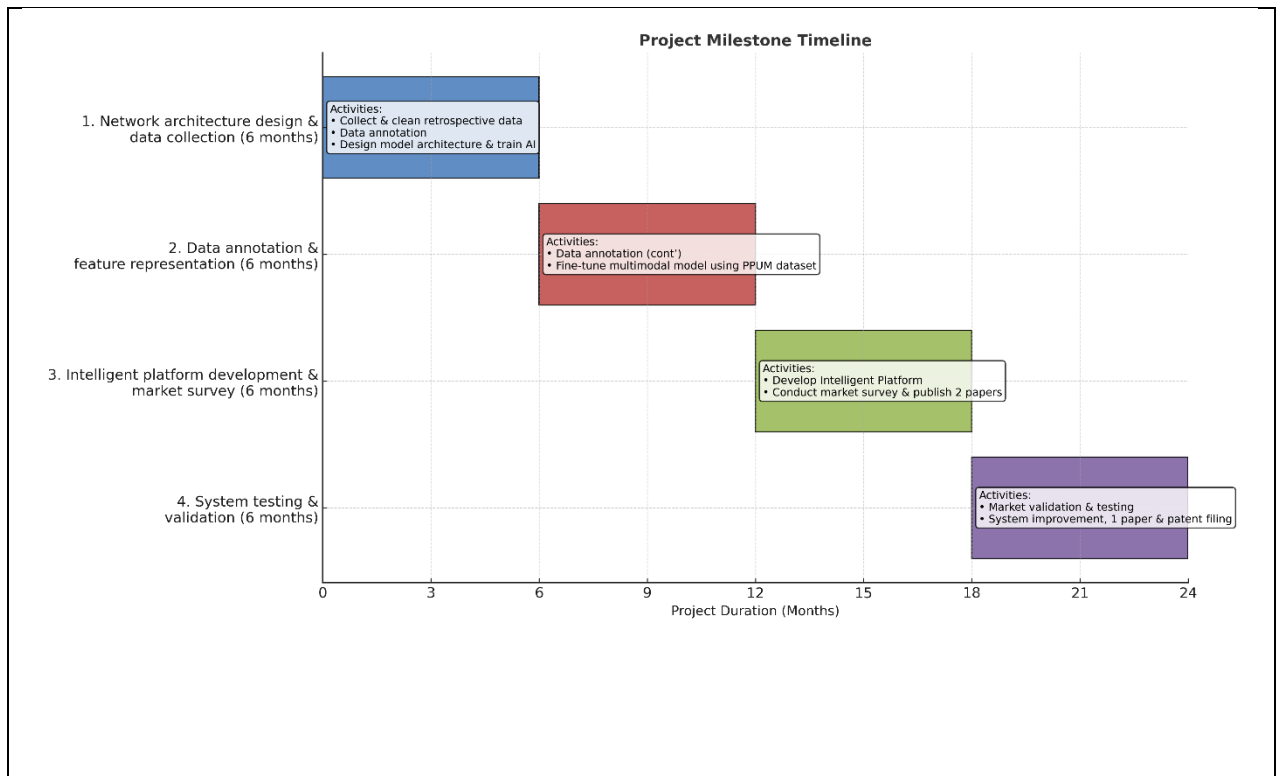


TITLE OF RESEARCH PROPOSAL
Comprehensive End-to-End Intelligent Platform for Brain Tumour Diagnosis, Treatment and Recurrence Monitoring Using Multimodal Datasets
KEYWORDS
Brain Tumour, Multimodal AI, Medical Imaging, Diagnosis Platform, Recurrence Monitoring
OBJECTIVES/OUTCOMES
<ol style="list-style-type: none"> 1. To develop a multimodal AI model for pre-operative tumour diagnosis and post-operative recurrence warning. 2. To develop a multimodal radiological imaging fusion AI model for brain tumours and blood vessels segmentation and evaluates its performance. 3. To develop an End-To-End Intelligent Platform for Brain Tumour Diagnosis, Treatment and Recurrence Monitoring to increase the survival rate of brain tumour patients and evaluate its effectiveness.
METHODOLOGY
<p>The project consists of three phases.</p> <p>In the first phase, demographic and image datasets of existing patients who attended neuro neurosurgery clinic for brain cancer treatment from 2015 - 2025 will be collected. The patients will be selected through a purposive sampling method who have fulfilled the inclusion criteria for this research. All data will be anonymised before analysis. Data preprocessing and annotation will be performed. In the meantime, AI models will be trained using public datasets.</p> <p>In the second phase, we will evaluate the developed AI models with PPUM data. Fine-tuning the model could be performed to improve the model's performance.</p> <p>In the third phase, an end-to-end service application platform consisting of AI modules will be developed. Focus group discussions will be performed to gather user information to develop the platform.</p> <p>In the last phase, testing will be conducted on the developed system to evaluate its effectiveness in aiding clinical diagnosis.</p>
GANTT CHART



POTENTIAL IMPACT

This project is in line with Malaysia's drive for mission-oriented research and development, our mission is to revolutionize brain tumour care by developing a dedicated AI-driven platform for brain tumour diagnosis, treatment planning, and recurrence monitoring that seamlessly integrates multimodal datasets. By covering pre-operative and post-operative workflows, this platform will tackle critical challenges, including the complexities of encoding clinical and pathological knowledge, the limitations posed by small sample sizes, and the heterogeneity of neuroimaging data. In doing so, we aim to reduce reliance on invasive, gold-standard pathological sampling methods, mitigating risks to patients while preserving diagnostic accuracy.

1. This will be the first large-scaled brain tumour database that leverages the power of advanced machine learning algorithms will significantly accelerate research and innovation in neuro-oncology, serving as a central clinical hub for clinicians, researchers, and policymakers alike.
2. By pioneering an integrated, AI-driven approach to brain tumour care, our project not only promises substantial improvements in patient outcomes and quality of life but also positions us at the forefront of the global effort to combat one of the most challenging and devastating cancers.
3. This project aims to drive Digital Healthcare advancement in Malaysia by leveraging big data analytics to guide hospital policy-making. Through robust data-driven insights and streamlined clinical workflows, the initiative can enhance healthcare delivery while positioning Malaysia as a leading Clinical Trial Hub in Southeast Asia.
4. By integrating AI and comprehensive datasets, the project not only raises the national standard of care but also bolsters Malaysia's global competitiveness in clinical research and innovation.