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Anniversary**  
Galvanising Research Excellence

**UiTM's Global Effort  
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# RISE

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## ABOUT THE MAGAZINE

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RISE Magazine is published by Office of the Deputy Vice-Chancellor (Research & Innovation) with the aim of highlighting the research and innovation on of experts from multidisciplinary 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 strive to elevate Universiti Teknologi MARA to global standards. This is an effort to promote research as a culture that should be embraced by everyone.

## ABOUT UiTM

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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. Office of the Deputy Vice-Chancellor (Research & Innovation) or known as TNCPI (*Timbalan Naib Canselor (Penyelidikan & Inovasi)*) serves a *Pusat Tanggungjawab (PTJ)* that navigates the research and innovation of university in achieving UiTM agenda. TNCPI office strives to mobilise the faculties, and campuses to move together and promotes cooperation among researchers in bringin UiTM as a leading global university of science, technology, and innovation by 2025.



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# FOREWORD

## VICE-CHANCELLOR



To excel globally, research must be weighed in as a key factor to navigate the university's direction in making an impact. This is especially when focusing on translational research where society can benefit greatly from its findings.

Congratulations to the Office of the Deputy Vice-Chancellor (Research and Innovation) on the publication of this magazine, aptly called RISE. I am pleased to see that the COVID-19 pandemic has not dampened UiTM researchers' pursuit of their dreams. The contents of these pages allow active research and innovation activities be shared with our stakeholders, local and international collaborators.

As UiTM aspires to be a world-renowned university by 2025, I believe that our current research practises are on track. For example, the featured article in the magazine highlights the key success of robotic technology ventured by our researcher, Associate Professor Dr Hanafiah Yussof, who formed a start-up company to advance robotic technology in Malaysia. His contribution to the robotics industry, the Robot Rehabilitation System for Autism Therapy, is an example of innovation that can transform the future.

In our pursuit of changing the future, we at UiTM are cognisant of the current and future direction of research to facilitate research from different disciplines. We have researchers using drones for pineapple plantations, exploring hybrid rockets with Equatorial Space System (ESS), and researching sanitation, collection, and sewage/wastewater treatment systems with Indah Water Konsortium (IWK) Sdn Bhd, to name a few of the work we have been actively involved in.

Hence, we will continue to contribute and make progress associated with processes and knowledge pivotal for impactful research, especially in developing knowledge-based technology that benefit society.

Ultimately, I am confident that the publication of this magazine will further strengthen the visibility of UiTM research and innovation.

Thank you.

**PROFESSOR Ts. DR HAJAH ROZIAH MOHD JANOR**

Vice-Chancellor

Universiti Teknologi MARA

# FOREWORD

DEPUTY VICE-CHANCELLOR (RESEARCH & INNOVATION)



I would like to congratulate the editorial team on the release of RISE, a research magazine highlighting our research and innovation efforts and accomplishments. The magazine exemplifies our office's synergistic and collaborative efforts, as well as those of our researchers and article contributors, to advance the visibility agenda.

As the office in charge of research and innovation, we are constantly hoping that every research result and invention will benefit the community through translational research. Assoc. Prof. Dr Hanafiah Yussof's Robot Rehabilitation System for Autism Therapy, for example, has aided the autism community in improving communication. Even more proud that this endeavour resulted in the formation of a start-up company.

Despite the COVID-19 pandemic, UiTM researchers continued to conduct relevant research activities despite the uncertainty. The scale of the events varies from a small effort to install solar panels at a rural school and organise virtual conferences to the use of drones and precision agriculture technology on pineapple plantations. Notably, a Bioextreem solution capable of inhibiting 99.99 percent of bacteria and viruses was also developed.

With these accomplishments, we will continue to support research efforts, particularly those aimed at developing knowledge-based technology with a social benefit in mind.

Finally, I believe that this magazine can serve as a platform for the visibility agenda by incorporating a wide range of science and research perspective, fostering more potential collaboration between UiTM researchers and local and international institutions and industries.

Thank you.

**PROFESSOR Ts. DR MOHD NAZIP SURATMAN**

Deputy Vice-Chancellor (Research & Innovation)

Universiti Teknologi MARA

# MESSAGE

## FROM THE CHIEF EDITOR



Alhamdulillah.

It gives me great pleasure to see this issue published. We received a massive and impactful submission to feature our UiTM community's research stories. Despite the difficult circumstances, UiTM researchers are proactive in carrying out research activities and events within their respective capacities.

Allow me to express my heartfelt gratitude to all of the authors of the articles in this magazine. The publication of this issue would have been far more difficult to achieve without their contributions. Here, we feature Assoc. Prof. Dr Hanafiah Yussof of the College of Engineering's beautiful journey into robotic technology. I believe that robotics has always been on the national agenda for its true mission in helping people. We chose to focus on robotics to honour a UiTM researcher who has dedicated his academic

career to assisting society through technological advancements. To all researchers out there, we hope that his inspiring journey will rekindle our enthusiasm for research.

The inaugural issue of the RISE magazine also features research achievements and the multidisciplinary research areas in UiTM which support national priorities. Research Nexus UiTM (ReNeU) celebrates its first anniversary in 2021, marking a major milestone in its journey. Faculty of Pharmacy is making a global impact towards producing young aspiring neuroscientists. The exploration of Lembah Benua has highlighted the wonderful forest as a potential research station. The potential of fine art logistic industry is also of utmost importance towards making Malaysia as a top art market hub. These are some of the exciting research stories and I invite you to discover more in this issue.

We sincerely hope to bring you more research news from the UiTM family in the coming issues. Have fun reading!

**DR MOHD MUZAMIR MAHAT**

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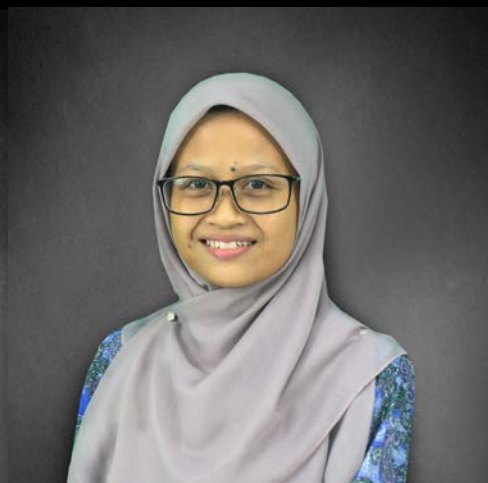
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# CONTENTS

NOVEMBER 2021

## FEATURE STORIES

|                                                                                  |    |
|----------------------------------------------------------------------------------|----|
| Robotics Technology: Driving Innovation, Transforming Future                     | 1  |
| Hutan Simpan Lembah Benua Exploration 2021                                       | 7  |
| Drone and Precision Agriculture Technology for Pineapple Plantation              | 9  |
| A Project to Provide Solar-Powered Lighting Project to Rural Schools in Perak    | 10 |
| Virtual Green Safe Cities Seminar (GRESK 2021)                                   | 12 |
| Ads – UNNIZOL Hand Sanitizer                                                     | 13 |
| Good Bacteria That Lower Cholesterol: Myth or Truth?                             | 15 |
| MatE2U: Community Outreach by the Maternofetal and Embryo Research Group (MatE)  | 16 |
| Nextgreen Global- UiTM Research Collaboration                                    | 17 |
| IWK-UiTM Research Collaboration                                                  | 18 |
| Gait Recognition System for Mass Surveillance                                    | 19 |
| Achievements                                                                     | 21 |
| NANO-ElecTronic (NET) Research Group                                             | 22 |
| Addressing Public Health Concerns Through University-industry Collaboration      | 24 |
| Adaptive Strategies for Microbial Performance Through Optimization Approach      | 25 |
| The Effectiveness of the ICQS Bukit Kayu Hitam and CIQ Sadao's 24-hour Operation | 26 |
| Green Event Research @ Borneo Jazz Festival                                      | 27 |
| Ads – Dr Azri's Perfume                                                          | 29 |

“

Collaboration between NEXTGREEN Global and UiTM will strengthen UiTM cooperation with public listed company in zero waste technology and renewable energy for sustainable development



”



17

Nextgreen Global- UiTM Research Collaboration

38

UiTM'S Global Effort in Training Young Aspiring Neuroscientists





# 42

High Energy Material Research Laboratory (HEMREL)



|                                                                                                                                                           |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| ReNeU's 1 <sup>st</sup> Anniversary – Galvanising Research Excellence                                                                                     | 31 |
| Potential of Fine Art Logistic Industry                                                                                                                   | 33 |
| Erasmus+ KA2: The Complexities of the Creation of a Validation Protocol for the Making4.0 Curriculum Between the Malaysian and European Education Systems | 35 |
| Clove, Habbatus Sauda, Neem and COVID-19                                                                                                                  | 36 |
| UiTM's Global Effort in Training Young Aspiring Neuroscientists                                                                                           | 38 |
| Ads - Paina (Pineapple Chili Sauce)                                                                                                                       | 40 |
| High Energy Material Research Laboratory (HEMREL)                                                                                                         | 42 |
| Disruptions in Supply Chains and a Lesson from the COVID-19 Pandemic: A Retail Perspective                                                                | 43 |
| New Road-Side Speed Display Signs in Reducing Speeding Problem in Malaysia                                                                                | 45 |
| The Data is Talking to You. Are You Listening?                                                                                                            | 46 |
| Ads - UnaCoffee                                                                                                                                           | 48 |
| Ads – RM Polypack Sdn Bhd                                                                                                                                 | 49 |



# 07

Hutan Simpan Lembah Benum Exploration 2021



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# Gait Recognition System for Mass Surveillance

by Dr Fakhru Hazman Yusoff



The need for surveillance and counter-terrorism mechanisms among the general public has become increasingly important in today's world, where human movement is seamless, and potential threats can exist anywhere at any time. Various solutions have been implemented to address this issue, with video-based surveillance being among the most popular.

These video-based surveillances include the use of CCTV in city-wide installations [1, 2], body cams for police officers [3, 4], and video cameras for security checks, such as those found at airports or building entrances [5]. Implementing CCTV as a means of surveillance can be pretty straight-forward. It requires the installation of video cameras at strategic locations, and the cameras will record the image feed. These recordings can be used later when a need arises, such as during a robbery or investigation into a person of interest.

While setting up the video camera can be straight-forward, processing the acquired information is not that simple. Aside from the 'record-store-view' approach, a more elaborate setup includes having a live monitor via a specialised room or a command centre equipped with a prominent display. At the same time, several officers are tasked with monitoring. Unfortunately, humans can only watch a display for an average of only 20 minutes without being distracted [4], so the task can be daunting.

Large scale surveillance will become a great challenge, especially in security situations where decisions are needed in the nick of time. The usage of artificial intelligence (AI) in recognition systems greatly helps surveillance operations. AI can be trained to detect the face region in the video, hence reducing the burden of detecting the existence of a human in the video feed.

As we know, the human face has a distinct biometric feature that is useful for identifying and tracking a person. In a building security setup, a person can be made to walk in a single file for the system to capture his unique features. This information can later be used to track the person in the building. On a larger scale, the video feed can be made to detect several lanes of faces at once. Hence, the person in charge can focus on more advanced stages, such as several identified individuals, leaving initial assessment to be done by an AI-based recognition system.

Unfortunately, the face-based AI recognition system faces several challenges for implementation in mass situations. The first challenge in a mass situation is that not much face information can be detected. A video feed with several hundred faces, for example, will produce a small image with little information per person. Occasional occlusion is the second challenge in the face-based system. Being in a mass situation can make faces 'collapse' or 'hide'. Unlike single file set up in a building,



CCTV, human movement cannot be controlled in a mass situation. Therefore, ensuring stable recognition can be a problem. The final challenge is intentional occlusion, such as wearing sunglasses, a hat, or a face mask. The third situation is even more challenging than the second situation because the occlusion can be permanent with not much information being retrieved.

Human gait has the potential to be used for recognition systems in a mass surveillance context. Watrix, a gait recognition company, has introduced the system for implementation by law enforcement in Beijing, Shanghai, and Chongqing with favourable results [6]. Given the advancement of AI with the incorporation of deep learning approaches, gait-based AI recognition can be investigated further [5].

As the dl system has great potential and is relatively new in the context of gait recognition technology, we at Spatial Visual Analytics Group (SVAG) have embarked on research into deep learning-based human gait recognition. Since it is still new, the existing gait-based AI recognition is still plagued with several issues. SVAG aims to look at two issues: the establishment of unique feature traits and the optimisation of the deep learning process for the mass recognition system. As DL in gait recognition is relatively new, the unique features have yet to be fully explored. Likewise, the exact implementation process in DL can be further refined to increase its accuracy and address its shortfall issues. This research was spearheaded by Dr Fakhruil Hazman Yusoff, Assoc. Prof. Dr Marina Yusoff and Miss Wang Xijuan.



# Congratulations

**PROF. DATIN DR  
HAPIZAH MD NAWAWI**

Faculty of Medicine  
Institute of Pathology, Laboratory & Forensic Medicine (I-PPerForM)  
and the Malaysian FH research team

on the successful publication in the flagship journal

**THE LANCET**

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**Global perspective of familial hypercholesterolaemia:  
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## Achievements

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# Congratulations

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\*Source: PLoS Biol 18(10): e3000918. <https://doi.org/10.1371/journal.pbio.3000918>

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|                                     | 04 | Construction & Infrastructure |                                 | 04            | Robotics & AI                |                                 | 04                                        | Genomics                |
|                                     |    | 05                            |                                 | Smart Sensors | 05                           |                                 | Non-Communicable Disease                  |                         |
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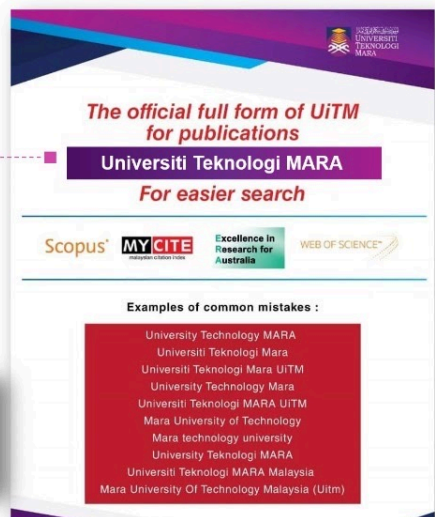
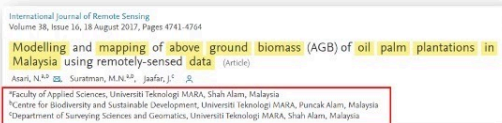




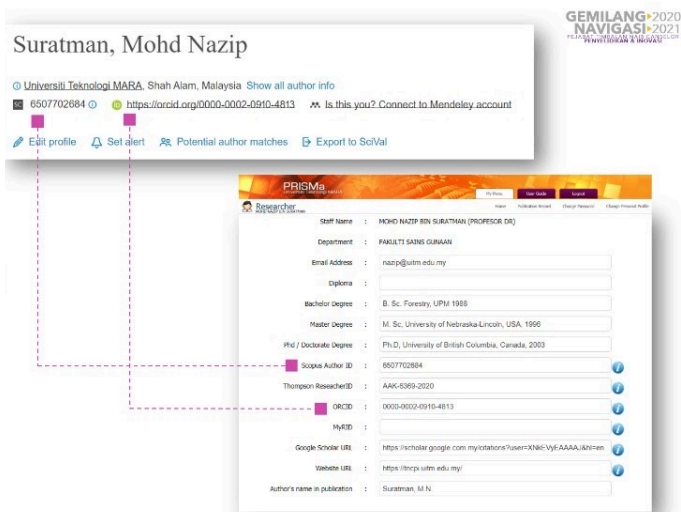
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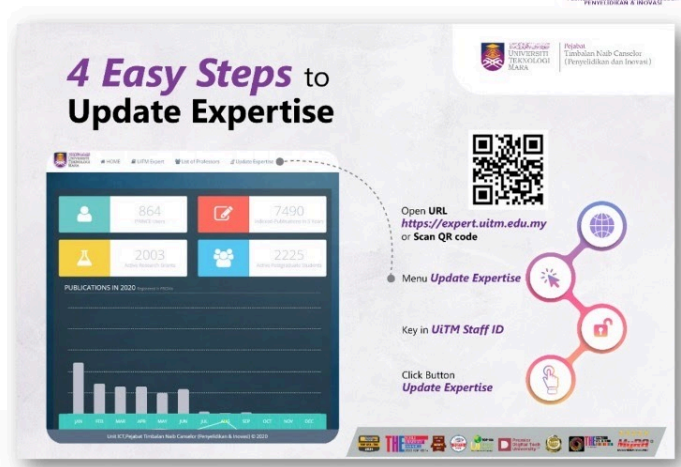
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*Potential of Fine Art Logistic Industry*

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*Erasmus+ KA2: The Complexities of the Creation of a Validation  
Protocol for the Making4.0 Curriculum Between the Malaysian and  
European Education Systems*

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*Clove, Habbatus Sauda, Neem and COVID 19*

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