CERTIFICATE

This is to certify that the thesis entitled **"Cervical Cancer Detection and Classification in Pap smear Images using Enhanced Deep Learning Models"** submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, in partial fulfilment of the requirements for the award of the **Degree of Doctor of Philosophy in Computer Science,** is a record of original research work done by **Soumya Haridas** during the period of her study in the Department of Computer Science at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, under my Supervision and Guidance and the thesis has not formed the basis for the award of any Degree/ Diploma/ Associateship/ Fellowship or other similar title to any candidate of any University.

6/11/24

Signature of the Head of the Department

Department of Computer Science
Avinashilingam Institute for Home Science
and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC, Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

6/11/24

Signature of the Supervisor

07/11/24

Signature of the Dean

Dr. (Mrs) V. RADHA
Professor
Department of Computer Science
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and Higher Education for Women
Coimbatore - 641 043

DECLARATION

I, **Soumya Haridas,** hereby declare that the thesis entitled **"Cervical Cancer Detection and Classification in Pap smear Images using Enhanced Deep Learning Models"** submitted to Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, in partial fulfilment of the requirements for the award of the **Degree of Doctor of Philosophy in Computer Science,** is a record of original research work done by me during the period of my study under the Supervision and Guidance of **Dr. T. Jayamalar, MCA, M.Phil., Ph.D., NET,** Department of Information Technology at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, and it has not formed the basis for the award of any Degree/ Diploma/ Associateship/ Fellowship or other similar title to any candidate of any University.

6/11/24

Signature of the Candidate

Signature of the Supervisor

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LIST OF TABLES

LIST OF FIGURES

ACRONYMS

ADC	Adenocarcinoma
ADF-DO	Adaptive Diffusion Filter-Dragonfly Optimization
ADF-HE	Anisotropic Diffusion Filter with Histogram Equalization
AI	Artificial Intelligence
CAD	Computer-aided Design
CC	Cervical Cancer
CES-BOA	Chaos and Exponential Scale based Butterfly Optimization Algorithm
CIN	Cervical Intraepithelial Neoplasia
CIS	Cancer in Situ
CL	Convolutional Layer
CLAHE	Contrast Limited Adaptive Histogram Equalization
CNN	Convolutional Neural Network
DL	Deep Learning
DLNN	Deep Learning Neural Network
DNA	Deoxyribo Nucleic Acid
EDA	Exploratory Data Analysis
FCL	Fully Connected Layer
FCM	Fuzzy C-Means
GLCM	Gray-Level Co-occurrence Matrix
HIV	Human Immunodeficiency Virus
HPV	Human Papilloma Virus
hrHPV	high-risk Human Papilloma Virus
i-WFCM	improved - Weighted Fuzzy C-Means
i-WFCM-GOA	improved - Weighted FCM- Grasshopper Optimization
LBC	Liquid Based Cytology
LMICs	Low and Middle-Income Countries
LTrP	Local Ternary Patterns
ML	Machine Learning
Pap test	Papanicolaou test
PDE	Partial Differential Equation

PL	Pooling Layer
RBM-DBN	Restricted Boltzmann Machine - Deep Belief Neural Network
ReLU	Rectified Linear Unit
RNA	Ribo Nucleic Acid
RVDLNN	Radiance and Variance Enabled Deep Learning Neural Network
SCC	Squamous Cell Carcinoma
TLR	Toll-Like Receptors
TWBS	Topographic Weibull Bounding Segmentation
TZ	Transformation Zone
VIA	Visual Inspection with Acetic acid
WHO	World Health Organization
WSI	Whole Slide Images