

AI and Quantum Research Center (AIQRC), Asia University, Taiwan**Activities**

In this issue, we report on two recent activities and extend a warm welcome to AIRA, the Artificial Intelligence Research Group at Universitas Multimedia Nusantara, Indonesia.

[1] Asia University and AIQRC, supported by the Ministry of Education's Taiwan Global Pathfinders Grant Program, provide Taiwan students with world-class experiential learning opportunities through programs in IBM quantum technologies, UCLA academic exchange, quantum finance, humanoid robotics, and astronaut mission training.



(A) IBM dream program



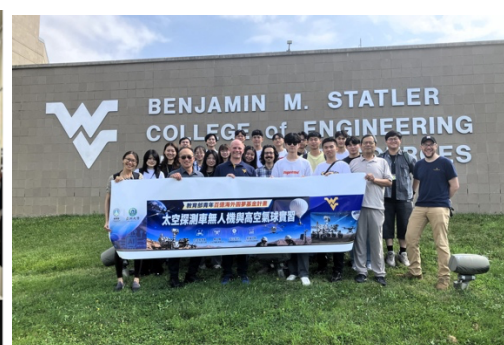
(B) UCLA elite program



(C) Quantum finance program



(D) Humanoid robot program



(E) Astronaut mission training program

Prepared and Edited by

Ka-Lok Ng ^{1,2}

Deputy Director ¹ & Distinguish Professor ²

¹ [AI and Quantum Research Center \(AIQRC\)](#),

² [Department of Bioinformatics and Medical Engineering](#), Asia University, Taiwan

[2] AI for disease clinical pathway analysis and prediction at Universitas Multimedia Nusantara, Indonesia.

It is an honor for our research group to join AI and Quantum research Center (AIQRC), as a research member. Our research group is focusing on AI and biomedical research. This research group is called AIRA: Artificial Intelligence Research Group at Universitas Multimedia Nusantara. AIRA is supported by the Ministry of Education's Indonesia national competitive grant program for three years in a row to develop AI model in health sector utilizing transcriptomic, radiomic and medical record dataset begin in 2023-2024 and 2024-2025, the research scope is a fundamental research with the output are some publications accepted in an international reputable journal indexed by Scopus. Moreover, in 2025-2026 currently, the research scope is already for applied research where the output is a prototype with a feasibility study analysis for the developed AI model. AIRA is consist of researchers and students from Universitas Multimedia Nusantara and also some national collaborator with a background as a urology, radiology and statistician. Furthermore, AIRA also have an international research partner to boost our international research network (IRN) that come from (1) Universitas Malaysia Perlis in Malaysia, (2) Marshfield Clinic Research Institute in United States, (3) Mae Fah Luang University in Thailand, (4) Hualian Tzu Chi hospital in Taiwan, (5) Queensland University of Technology (QUT) and (6) Avantika University Ujjain in India.



Machine learning and deep learning application model in clinical pathway

Clinical pathway in health sector is consist of diagnosis, prognosis and drug or treatment response for personalized medicine. AIRA has developed some AI model to predict or diagnose some cancer stage classification utilizing transcriptomic and radiomic dataset that has been deployed in a website that can be accessed in this link: <https://airacare.org/>. Some projects are also already published in a reputable journal (1–5). Our AI model follow the machine learning or deep learning pipeline that consist of data collection, data preprocessing, feature engineering, model development, model evaluation and model validation using explainable AI. Figure 1 is shown our framework to develop AI model to diagnose prostate cancer stage using DNA methylation feature.

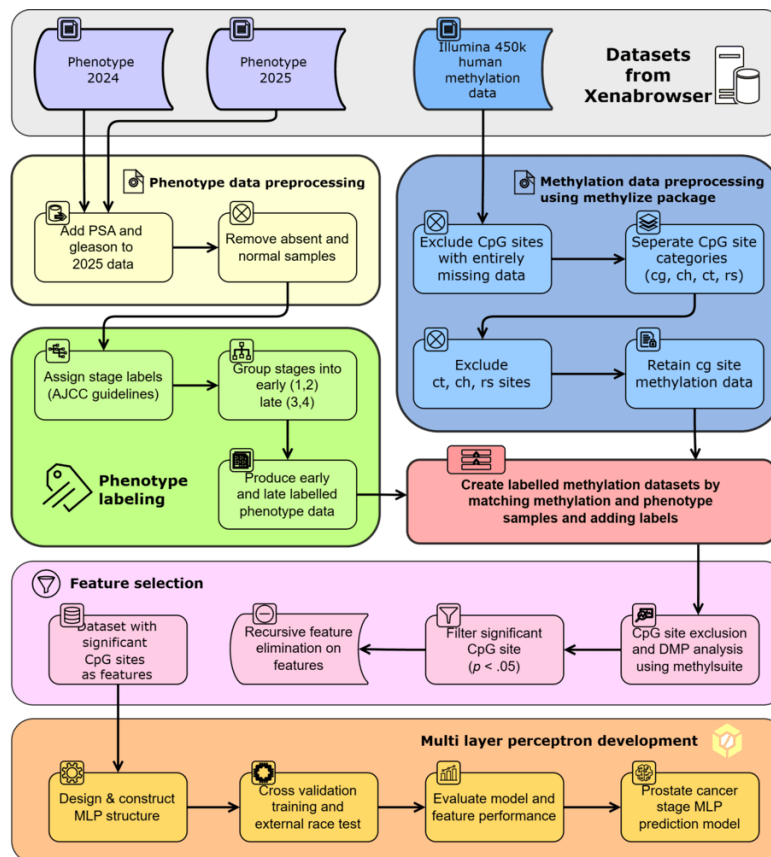


Figure 1. Datasets were sourced from Xena Browser and processed independently. Phenotype data were standardized for labeling, while Illumina 450k methylation data were preprocessed using the methylize package. CpG sites were categorized (cg, ch, ct, and rs); however, only cg sites were retained as others lacked sufficient methylation values. Phenotype samples were labeled according to AJCC 7th edition guidelines and binarized into “early” (stages I and II) and “late” (stages III and IV) groups. Following sample matching, feature selection was performed using methylsuite for differentially methylated position (DMP) analysis, followed by recursive feature elimination (RFE) to identify the most informative CpG sites. These features were used to develop a multilayer perceptron (MLP) model, featuring cross-validation and external race testing, to predict prostate cancer stages. AJCC: American Joint Committee on Cancer; PSA: prostate-specific antigen.

AIRA is also develop AI model for other diseases utilizing another dataset type such as radiomic, medical records dataset, sequence dataset and etc. Some projects are already submitted in a reputable journal. Moreover, for some projects are also already submitted for the patent recognition to Directorate General of Intellectual Property (DGIP) in Indonesia. AIRA is open for any collaboration for seeking an international funding, joint publication, visiting professor and etc.

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Prepared by

PIC of AIRA: David Agustriawan, Ph.D.^{1,2}

Email: david.agustriawan@umn.ac.id

WhatsApp number: +6287781535936

¹ Artificial Intelligence Research Group at Universitas Multimedia Nusantara, Indonesia

² AI and Quantum Research Center (AIQRC), Asia University, Taichung, Taiwan

AI and Quantum Research Center (AIQRC)

Room A110, Asia University, No. 500, LiuFeng Rd., WuFeng Dist., Taichung City 41354 Taiwan.

Email: qphys.qcomp@gmail.com Office: 04-23323456 ext. 6631

Web: <https://quantum.asia.edu.tw/>