**[Final Year Project Proposal]**

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| Sr# | Student Name | Roll Number | Credit Completed | Signature |
| 1 | Muhammad Nauman | 21p-8045 | 97 |  |
| 2 | Sajid Ali | 21p-8023 | 100 |  |
| 3 | Ammar raza | 21p-8004 | 100 |  |

# Suggested Supervisor:

Faculty Member’s Name: Signature:

# Project Details

Date:

**(09 September 2024)**

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| **Project Title** | **Advanced MRI-Based Detection and Characterization of Pineal Cysts: Assessing Size and Benignity** | | |
| **Project Area of Specialization** | Computer Vision  Bio informatics Deep Learning | | |
| **List Related Core Subjects** | 1. Artificial Intelligence 2. Data Structures 3. Object Oriented Programming | | |
| **List Related Elective Subjects** | 1. Computer Vision 2. Machine Learning | | |
| **Project Start Date** | 05/09/2024 | **Project End Date** | June -2025 |
| **Project Summary (less than 2500 characters)** | This project involves developing a comprehensive system for detecting and analyzing pineal cysts in brain MRI scans. We will aggregate a dataset of MRI images from online sources, followed by a manual annotation process to delineate and measure the size of each cyst. Subsequently, we will employ advanced deep learning techniques to automate cyst detection and classification, distinguishing benign from potentially malignant lesions. The culmination of this project will be a sophisticated web-based application that integrates these capabilities, providing users with an accessible and  robust tool for pineal cyst assessment. | | |

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| **Project Objectives (less than 2500 characters)** | 1. Develop an Accurate Deep Learning Model: Create and train a deep learning model to reliably detect and measure cysts in brain MRI images. 2. Implement a User-Friendly Web Application: Build a web-based   platform for easy visualization, interaction, and analysis of brain MRI data and model results. |
| **Project Implementation Method (less than 2500 characters)** | 1. Manual Annotation: Annotate images to identify and measure pineal cysts. 2. Preprocessing: Normalize and preprocess MRI images for deep learning. 3. Deep Learning Model Development: Design and train convolutional neural networks (CNNs) for cyst detection and classification. 4. Model Evaluation: Validate model performance using metrics like accuracy, sensitivity, and specificity. 5. Web Application Development: Create a user-friendly web interface for automated cyst detection and size analysis. 6. Integration and Testing: Integrate the deep learning model with the web application and conduct thorough testing for robustness. |
| **Benefits of the Project (less than 2500 characters)** | This project enhances diagnostic accuracy and efficiency by automating cyst detection and measurement in brain MRIs. The web-based application offers a user-friendly platform for easy data access and interaction, while  also generating valuable insights for further research. |
| **Technical Details of Final Deliverable (less than 2500 characters)** | The project involves collecting and annotating brain MRI images, applying deep learning models for cyst detection, and developing a scalable web-based application for user interaction and data analysis. |
| **Final Deliverable of the Project** | A working prototype of smart navigation stick designed for visually impaired users |
| **Type of Industry** | Healthcare and Rehabilitation Consumer Electronics Industry |
| **Technologies** | The Track Mate utilizes a combination of advanced technologies, including microcontrollers as the core processing unit, sensors for obstacle, water and stairs detection, vibration motor and speaker to provide feedback to the user, power- efficient components for extended battery life, and application  development technologies for creating an intuitive user interface on various computing platforms. |

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| **Sustainable Development Goals** | 1. Good Health and Well-Being (SDG 3): Enhancing diagnostic accuracy and treatment for brain conditions through advanced imaging and deep learning. 2. industry, Innovation, and Infrastructure (SDG 9): Promoting   technological innovation in medical imaging and data analysis through the development of a web-based application. |