UNIVERSITI TEKNOLOGI MARA

Issue #3 | November 2023

RISE

Catalysing Global Research Excellence

ARTIFICIAL INTELLIGENCE (AI): Embracing the Future

eISSN 2805-5683

9 772805 568009

UNIVERSITI TEKNOLOGI MARA

RISE

Phone: +603-5544 2004 | E-mail: tncpi@uitm.edu.my | Web: https://tncpi.uitm.edu.my/
Facebook: tncpi.uitm | Youtube: TNCPI UiTM
Instagram: tncpi_uitm | Twitter: tncpi_uitm

ADMINISTRATION

PROF. TS. DR NORAZAH ABD RAHMAN
Deputy Vice-Chancellor (Research & Innovation)
Office of Deputy Vice-Chancellor (Research & Innovation)
noraz695@uitm.edu.my
+603 – 5544 2004

ASSOC. PROF. DR MOHD MUZAMIR MAHAT
Head of Research Communication & Visibility Unit (UKPV)
mmuzamir@uitm.edu.my
+603 – 5544 3097

ABOUT THE MAGAZINE

RISE Magazine is published by Office of the Deputy Vice-Chancellor (Research and Innovation) with aims to highlight a research and innovation on multidisciplinary expert of fields in UiTM. It serves as a platform for researcher to showcase their high quality and impactful findings, activities and innovative solution through publication. Contribution of these ideas come from academicians, researchers, graduates and universities professionals who will enhance the visibility of research and stride to elevate Universiti Teknologi MARA to global standards. This is an effort to promote research as a culture that is accepted by all expertise.

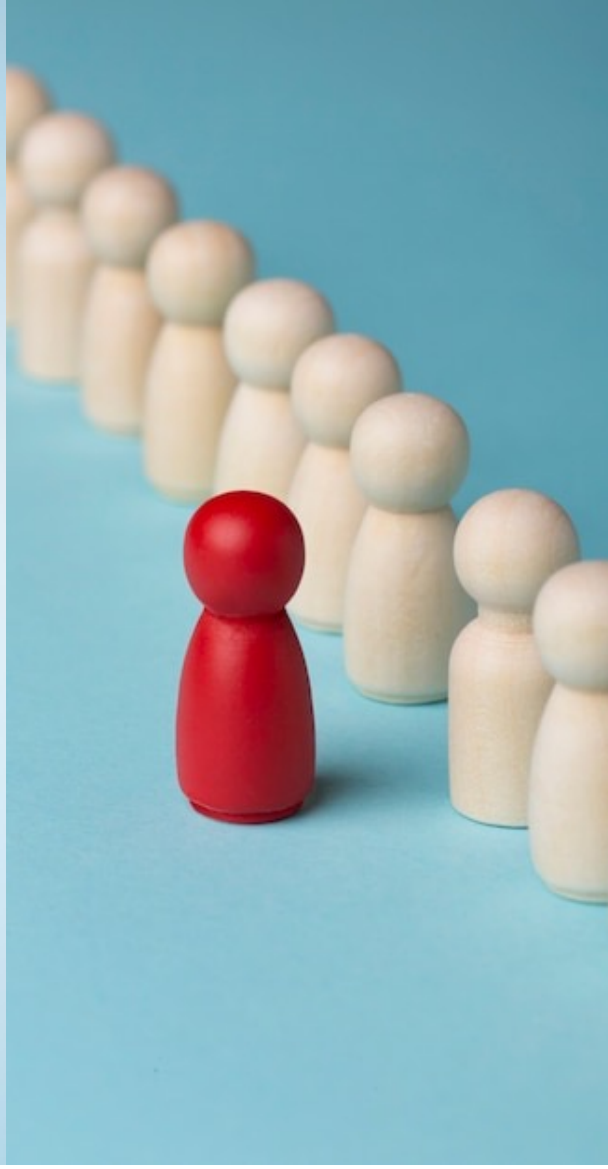
ABOUT UiTM

Universiti Teknologi MARA (UiTM) is a public university based primarily in Shah Alam, Malaysia. It has grown into the largest institution of higher education in Malaysia as measured by physical infrastructure, faculty and staff, and student enrollment. UiTM is the largest public university in Malaysia with numerous campuses throughout all 13 states in Malaysia. There is a mixture of research, coursework and programmes offered to the students. The Office of the Deputy Vice-Chancellor (Research and Innovation) also known as PTNCPI *(Pejabat Timbalan Naib Canselor (Penyelidikan dan Inovasi))* serves as a *Pusat Tanggungjawab* (PTJ) for navigating the research and innovation agenda of the university to achieve UiTM's goals.The PTNCPI office strives to mobilize faculty and campuses, fostering collaboration among researchers, with the aim of transforming the University into a Globally Renowned University by 2025

Artificial Intelligent (AI) in Construction Industry: ***The Talent Gap***

Dr Sheikh Ali Azzran Sh Said
School of Construction and Quantity Surveying,
College of Built Environment, UiTM Shah Alam

The prevalence of discussions surrounding Artificial Intelligence (AI) has rapidly spread through global news, especially with the introduction of ChatGPT. With the current state of technology, AI breakthroughs are inevitably being integrated into various economic sectors, including construction. However, due to the industrial challenges in the background of the construction industry, it is rare to find a supply of niche talent with the required experience to address and champion the opportunities presented by the AI agenda. To bridge this gap, the government needs to take a significant step in spurring investment to embed digital transformation education, thereby producing the adequate talent required for the industry. This integration demands a combination of knowledge and industrial experience in an interdisciplinary field encompassing both construction and IT-related expertise. Consequently, the collaboration of ideas between researchers and industry experts from both fields will pave the way for breakthroughs in advancing the construction industry.



As the demand for highly skilled AI talent increases, it becomes increasingly challenging to find individuals who possess expertise in both AI and construction. Therefore, upskilling employees becomes mandatory to educate them on the introduction to AI and its potential impact on long-term career growth and opportunities. Government incentives can play a crucial role in supporting the workforce by providing opportunities for re-training, upskilling, and access to computing and analytics capabilities, giving them a competitive advantage. Learning AI requires hands-on experience, necessitating a strategic collaboration between the industry and academia to create apprenticeship programs that cater to both students and employees, allowing them to apply AI across various disciplines in construction and job functions. Furthermore, there must be openness in sharing knowledge of AI applications through the academic community to enhance the development of futureready AI talents.

The Malaysia National Artificial Intelligence (AI) Roadmap 2021-2025 is one of the strategic initiatives of the government that aims to integrate AI into various sectors, including construction. One of the key highlights of the framework is the focus on 'Fostering AI talents,' as the shortage of AI talent and experts poses a significant challenge for organizations looking to adopt and implement AI. The roadmap outlines the competencies that future AI talents are expected to acquire, which include:

- Analytical mind and problem-solving skills with a focus on cost-effective solutions.
- Technical ability to design, maintain & troubleshoot technology and software programs.
- Proficiency in big data computational skills (Phyton, Java, C++) and statistical modelling to develop algorithms powering AI technologies
- Capability to translate highly technical knowledge into actionable strategies
- Ability to predict the trends of technological innovations.

The mentioned competencies will foster future career growth for AI talents, enabling them to pursue roles as AI data scientists/experts, AI engineers, and AI business strategists. The AI data scientist role involves comprehending and contributing to the end-to-end data science process, including data preparation, feature engineering, AI model development, and model evaluation. On the other hand, AI engineers possess the ability to create technology architectures that scale, write and deploy failure-proof software using AI features, and integrate AI

capabilities with existing systems. Lastly, an AI business strategist adopts a multi-disciplinary approach that encompasses a profound understanding of both business strategy and AI systems, thus leveraging AI for business advancement.

The construction business has seen an astronomical amount of expenditure, approximately RM116 billion, invested in global AI research and development (R&D) for construction and engineering technologies over the last eight years. However, despite such significant investments, the core construction processes have remained tedious and unchanged for nearly four decades. The industry's heavy reliance on manual practices, coupled with the complexities of project management, has led to a series of challenges, including cost inefficiencies, project delays, poor quality performance, and decision-making struggles. The integration of AI in the construction sector not only facilitates substantial improvements in business processes but also acts as a catalyst for enhanced productivity and provides a more robust long-term competitive advantage for future construction endeavours.

The future career prospects of AI in construction rely on individuals who possess a holistic vision and the ability to envision the potential applications of not just AI but also other vital elements of the digital world, such as IoT, AR/VR, and 3D modeling, combined with a solid foundation of construction knowledge and expertise. To secure a significant role in the future of construction, adaptability to digital advancements is crucial for acquiring niche skills and meeting the rising demand for AI implementation. Some of the key future AI roles that are set to revolutionize the construction business include:

- **AI Project Engineer** – able to estimate/determine the time, schedule, and procurement necessary for project completion based on past projects of similar scope.

- **Operator-3D Scanning-** This technology allows us to scan any substance of any size, allowing us to make a copy of the material that was previously scanned. The primary technologies at work here are artificial intelligence and machine learning. The operator must be highly competent in AI and machine learning technology.

- **AI-assisted BIM Engineer** - analysing the structure by layers prior to any construction work and promoting overall safety and reducing dangers connected with building projects. Risk mitigation is critical in an accident-prone business like construction. This aids in the development of contingency plans, evacuation tactics, and the identification of future threats such as heights and falling hazards.

- **AIoT Operator**- The human intervention, equipment, and machinery are controlled via the Internet and AI. This technology is handled by a person, with no physical intervention. Plus, The purpose of AIoT is to make IoT operations more efficient, improve human-machine interactions, and enhance data management and analytics.

- **VR/AR Manager**- facilitate visual interaction with viewers of the prospective project, immersing them in the experience of the project model in virtual.

In conclusion, AI is set to play a crucial role in the future of construction, with its potential to enhance analytics, enable cognitive automation, and improve overall performance. To ensure a smooth integration and prevent any negative impact on current employment or displacement of existing employees, proactive measures must be taken. This includes reskilling and upskilling current workers to equip them with the necessary AI skills. Reskilling initiatives should be intentional and incorporate upskilling exercises for those who already possess AI capabilities, fostering a workforce that is future-ready and adaptable to the advancements brought about by AI in the construction industry.