

M.Sc. in Artificial Intelligence and Machine Learning AY 2023/2024

Dissertation Setup Form

Student Name: Siddharth Prince

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Proposed Dissertation Title: Leveraging Machine Learning for Automated HER2 Scoring in Breast Cancer Pathology

Proposed Dissertation Topic (max 200 words):

Breast cancer diagnosis and treatment planning heavily rely on accurate assessment of biomarkers, including HER2 (Human Epidermal Growth Factor Receptor 2) expression. Manual HER2 scoring by pathologists is time-consuming, subjective, and prone to inter-observer variability. This project aims to develop an automated system using machine learning (ML) techniques to enhance HER2 scoring consistency and efficiency.

Core academic papers related to the dissertation topic (at least 3 and no more than 5):

Title: Immunohistochemical HER2 Recognition and Analysis of Breast Cancer Based on Deep Learning

Reference: Che, Y., Ren, F., Zhang, X., Cui, L., Wu, H. and Zhao, Z. (2023)., Diagnostics 2023 13(2), p.263. doi:<https://doi.org/10.3390/diagnostics13020263>.

Relevance to Topic (max 100 words):

This paper discusses the use of deep learning models for HER2 recognition in breast cancer pathology. This offers insights into dataset selection, labelling, and model training.

Title: HER2 Molecular Marker Scoring Using Transfer Learning and Decision Level Fusion

Reference: Tewary, S. and Mukhopadhyay, S. (2021). Journal of Digital Imaging. doi:<https://doi.org/10.1007/s10278-021-00442-5>.

Relevance to Topic (max 100 words):

This study explores the use of transfer learning architectures (including VGG16, VGG19, ResNet50, MobileNetV2, and NASNetMobile) for HER2 scoring. This is relevant for understanding HER2 assessment using transfer learning.

Title: A Systematic Literature Review of Breast Cancer Diagnosis Using Machine Intelligence Techniques

Reference: Nemade, V., Pathak, S. and Dubey, A.K. (2022). doi:<https://doi.org/10.1007/s11831-022-09738-3>.

Relevance to Topic (max 100 words):


While not HER2-specific, this review covers ML techniques in breast cancer diagnosis and provides context for understanding ML applications in breast cancer pathology.

Student Signature: _____



Date: 28/02/2024

Supervisor Signature: _____



Date: 05/03/2024