**Minimal Literature Survey for Cancer Cell Detection Using Machine Learning**

**Introduction**

Cancer cell detection through histopathological images is a critical area in medical diagnostics. Machine learning, particularly deep learning, has shown promising results in automating and enhancing this process. This minimal literature survey reviews key studies in this field, highlighting major findings, methodologies, and research gaps.

Key Studies and Major Findings

1. Spanhol et al. (2016):
   * Title: "A Dataset for Breast Cancer Histopathological Image Classification"
   * Findings: Demonstrated the effectiveness of CNNs in classifying breast cancer images with high accuracy.
   * Methodology: Utilized CNNs for feature extraction and classification, achieving state-of-the-art performance on a breast cancer dataset.
2. Litjens et al. (2017):
   * Title: "A Survey on Deep Learning in Medical Image Analysis"
   * Findings: Provided a comprehensive overview of deep learning applications in medical imaging, including cancer detection.
   * Methodology: Reviewed various neural network architectures and their applications, emphasizing the success of CNNs in image classification tasks.
3. Komura and Ishikawa (2018):
   * Title: "Machine Learning Methods for Histopathological Image Analysis"
   * Findings: Highlighted the potential of machine learning in improving diagnostic accuracy and reducing pathologist workload.
   * Methodology: Compared different machine learning techniques, including traditional methods and deep learning approaches.

Methodologies

* Convolutional Neural Networks (CNNs): Commonly used for image classification due to their ability to automatically learn hierarchical features.
* Transfer Learning: Leveraging pre-trained models on large datasets to improve performance with limited annotated data.
* Feature Extraction: Techniques such as texture analysis, shape descriptors, and color histograms to capture relevant patterns in histopathological images.

Research Gaps

* Limited Dataset Diversity: Many studies focus on specific types of cancer, limiting the generalizability of the models.
* Computational Requirements: High-performance computing resources are often necessary, which may not be readily available in all clinical settings.
* Model Interpretability: The black-box nature of deep learning models makes it challenging to interpret their decision-making process.

Relevance to our Project

This project aims to develop a model for cancer cell detection in histopathological images, addressing some of the identified research gaps by expanding the dataset diversity and exploring techniques to enhance model interpretability. By building on the methodologies and findings of previous studies, this project seeks to contribute to the field by providing a robust and scalable solution for automated cancer diagnosis.