CYIENT

Accelerating Early Cancer Detection:

AI-DRIVEN ALGORITHMS FOR HEAD AND NECK CANCER DIAGNOSIS

Business Challenge

Traditional cancer diagnostics depend heavily on manual interpretation of pathology images, making early-stage detection prone to human variability. This requires a scalable, automated solution capable of identifying specific immunohistochemistry (IHC) biomarkers in head and neck tissue samples.

The challenge lay in creating a high-performance, cloud-native platform that could process massive image datasets, ensure balanced and cleansed data for model training, and seamlessly integrate into clinical workflows.

Overview

A leading healthcare technology provider sought to enhance digital pathology workflows by integrating AI-based cancer detection into routine diagnostics. Manual analysis of tissue samples was time-consuming and subject to variability, especially in identifying subtle cancer markers in head and neck regions.

Cyient developed an AI-driven cancer detection solution that automates image processing, integrates deep learning models, and streamlines cloud deployment through MLOps. The platform supports faster, more reliable diagnosis, augmenting pathologists' precision while reducing turnaround time.

The Cyient Solution

Cyient engineered a comprehensive cancer detection pipeline powered by AI and deep learning, featuring:

Cloud-Native Integration

Developed a scalable data ingestion and processing pipeline for seamless deployment in a cloud environment.

Data Preparation & Curation

Implemented automated data cleansing, annotation, and balanced dataset creation to improve model reliability.

Deep Learning Algorithms

Designed and trained computer vision models for precise cancer detection based on specific IHC biomarkers.

MLOps Integration

Deployed models with CI/CD pipelines to enable continuous improvement and simplified version management.

UI & Automation

Developed an intuitive interface for digital pathologists, complete with automated testing and production-ready release mechanisms.

Marker	Detection method	Species detected	Usage
HPV DNA	PCR	DNA	Diagnosis/Prognosis
HPV E6/E7	ISH	RNA	Diagnosis/Prognosis
Expression profile	Array/RT-PCR	RNA	Diagnosis/Prognosis
EGFR	IHC	Protein	Treatment
VEGF	IHC	Protein	Treatment

Key Biomarkers Powering AI-Based Diagnosis

The Results

The AI-based cancer detection platform delivered measurable improvements in diagnostic speed and accuracy:

Accelerated Detection

Reduced analysis time through automated screening and pre-classification.

Enhanced Diagnostic Accuracy

Improved cancer identification by augmenting human expertise with AI-driven precision.

Scalable Cloud Deployment

Enabled faster updates and model retraining cycles through cloud-native architecture.

Clinician Empowerment

Equipped digital pathologists with actionable insights for more informed treatment decisions.

Designing Tomorrow Together

With domain expertise at our core and AI as our catalyst, Cyient transforms how healthcare sees, understands, and acts. Together, we're building a smarter path to early detection.

Detect Sooner. Decide Smarter. Partner with Cyient.

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#IntelligentEngineering

Cyient (Estd: 1991, NSE: CYIENT) delivers intelligent engineering solutions across products, plants, and networks for over 300 global customers, including 30% of the top 100 global innovators. As a company, Cyient is committed to designing a culturally inclusive, socially responsible, and environmentally sustainable tomorrow together with our stakeholders.

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