Large Language Models Explained

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Like most people, you've probably been hearing a lot about Artificial Intelligence lately. You've likely come across terms like AI, Generative AI, Machine Learning, and Large Language Models....

These terms are all related to AI, but do you know what they mean or the role that they play?

Today, we're going to talk about Large Language Models, or LLMs, with a goal to uncover how LLMs are reshaping the way we interact with technology in our work and daily lives.

Let's start at the beginning. Imagine a tool so smart that it can understand and even mimic human language. That's what LLMs do. They're like vast libraries of knowledge, containing information from countless books, articles, and websites, trained to mimic human writing styles and perform a wide range of tasks. [1]

Large Language Models (LLMs) are advanced artificial intelligence systems designed to understand, interpret, and generate human-like text.

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LLMs like ChatGPT by OpenAI, BERT by Google, and others, represent a significant breakthrough in natural language processing technology. They can write articles, compose poetry, generate code, translate languages, and power chatbots. These capabilities make LLMs incredibly versatile for enhancing productivity, automating content creation, improving customer service, and so much more.

But before any digital program can take in information and use it to create a letter, piece of code or blog post, that program needs to find the information and learn how to 'speak' the language it's being asked to replicate.

This leaves the question – how do we teach a computer to understand language?

The process is similar to learning a new language ourselves. We feed LLMs a diet of text from the internet, allowing them to learn from patterns and relationships between words. Over time, they grow smarter, improving their ability to generate text that is both coherent and strongly related to the context of your prompts.

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To explain how LLMs find and store the information they use for generating outputs, we're going to introduce another one of those AI-related terms mentioned a moment ago – Machine Learning.

Machine Learning is how LLMs 'learn' the nuances of the English language and store the information needed to carry out the tasks they are asked to complete.

For LLMs, the Machine Learning process involves feeding them enormous datasets from the internet, including a diverse range of texts like books, articles, and websites.

During this training phase, LLMs analyse and learn from the patterns, contexts, and relationships within the data, effectively absorbing the expanse of human knowledge and linguistic structure available online.

They use sophisticated algorithms to understand the minute intricacies of language, including grammar, semantics, and even cultural nuances – like how, in North America, it's soccer rather than football.

Ask an LLM to write a blog post about the history of the World Cup, and mention you want it written in American English. What you'll receive is a post that talks a lot about soccer games. Ask for that post to be written in British English, you'll be reading all about the football matches you know and love.

This extensive learning enables LLMs to produce incredibly human-like text based on their many inputs, drawing from this enormous internal database of language patterns and information to craft responses to user requests.

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The next question: where does all this information come from?

The answer is pretty simple – it comes from the internet.

Large Language Models (LLMs) are like incredibly curious beings, tirelessly browsing through the seemingly endless library of the internet, soaking up everything from literary classics like Shakespeare and Hemingway to the latest blog posts about fashion and gardening.

As they wander through this enormous digital universe, they're not just passively reading; they're learning, finding patterns in language, understanding jokes, grasping complex concepts, and even picking up on the subtleties of human emotions.

They do this through a process that's like a supercharged version of learning by example, where each piece of text they come across helps them get better at predicting which word comes next or how to answer a question.

So, when you ask an LLM to write a poem or explain a scientific theory, it dives into its treasure trove of information, piecing together what it has learned to craft responses that feel remarkably human.

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Now that we understand more about the world of LLMs, let's discuss the most popular LLMs and their most common uses. We all probably know ChatGPT, which can write, code, and more.

Then there's BERT from Google, which enhances search results by understanding the context behind our queries.

There's also Google's LaMDA, which the search giant refers to as their 'breakthrough conversation technology.' [2]

Each model has its unique strengths, contributing to the diversity of the LLM ecosystem.

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The Large Language Model you hear about most these days is ChatGPT.
ChatGPT, developed by OpenAI, was created using advanced Machine Learning techniques. Officially launched in November 2022, ChatGPT exploded right from the start, attracting over a million users within its first five days and 100 million users in its first two months. [3]

On its first anniversary, ChatGPT had more than 1.7 billion users. [3] That's the fastest adoption of a consumer application in history, showcasing the growing public interest and excitement around AI and all the ways it enhances human-computer interaction.

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ChatGPT and other tools like it can be incredibly helpful in many areas of life.
In the workplace, this Large Language Model can revolutionise the way companies handle customer service. By integrating LLMs into chatbots or virtual assistants, companies can offer 24/7 customer support with personalised, human-like interactions. These AI-driven systems can understand complex queries, provide

accurate information, and even handle bookings or refunds, significantly improving the customer experience while reducing the workload on human staff.

When it comes to personal creativity, writers and artists can turn to LLMs as a never-ending source of inspiration. Whether you're experiencing writer's block or just looking for a new angle on a story, LLMs can generate creative writing prompts, suggest plot twists, or even draft entire sections of text. This can help writers explore new ideas, refine their writing, or overcome creative hurdles, making the creative process simpler and more enjoyable.

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LLMs can also help with tasks you may not have thought about, like planning holidays. Why spend hours combing the web looking for the best hotels and restaurants when you can just ask ChatGPT to plan your itinerary? By simply describing your interests, budget, tastes, and any hot spots you don’t want to miss, LLMs can curate a personalised plan - suggesting destinations, creating itineraries, recommending restaurants and accommodation, and even providing tips on local customs or must-see attractions.

Regardless of your opinion on Large Language Models, they are here to stay, so why not leverage them to make your life easier? The best way to learn is by trying for yourself, so if you haven’t experimented with LLMs before – make today the day you start!

Thank you for joining us to discover more about Large Language Models. As we step forward, let's carry the knowledge and insights we've gained, ready to apply them in our work and beyond.

This week, test some of the LLMs we’ve mentioned. Consider their advantages and note their limitations. How useful could they be in supporting your current work? Do you have any concerns about them? How might LLMs impact the future of your organisation?

[1] *Exploring AI: What are Large Language Models,* Sunil Rajaraman, Forbes (2024) https://www.forbes.com/sites/sunilrajaraman/2024/02/29/exploring-ai-what-are-large-language-models/?sh=159f1181e9ea

[2] *LaMDA: our breakthrough conversation technology,* Eli Collins and Zoubin Ghahramani, Google (2021) https://blog.google/technology/ai/lamda/

[3] *On ChatGPT’s one-year anniversary, it has more than 1.7 billion users—here’s what it may do next* Cheyenne DeVon, CNBC (2023) https://www.cnbc.com/2023/11/30/chatgpts-one-year-anniversary-how-the-viral-ai-chatbot-has-changed.html