**Leveraging Deep Learning for Enhanced Gleason Grading in Prostate Cancer Histopathology**

**Abstract**

Prostate cancer is a prevalent and deadly cancer in men globally, requiring precise and effective diagnostic techniques. The traditional method of histopathological assessment, particularly the Gleason grading system, is still considered the most reliable way to diagnose prostate cancer. Nevertheless, this procedure is influenced by differences among pathologists and requires a significant amount of time. New developments in deep learning show potential in improving the precision and effectiveness of Gleason grading. This dissertation examines the use of deep learning, specifically utilizing the MobileNet architecture, to enhance Gleason grading of prostate cancer histopathology images. The project is influenced by the winning solution to the Prostate cANcer graDe Assessment (PANDA) challenge, showing the effectiveness of deep learning models in grading prostate cancer. The PANDA challenge showcased how well deep learning models can predict ISUP grade scores from whole-slide images of prostate tissue biopsies. The victorious team utilized EfficientNet and creative data augmentation methods, resulting in notable enhancements in classification performance. Based on their methodology, this study suggests employing MobileNet, a compact and effective convolutional neural network (CNN), for implementing Gleason grading.