PathLLM

Digital Pathology

📊 Whole Slide Image (WSI) Processing

- ✓ Cancer Grading & Classification
- ✓ Cell Counting & Detection
- ✓ Tissue Segmentation
- ✓ Histopathology Report Generation

🎯 Cancer Grading & Classification

Automated tumor grade assessment and cancer type identification

Tumor grading spectrum based on differentiation

Overview

Automated assessment of tumor aggressiveness and classification into cancer subtypes using deep learning models trained on pathologist-annotated slides.

Key Applications

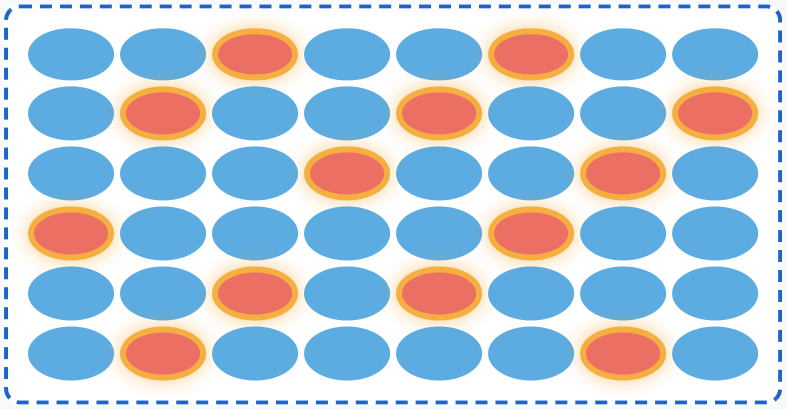
- Gleason scoring for prostate cancer
- Breast cancer grade determination
- Lung cancer subtype classification
- Lymphoma classification

Clinical Impact

Reduces inter-observer variability, provides consistent grading standards, and assists in treatment planning decisions.

Cell Counting & Detection

Precise identification and quantification of cellular components



Normal cells Detected abnormal cells (highlighted)

Overview

Automated detection and counting of specific cell types in tissue samples using computer vision and deep learning algorithms for quantitative analysis.

Key Applications

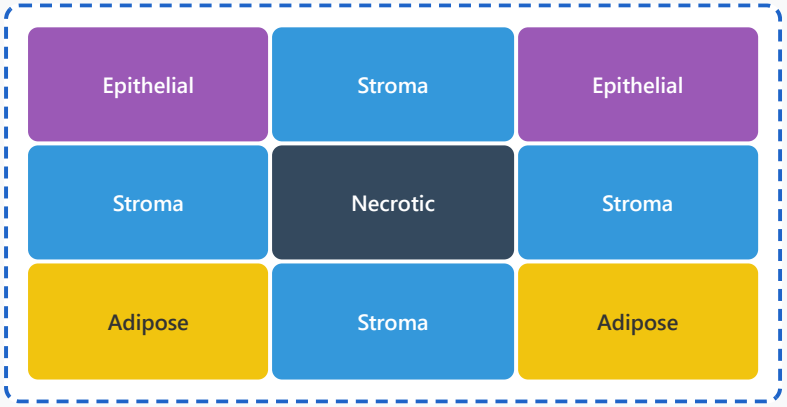
- Mitotic figure counting
- Tumor-infiltrating lymphocyte (TIL) analysis
- Ki-67 proliferation index calculation
- Immunohistochemistry (IHC) scoring

Clinical Impact

Provides objective quantification, eliminates counting errors, and enables large-scale biomarker analysis for precision medicine.

🧩 Tissue Segmentation

Precise delineation of tissue structures and regions



Multi-class tissue segmentation showing different tissue types

Overview

Pixel-level classification of tissue regions into distinct anatomical or pathological categories using semantic segmentation models.

Key Applications

- Tumor vs. normal tissue delineation
- Gland structure segmentation
- Necrotic region identification
- Tumor microenvironment analysis

Clinical Impact

Enables precise tumor margin assessment, quantifies tissue composition, and supports spatial analysis of the tumor microenvironment.

📋 Histopathology Report Generation

Automated synthesis of diagnostic findings into comprehensive reports

PATHOLOGY REPORT

Specimen: Breast biopsy, left upper quadrant

Diagnosis: Invasive ductal carcinoma

Grade: Nottingham Grade II (3+2+2=7)

Size: 1.8 cm maximum dimension

Sample automated pathology report with structured findings

Overview

Natural language processing and vision-language models synthesize visual findings into structured, comprehensive diagnostic reports following standardized protocols.

Key Applications

- Structured reporting (CAP protocols)
- Diagnostic summary generation
- Finding synthesis and correlation
- Quality assurance and completeness check

Clinical Impact

Standardizes reporting format, reduces turnaround time, ensures completeness of essential diagnostic elements, and improves communication with clinicians.