



MAY 2024

RESEARCH PULSE

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GREETINGS FROM RESEARCH PULSE

Greetings everyone.

Time really flies and we have already sailed into almost the middle of a busy year.

We have accomplished quite a bit in developing our research capability and profile at Curtin Singapore. We have added two staff members to the list of registered co-supervisors for our PhD programme and will continue to build a strong pool of co-supervisors for our future PhD students. We are also making inroads in the Higher Degree by Research space with steady interest and applications for our PhD programme. We also have academic staff members who are successful in getting their research accepted for publication, made successful submissions for presentation of their research at major conferences, as well as achieve a research partnership with a local institution of higher learning as adjunct research fellow. We will share more of these news in the next issue of Research Pulse.

In this issue, I thank Dr. Tien Nguyen and Mr. Leo Kee Chye for contributing news of their research activities and for sharing with the wider research community and stakeholders. Please read on to find out the interesting things about research they have to share. Thanks for tuning in and we hope you will continue to enjoy reading about our research adventures.

Best Wishes,

Dr Adrian Tan
Research Director
Curtin Singapore



Harnessing the Power of Multimodal Large Language Models in Academic Research: A Preliminary Investigation

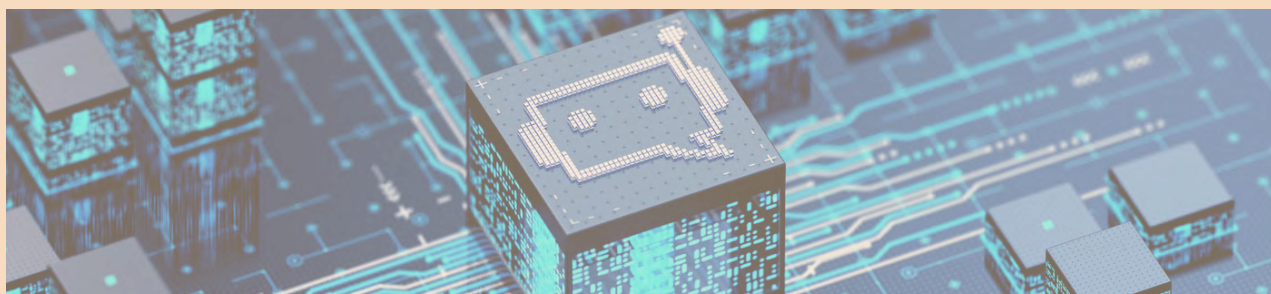
Contributed by Mr. Leo Kee Chye

Introduction

Recent advancements in artificial intelligence (AI), particularly in the development of sophisticated large language models (LLMs), have transformed academic research possibilities. Notably, these LLMs excel in parsing and generating human-like text, but their recent evolution extends beyond text to multimodal capabilities, integrating diverse media formats such as images, audio, and video. This expansion into multimodal functionality highlights the need for a rigorous evaluation of LLM capabilities and limitations, ensuring their effective integration into academic research methodologies.

Methodology

This study conducts a preliminary assessment of three leading multimodal LLMs—GPT-4, Claude-3 Opus, and Gemini-1.5 Pro—within an academic context, focusing on the accuracy and coherence of their outputs. Employing zero-shot training, each model was tested independently. To ensure objectivity, the first response from each model to basic, minimally contextual prompts was analysed. Notably, during this research, the basic models of GPT-4 and Claude-3 Opus lacked audio and video input capabilities, a limitation not shared by Gemini-1.5 Pro, which supports comprehensive multimodal inputs.



Harnessing the Power of Multimodal Large Language Models in Academic Research: A Preliminary Investigation

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Image Interpretation

An image of a statistical output table in PNG format, displaying P-values and t-statistics from various hypothesis tests, was used to evaluate the models. GPT-4 and Claude-3 Opus demonstrated high accuracy in identifying significant and non-significant hypotheses at predetermined significance levels, crafting coherent summaries of the statistical findings. In comparison, Gemini-1.5 Pro provided accurate but succinct responses, potentially reflecting a need for more detailed prompting.



Audio Interpretation

Exclusively, Gemini-1.5 Pro was tested for audio interpretation using a 23-minute interview in MP3 format. The model effectively summarised the key points, though it omitted some minor details, likely influenced by the specific nature of the prompt. This test highlighted Gemini's ability to recognise and prioritise significant information, even suggesting insights initially overlooked by the researcher.

Harnessing the Power of Multimodal Large Language Models in Academic Research: A Preliminary Investigation

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Video Interpretation

A video clip in MP4 format of a PowerPoint presentation, featuring a case study without verbal explanation but accompanied by background music, was used to test Gemini-1.5 Pro. The model efficiently processed and responded to the content, identifying key information despite animated elements and the lack of audio narration, demonstrating robust video interpretation capabilities. Overall, Gemini-1.5 Pro satisfactorily answered all the questions in the slides, as the case study took place in 2022, and Gemini-1.5 Pro's knowledge cutoff extends to November 2023. Furthermore, Gemini was able to correctly label each slide despite the presence of animated texts and images appearing in sequence on the same slide.



Conclusion

This exploratory study indicates that while GPT-4 and Claude-3 Opus excel in handling static image data, providing clearer and more elaborate interpretations, Gemini-1.5 Pro's strength lies in its broader multimodal capabilities, particularly with audio and video content. As the AI field progresses rapidly, it is anticipated that enhancements to these models will foster strong competition among developers, further expanding their utility in academic research.



Harnessing the Power of Multimodal Large Language Models in Academic Research: A Preliminary Investigation

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Future Directions

To fully harness the potential of multimodal LLMs in academia, comprehensive studies are needed to evaluate their performance across various disciplines and research scenarios. Establishing best practices for integrating these tools into research workflows will be crucial for their responsible and effective utilisation. Moreover, as LLMs' capabilities expand, their potential applications in areas like data visualisation, sentiment analysis, and cross-media content synthesis warrant further exploration. Concurrently, the ethical dimensions of employing these models in research—such as concerns related to data privacy, intellectual property, and output bias—must be diligently managed. By strategically leveraging multimodal LLMs while addressing their limitations and ethical implications, academic researchers can unlock new avenues for innovation and knowledge advancement, propelling their fields forward.



Harnessing the Power of Multimodal Large Language Models in Academic Research: A Preliminary Investigation

Contributed by Mr. Leo Kee Chye

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| Input | Prompt | GPT-4 | Claude-3 Opus | Gemini 1.5 Pro |
|--|--|-----------------------------------|-----------------------------------|------------------|
| Pictorial Diagram of a table with hypothesis statistical results (PNG Format) (140KB) | Acting as a Professor in statistical research, interpret the statistical output of the attached diagram. Offer the key takeaways. | Output Available | Output Available | Output Available |
| Audio Clip from a recorded interview (23 minutes) (MP3 Format) (19MB) | Summarise and offer the key takeaways from this interview of a student's perspective towards GenAI. Name the speaker the "Researcher" as the interviewer and "Student" as the interviewee in your reply. | Not yet available for audio input | Not yet available for audio input | Output Available |
| Video Clip from a PowerPoint presentation (Background Music Only) (5.1 minutes) (MP4 Format) (211MB) | Acting as a finance expert, you need to present this video clip case study to audiences who are not familiar with this incident. Explain each of the slides in the video clip in detail; answer all the questions if any in the slides. Finally, offer the key takeaway from this video. | Not yet available for video input | Not yet available for video input | Output Available |



International Women's Day Event - Celebrating HERstory

Contributed by Dr. Tien Nguyen

On 19th March 2024, Curtin Singapore hosted our annual International Women's Day celebration - "IWD - Celebrating HERstory" with the presence of the distinguished guest: Ms. Georgette Tan Adamopoulos, President of United Women Singapore (UWS) alongside Professor Linley Lord, Pro Vice-Chancellor and President of Curtin Singapore, Dr. Carolyn Koh, Research Director External Engagement, Mr. Shaowen Ng, Director of Learning and Teaching, Dr. Tien Nguyen, Co-Lead of Curtin Singapore's Gender Research Network and over 40 students at Curtin Singapore. The event was a joint effort between Curtin Singapore, the Gender Research Network, Curtin Singapore Student Committee, Curtin Singapore Music and Dance Clubs, and Curtin Singapore Business Club.

The event featured a firechat session led by Dr. Tien Nguyen where Ms. Tan passionately engaged with our students and staff on empowering young girls and women through access to education and decent work.



International Women's Day Event - Celebrating HERstory

Contributed by Dr. Tien Nguyen

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Ms. Tan started by sharing some important topics of discussion from the recent UN Women global conference, including gender issues, access to education, male allyship, and safe spaces for women. She shared insights into UWS's initiatives including Girls2Pioneers, scholarships, career exposure programs, self-defense training, and training for young boys. These great initiatives underline UWS's dedication to empowering young girls and women and striving for gender equality and equity. During her talk, Ms. Tan emphasised the importance of building confidence for young girls and women, encouraging support from parents and family, and providing effective mentorship in driving gender equality forward. She encouraged Curtin Singapore staff and students to be part of the change by being more sensitive and aware of gender issues around us, getting involved, and participating as volunteers at UWS.



Through her inspirational talk, Ms. Tan left the audience with two pivotal takeaways: change needs to happen across all levels in our society and the need to include both men and women in both conversations and action on gender equality.



International Women's Day Event - Celebrating HERstory

Contributed by Dr. Tien Nguyen

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The event closed with a sharing session where Curtin Singapore staff and lecturers expressed their appreciation and thoughts on the women that have made a significant impact on their life and the communities around them.

Our IWD event sparked meaningful discussions and inspired a collective commitment at Curtin Singapore towards fostering a more equitable and inclusive future. On the 3rd of May, Professor Linley Lord and Dr. Carolyn Koh had a follow-up meeting with Ms. Tan to discuss potential collaborations with UWS to contribute to gender equality and inclusion in Singapore.



Strategic Public Sector Leadership Workshop in Vietnam

Contributed by Dr. Tien Nguyen



Hanoi, 25th - 27th March 2024, Advanced Political Theory Cohort

From 25th to 27th March 2024, Curtin University had the privilege to deliver a three-day Strategic Public Sector Leadership workshop to 50 mid-level public sector leaders who undertook the Advanced Political Theory program at Ho Chi Minh National Academy of Politics. This program was sponsored by Australia Department of Foreign Affairs and Trade (DFAT), managed through the Vietnam Australia Centre, and delivered by the Curtin University team co-led by Professor Amy Tian and Professor Jane Coffey. Dr. Tien Nguyen from Curtin Singapore is a core member of the delivery team.



Strategic Public Sector Leadership Workshop in Vietnam

Contributed by Dr. Tien Nguyen

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Addressing some of the most important topics in public sector leadership, such as contemporary thoughts on leadership and followership, the future of work, public sector capability framework and governance, foreign policies, and the intersection of public leadership with technology, ethics and sustainability, the program successfully offered participants with opportunities to engage in practical exercises, case studies, and interactive sessions that challenged their perspectives and developed their strategic thinking skills with Curtin delivery team and esteemed experts and practitioners from Australia, Singapore, and Vietnam.



Yen Bai, 28th - 30th March 2024, Emerging Leaders Cohort

The success of the Strategic Public Sector Leadership workshop was further highlighted when it was delivered to 50 emerging leaders in local Party and Government agencies in Yen Bai province from 28 to 30 March 2024. This meaningful program not only facilitated knowledge sharing but also fostered a meaningful exchange of experiences between experts and practitioners in Vietnam and Australia.



Women in Leadership Journey 6 in Vietnam

Contributed by Dr. Tien Nguyen



Hanoi, 21st - 22nd March 2024

Following the success of the Women in Leadership Journey 5, Curtin University has been selected again as the trusted partner to deliver the Women in Leadership Journey 6 to 20 women leaders from 11 key government agencies and political and social organisations of Vietnam. This 10-month training program with five components in both Vietnam and Australia is sponsored by Australian Department of Foreign Affairs and Trade, managed through the Vietnam Australia Centre, and delivered by Curtin University.



Women in Leadership Journey 6 in Vietnam

Contributed by Dr. Tien Nguyen

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Curtin Singapore is proud to be a strong contributor to this impactful program, with Dr. Tien Nguyen being the program co-lead alongside with Associate Professor Samantha Owen, Curtin University Director of Gender Equity and Inclusion, and Professor Linley Lord, Pro Vice-Chancellor and President of Curtin Singapore, being the key training expert and mentor. Professor Lord and Dr. Tien Nguyen joined the team to lead the Opening Ceremony and Introductory Workshop in Hanoi from 21st to 22nd April 2024. Dr. Nguyen continued to join the participants in the one-week intensive training component in Quy Nhon, Vietnam from 23rd to 29th April 2024. This component was led by the Centre for Gender Studies and Women's Leadership under Ho Chi Minh National Academy of Politics.



Conference Presentations and Publications

Journal Publications in 2024

By Dr. Nicolas van der Nest, Dr. Sharyn Curran, and Associate Professor Elizabeth Jackson:

“Trust Me! Trust You? The Indicators of Trust on Buyer-Seller Relationships: Pre- and Post-COVID-19”

~ International Journal of Procurement Management, Volume 20, Issue 2

By Dr. Zahirah Zainol and Dr. Ashley Tong:

“Faithful and Luxurious: Mediating Halal with Luxury through Self-Congruity”

~ Journal of Global Fashion and Marketing, *in press*



European Academy of Management (EURAM) 2024 Conference

The following papers will be presented at the EURAM Conference to be held in Bath, UK in June 2024.

By Dr. Adrian Tan and Dr. Nik Chong:

Layoff Decisions from the Technology Industry: Why Employers Are Still Making the Same Mistakes after All These Years and Lessons They Should Have Learned

By Dr. Ashley Tong and Dr. Zahirah Zainol:

Towards a More Inclusive Model of Financial Inclusion, Technology, and Well-Being



Calendar of Key Events

These are some upcoming events planned for the year. Full details of the events will be made known through official communication nearer the time.

***TBA:** To Be Announced

TBA
SEPTEMBER
2024

**Global Campuses
Brown Bag Seminar**

25
SEPTEMBER
2024

**Qualitative Research
Methodology Workshop**

25
SEPTEMBER
2024

**Curtin Singapore
Research Symposium**

TBA
OCTOBER
2024

**Global Campuses
Brown Bag Seminar**

TBA
NOVEMBER
2024

SDG Symposium 2024

