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REPORT

AI research on the rise in Southeast Asian universities

AS the race to capitalise on the escalating capabilities of artificial intelligence gains pace in the Industrial Revolution 4.0 era, many Asian countries are intensifying their focus on the field.

A recent report released by Clarivate Analytics on Artificial Intelligence (AI) sought to evaluate the input of academia in the sector in Southeast Asia to create an overview of AI-thought leadership in the region.

AI is an area of computer science that emphasises the creation of intelligent machines that work and react like humans.

The report stated developers in Southeast Asia were increasingly competing to uncover new approaches and broaden the reach of this key driving force for next-generation innovation.

Southeast Asia, the research company said, was one region that had invested heavily in AI and, as a result, boasted huge growth in its AI capabilities and understanding.

By recognising AI's capacity to influence business and social settings, the region has published a diverse range of AI-related research papers and patents in recent years.

Subject matters include not just computer algorithms, but also semiconductors, robotics, medicine and biochemistry, thus highlighting the versatility of AI and its potential applications in everyday lives.

Clarivate Analytics' data identified that 24,548 AI-related papers have been published by Southeast Asian countries, with the earliest paper dating back to 1985.

Singapore was the most prolific producer with 10,274 publications, followed by Malaysia (8,416) and Thailand (3,648). The output of Malaysia, Thailand and Singapore alone accounted for 86 per cent of the total research output for Southeast Asia.

Singapore was the leader for patent publications, accounting for 77 per cent of Southeast Asia's total. Malaysia ranked fifth, making up five per cent of the region's published patents.

Based on InCites Benchmarking and Analytics data by Clarivate Analytics from 2007 to 2016, it was identified that five Malaysian universities are among the top 10 Southeast Asian universities producing AI research papers receiving the most number of citations during this period.

The universities are the University of Malaya (UM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia and Universiti Sains Malaysia.

According to UM deputy vice-chancellor (Research and Innovation) Professor Dr Noorsaadah Abd Rahman, the university produced 1,103 AI-related papers in the past 10 years.

"The world is moving towards Industrial Revolution 4.0, the fusion of cyber and physical system. Industrial Revolution 4.0 is the convergence of man and machine," she said.

"We are looking forward to a future whereby work is connected virtually; robots carrying out our physical work; buildings, transport vehicles and cities are smart and interconnected; power generation are driven by renewable energy, such as solar, wind and biofuels; and, nanotechnology chip are implanted for healthier bodies.

"Research in UM is gearing towards this direction as well. We are looking into our researchers' competencies and planning for our own thrust areas to be more competitive in future."

Professor Abrizah Abdullah, who is dean of UM's Faculty of Computer Science and Information Technology, said the fundamental AI subjects focused by the faculty are Machine Learning, Numerical Methods, Image Processing and Natural Language Processing.

"The AI-related research conducted by UM's researchers is vast, spanning from robotics, medical and healthcare devices, electrical and mechanical engineering, and logic programming to business administration forecasting," she said.

"The university seeks to develop and promote specialised research areas at the frontier of knowledge and cutting-edge technology, or has the potential to be. We foster multidisciplinary and interdisciplinary collaborative research within and outside the university."

Professor Dr Ali Selamat, dean of UTM's Malaysia Japan International Institute of Technology, said the university promoted AI research since 1997, expecting the vast potential that AI and robotics can bring to Malaysian industries by way of increasing the competitiveness of their products.

COUNTRY SNAPSHOT OF THE PATENT LANDSCAPE IN SOUTHEAST ASIA

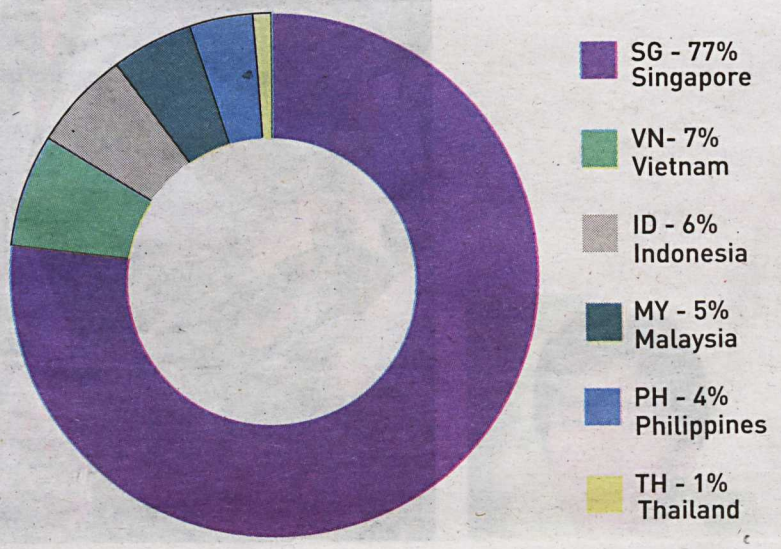

Figure 3: Artificial Intelligence patent filing country (Derwent Innovation, 1997–2016)

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"Since the inception of the university's Center for AI and Robotics (CAIRO), there has been much success through various research and development projects, as well as collaborative research with various industries in Malaysia."

Ali, who is UTM's chief information officer and director of the Computer and Information Technology Centre, shared that in the Industrial Revolution 4.0 era, CAIRO is working on new AI technologies, such as deep learning neural networks, and looking at the prospective of using the technologies for applications of optimization, control, fault diagnosis, and pattern recognition of immense number of data or images gathered by the Internet of Things platforms.

UPM vice-chancellor Professor Datin Paduka Aini Ideris, meanwhile, said AI research and development was prominently conducted by UPM researchers, particularly from the Faculty of Engineering, and Faculty of Computer Science and Technology.

"AI development in UPM has been focused prominently on the area of agriculture, natural disaster, and health.

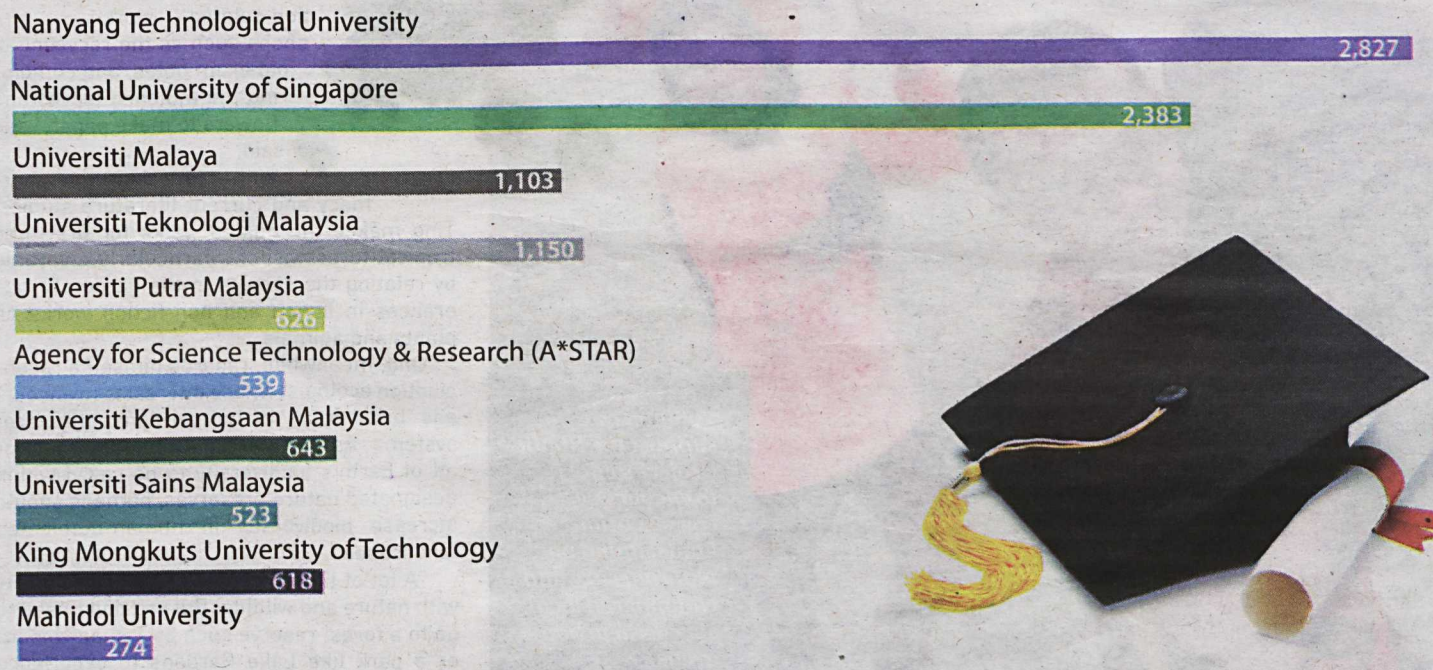
"UPM is looking forward to be in the forefront in applying AI technology to the field of agriculture for the benefit of the community. In addition, UPM research is moving towards the new concept of translational research," said Aini.

Professor Dr Noorsaadah Abd Rahman

Professor Abrizah Abdullah

Professor Datin Paduka Dr Aini Ideris

AL-RELATED RESEARCH PAPERS PUBLISHED BY TOP 10 SOUTHEAST ASIAN UNIVERSITIES FROM 2007 TO 2016



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