# Editorial: Large language models: from entertainment to solutions

As of March 2024, generative pre-trained transformer (GPT) and bidirectional encoder representations from transformers (BERT) are two well-developed and widely adopted large language models (LLM). The massive size of parameters up to 340 billion+ in an LLM enables it to capture and generate complex language structures effectively, reliably and systemically, although computationally expensive (Guinness, 2024). Hence, LLMs as new-generation artificial intelligence (AI) models are generally utilized to understand and respond to human-like conversations in text by interacting with people.

LLM has been essentially trained on vast, large datasets, mainly derived from the Internet. Note that data and information on certain topics from the Internet can be outdated, incorrect, inaccurate, inconsistent, incomplete or misleading. This would become problematic when fake news, political propaganda and conspiracy information get fluctuated, resulting in that such a bad data-trained LLM-empowered application can be terribly unreliable and untrustful. In particular, if it is in the wrong hands, the delivered interactive responses can be untruthful and evilly misleading. When LLMs are adopted in real-life problem-solving processes, there could be a lot of security concerns, ethical issues and business and societal risks associated with a large number of unchecked LLM-driven applications worldwide (Qiu, 2023; Waber & Fast, 2024).

Although there are concerns and risks, LLM or further developed artificial general intelligence (AGI) applications are revolutionizing digital transformation in all aspects of human life today and in the future. Due to the relatively low risk and high tolerance, the entertainment industry seems to be getting the first round of AI shock in a variety of positive ways. Entertaining in a broad sense includes but is not limited to online chatting, blogging, gaming, videoing, schoolwork "cheating" and deepfaking. We hope that AI-related policies and regulatory frameworks will be around the corner (Qiu, 2023). Therefore, more research on how LLMs/AGI or the like can revolutionize AI-driven applications becomes essential, making this round of AI phenomenon (since the introduction of ChatGPT at the end of 2022) not a hype but a reality that LLMs substantially empower the on-going digital transformations in truly and positively serving the industry, government, public, society and human beings at large.

According to Bergmann (2024), "2022 was the year that generative artificial intelligence (AI) exploded into the public consciousness, and 2023 was the year it began to take root in the business world. 2024 thus stands to be a pivotal year for the future of AI, as researchers and enterprises seek to establish how this evolutionary leap in technology can be most practically integrated into our everyday lives."

To ensure that LLMs can be leveraged to optimally deliver solutions in the field, from entertainment to problem-solving, domain-based fine-tuning with domain-oriented and right training data will be the key to the success of the adoption of LLM-driven applications. "Garbage in, Garbage out" is generally applied in machine learning, which is still true for

LLMs. To avoid hallucinations and prejudice, feeding the right data and knowledge into an LLM's training and, more importantly, fine-tuning becomes the most critical work in turning LLMs into productivity-oriented solutions (Qiu, 2023).

LLMs empower a variety of computing applications to provide smart language-driven services, including but not limited to content generation, language translation, text summarization, software programming and question answering, which can ultimately transform the labor market worldwide. The value of productivity from generative AI and analytics can be substantially increased, when compared to previous generations of technology. The upside swing in productivity was boldly projected to reach as high as a 66% increase although it will certainly vary with the industry. As LLMs spread more diffusely across the global workplace over time, worldwide productivity could potentially be further turbocharged (Waber & Fast, 2024).

Like what I did before (Qiu, 2023), before I finished my writing of this editorial, I asked Google's Gemini a question, "Will LLMs be largely adopted in applications?" Gemini's answer was quite long. It did highlight that LLMs are constantly improved in the following:

(1) Gaining knowledge abilities in tasks, such as summarization of information, content creation (text, code, etc.), answering questions, translation between languages and virtual assistance and

(2) Addressing the growing demand for business automation by executing repetitive tasks that are handled by humans.

Here are Gemini's main points as a summary, "Yes, there's a high chance that LLMs (Large Language Models) will be largely adopted in applications. . . . Of course, there are challenges to address, such as potential biases in LLM training data and ensuring responsible development. However, the potential benefits of LLMs are significant, making widespread adoption highly likely." What an interesting answer!

Just for fun, I also asked Gemini to write an editorial on "Large Language Models: From Entertainment to Solutions." Gemini's return was not impressive. (Even though it was good, it should never be used in publication.) But I like one sentence in the response, "The journey of LLMs from entertainment to solutions is far from over." In fact, we have a lot of work to do along the journey! The year 2024 could reveal itself to be the first year of transforming LLMs into a variety of productivity-oriented assistants or problem-solving solutions.

**Robin Qiu**
*Department of Information Science, Pennsylvania State University,*
*University Park, Pennsylvania, USA*

**References**

Guinness, H. (2024). The best large language models (LLMs) in 2024. Available from: https://zapier.com/blog/best-llm/ (accessed 30 March 2024).

Qiu, R. (2023). Editorial: GPT revolutionizing AI applications: Empowering future digital transformation. *Digital Transformation and Society*, 2(2), 101–103. doi: 10.1108/dts-05-2023-066.

Waber, B., & Fast, N. J. (2024). Is GenAI's Impact on productivity overblown?. Available from: https://hbr.org/2024/01/is-genais-impact-on-productivity-overblown (accessed 30 March 2024).