Project Initialization and Planning Phase

Date	14 June 2025
Team ID	SWTID1749876754
Project Title	SynapseScan – AI Driven Classification of Ovarian Cancer Variants
Maximum Marks	3 Marks

Project Proposal (Proposed Solution) Report

The proposal report aims to transform ovarian cancer diagnosis using AI-driven classification of cancer variants through transfer learning techniques, boosting diagnostic accuracy and efficiency. It tackles current diagnostic limitations in medical imaging analysis, promising better patient outcomes, reduced diagnostic errors, and accelerated research capabilities. Key features include a transfer learning-based classification model using pre-trained CNNs and real-time web-based prediction interface.

Project Overview	
Objective	The primary objective is to revolutionize ovarian cancer diagnosis by implementing advanced AI-driven classification techniques using transfer learning, ensuring faster and more accurate identification of ovarian cancer variants from medical imaging data.
Scope	The project comprehensively develops an AI system for ovarian cancer variant classification, incorporating transfer learning with pre-trained CNN models (VGG16) for robust and efficient medical image analysis, integrated with a user-friendly Flask web application.

Problem Statement	
Description	Current ovarian cancer diagnosis faces challenges in accurately classifying different cancer variants from medical imaging data, leading to potential misdiagnosis, delayed treatment decisions, and suboptimal patient outcomes. Manual analysis is time-consuming and subject to human error.
Impact	Solving these diagnostic challenges will result in improved diagnostic accuracy and early cancer detection, personalized treatment plans based on accurate variant classification, accelerated medical research through automated analysis, enhanced patient outcomes through timely and precise diagnosis, and reduced healthcare costs through efficient diagnostic processes.
Proposed Solution	
Approach	Employing transfer learning techniques with pre-trained Convolutional Neural Networks to analyze and classify ovarian cancer variants from medical imaging data, creating a dynamic and adaptable diagnostic system integrated with a Flask web application.
Key Features	- Implementation of transfer learning using pre-trained model for feature extraction - Real-time image analysis and classification through web interface - Continuous learning capability to adapt to new imaging data - User-friendly Flask-based web application for easy interaction - Automated preprocessing of medical imaging data - High-accuracy classification of ovarian cancer variants

Resource Requirements

Hardware Requirements

Resource Type	Description	Specification/Allocation
Computing Resources	CPU/GPU specifications for deep learning	GPU with CUDA support (recommended)
Memory	RAM specifications	Minimum 8 GB RAM
Storage	Disk space for datasets, models, and application files	Minimum 5 GB SSD

Software Requirements

Resource Type	Description	Specification/Allocation
Development Environment	IDE and tools	Visual Studio Code, Visual Studio
Programming Language	Core language	Python 3.12, 3.9
Deep Learning Frameworks	ML/DL libraries	TensorFlow 2.10, Keras@latest, scikit-learn
Data Processing Libraries	Data manipulation	NumPy, Pandas
Web Framework	Application development	Flask, React
Pre-trained Models	Transfer learning base	InceptionV3, Differential Attention

Data Visualisation Frameworks	Data Visualisation	Seaborn, Matplotlib, Pandas

Data Requirements

Resource Type	**Description**	**Specification/Allocation**
Training Data	Medical imaging datasets	Ovarian cancer histopathological images
Data Format	Image formats	JPEG, PNG medical images
Data Organization	Folder structure	Organized train/test directories by cancer variant types