**Early Lung Cancer Detection Using Deep Learning and Biomarker**

**Analysis**

**Objective:**

This project aims to develop an AI-powered system for detecting lung cancer at an early stage. The goal is to improve diagnosis, suggest better treatments, and track patients' health over time using advanced machine learning and deep learning techniques.

**Methodology:**

* **Medical Imaging & AI Analysis –** Uses scans like CT and X-rays, processed through AI models (such as CNNs and SVMs) to detect lung cancer with high accuracy.
* **Biomarker Detection –** Analyzes blood samples for cancer-related markers (such as proteins, ctDNA, and microRNA), making diagnosis less invasive.
* **Genetic Profiling –** Examines a person's genes to assess their risk and predict how likely they are to develop lung cancer.
* **AI-Based Treatment Suggestions –** Uses reinforcement learning to recommend personalized treatments based on medical history and genetic data.
* **Real-Time Health Monitoring –** Tracks patient data continuously to detect early signs of cancer recurrence.
* **Data Security & Privacy –** Uses federated learning and encryption to keep medical data safe while improving AI performance.

**Key Features:**

* **Early Detection:** AI quickly scans images and blood biomarkers for accurate cancer screening.
* **Personalized Treatment:** Suggests treatments based on genetic data and previous medical history.
* **Less Invasive Diagnosis:** Blood-based testing reduces the need for painful biopsy procedures.
* **Continuous Health Tracking:** Monitors patients to detect any signs of cancer returning.
* **Data Protection:** Uses advanced security to keep medical records private and secure.

**Abstract Statement:**

This project introduces an AI-powered system for lung cancer detection and treatment. It combines medical imaging, biomarker analysis, and genetic profiling to improve diagnosis and treatment accuracy. Deep learning models (like CNNs and SVMs) analyze medical scans, while predictive AI helps doctors choose the best treatment. The system also monitors patients over time and ensures data privacy using federated learning. This innovative approach aims to improve survival rates and make advanced cancer detection more accessible and effective.

**Expected Outcome:**

A highly accurate AI system that helps detect lung cancer early, suggests the best treatments, and continuously tracks patient health—leading to better survival rates and improved treatment success.

**Impact:**

This project enhances cancer diagnosis by integrating AI into healthcare. It provides a faster, safer, and more efficient way to detect and treat lung cancer, making advanced medical technology more accessible and ultimately saving lives.

**Nandeesh S Joel Deva Ezhile D Bertilla Senold G Niyati R**

SEC24AM074 SEC24AM096 SEC24AM098 SEC24AM085