Three DL models have been enhanced using dissimilar pre-processing and segmentation technique with three distinct mechanisms for accurate classification of cervical cancer cells. These models are evaluated using two datasets: the Herlev dataset used for classification of single-cell images and SIPaKMeD for multi-cell classification in cervical cancer. The methodology encompasses four key stages in three models for detection and classification of cervical cancer: pre-processing, segmentation, feature extraction, and classification.

The three models for CC detection and classification are described below. In Model-1, pre-processing based on diffusion stop function using CLAHE is utilized along with Topographic Weibull bounding-based segmentation, and segmented image is trained using radiance and variance enabled Deep Learning Neural Network for detection and classification. Model-2 pre-processes by employing the combination of Anisotropic Diffusion Filter (ADF) - histogram-based pre-processing and improved-Weighted Fuzzy C-Means (i-WFCM) -based segmentation; the CC is detected and classified using Restricted

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2 Soumya Haridas, T. Jayamalar. "PAP Smear Image Enhancement Using Diffusion Stop Function Based Clahe Algorithm", 2022 8th International Conference on Advanced Computing and Communication Systems (ICACCS), 2022
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3 "Medical Image Understanding and Analysis", Springer Science and Business Media LLC, 2017
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