**Project Initialization and Planning Phase**

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| **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.

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| **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. |

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| **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. |

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| **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**

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| **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**

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| **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**

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| **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 |