



The Rise of AI Chatbots: an economic perspective

by Angelo Desouza

- What is an AI Chatbot?
- AI Chatbots today
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Introduction

With the release of ChatGPT by OpenAI in November 2022, the AI chatbot space has seen tremendous growth in a race to gain consumer retention and stay up-to-date with the latest technological trends. The global chatbot market size was valued at \$0.84 billion in 2022 and is projected to reach \$3.99 Billion by 2030 at a CAGR (Compound Annual Growth Rate) of 25.7%. This article explores what an AI Chatbot is and how it will affect the economic landscape today and in the future decade.

What is an AI Chatbot?

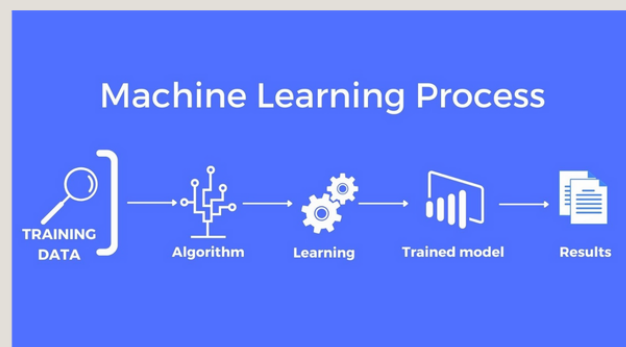
An AI chatbot can be defined as a computer program that utilises AI (Artificial Intelligence) and NLP (Natural Language Processing) to respond to prompts (inputs) from a user, emulating that of a human conversation.

AI is a computer's cognitive ability to perform human tasks such as logic (reasoning), learning, and image recognition, e.g. "A = B, how can we express B in terms of A?" or recognise the difference between raspberries and blackberries.



NLP is the area of AI that allows computers to understand text and spoken words as humans do, done with computational linguistics. For instance, saying, "I just love researching AI for all of my weekends", can be interpreted as literal or satirical, but how does one teach this to an AI?

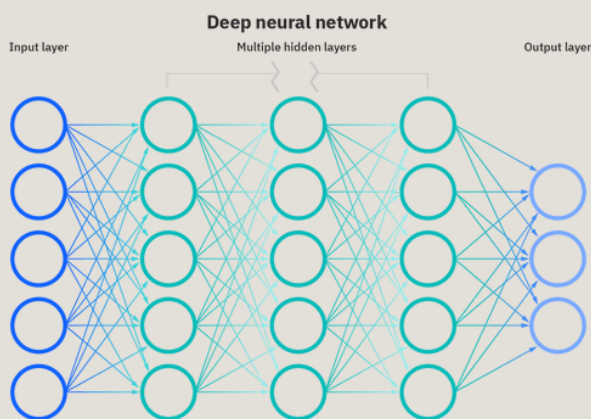
The fundamental answer is teaching, or machine learning, in technical terms. The AI system is inputted with large amounts of data, trained on this data and evaluated on its ability to assess future sets of data accurately. Currently, AI chatbots cannot provide up-to-date information from the internet like search engines. Hence, accuracy and reliability in their outputs are essential components of chatbots that are continuously improved upon.



AI chatbots also utilise Deep Learning - a subfield of machine learning that implements artificial neural networks, emulating the biological structure and function of the human brain. Deep Learning models can understand hierarchical representations of data that can process significant amounts of complex information and are especially useful in NLP.



AI in chatbots allows for enhanced understanding of open-ended user input, even with translation problems, misspellings, and mapping meaning to the specific user intent. Large Language Models (LLMs) are deep learning algorithms that perform NLP tasks, trained using datasets of a tremendous size with various parameters. LLMs also represent a class of deep learning transformer networks (type of architecture) with transformer models that can learn the context and meaning of a sentence through tracking relationships in such sequential data.



AI Chatbots Today

Technically, chatbots have existed since 1966, with the creation of Eliza by MIT; in the past few years, significant developments have been made in integrating this technology with search engines to provide accurate and informative responses in a human-like conversational format.

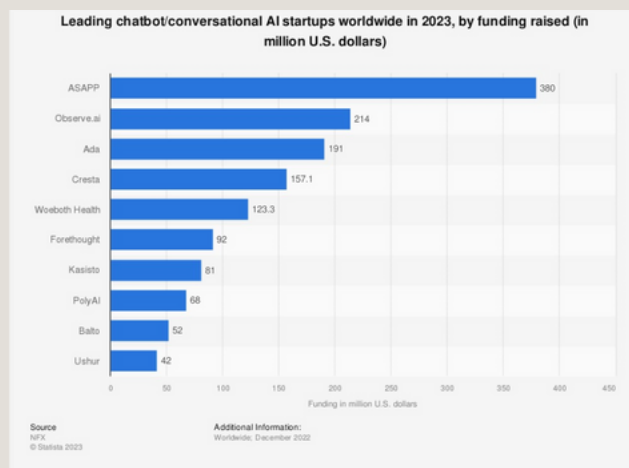
One of the critical reasons for this growth is the spike in competition to develop the best AI Chatbot to use as a collaborative information tool, from asking dinner suggestions for you to try with your partner to assistance with your coding projects.

After ChatGPT's release, it acquired over a million users in five days and 100 million two months later, triggering a gold rush.

Google released Bard in March 2023, in conjunction with its powerful search engine we all know and love (so much so that "to Google" is recognised as a verb by the Oxford dictionary). There were an estimated 142.6 million users of Bard in May 2023; however, factual errors performed by Bard during its release led to Google losing approximately \$100 million in market value.

Microsoft's Bing AI chat was launched in February 2023 in partnership with open AI to utilise GPT-4. The announcement of the synergy alone led to a surge in its global traffic, thus reaching its highest search advertising to date, from \$6.94 Billion to \$11.6 Billion from 2021 to 2022.

However, as well as the major players in the AI Chatbot industry, there is significant capital in the AI startups worldwide in 2023, with ASAPP raising \$380 million in funds.





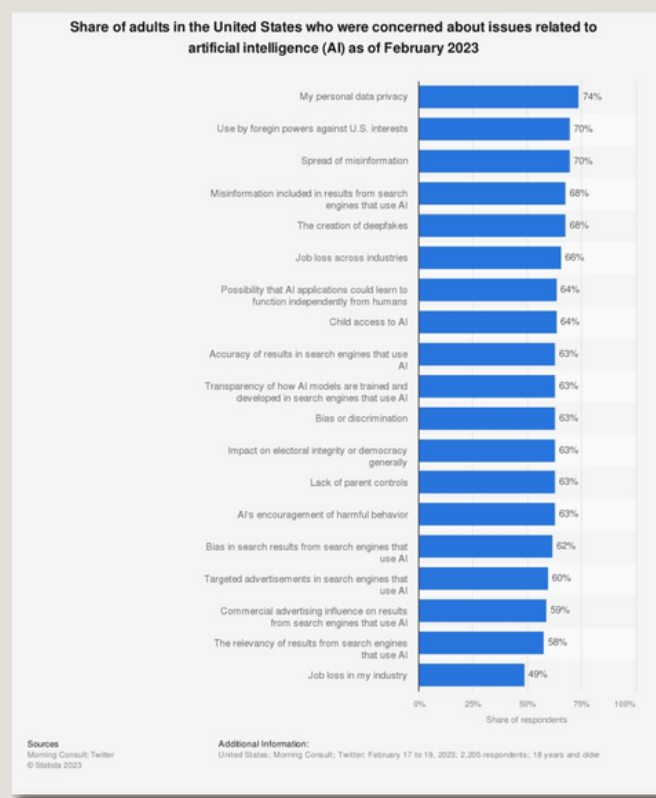
ASAPP has had 847,344 monthly visits as of 2022 and has used 30 technology products and services. The intellectual property includes 53 registered patents, mainly in the "Computing; Calculating" category. However, ASAPP grew monthly visits by 0.97% and is ranked 75,423 in Global Traffic Rankings.

Moreover, the E-commerce sector is a crucial driver for the AI chatbot space. Improvements in AI technology have led to more individualised shopping experiences based on browsing history, patterns, previous purchases, etc. The adoption of chatbots is also fuelled by the demand for 24-hour customer service with instant and personal customer responses.

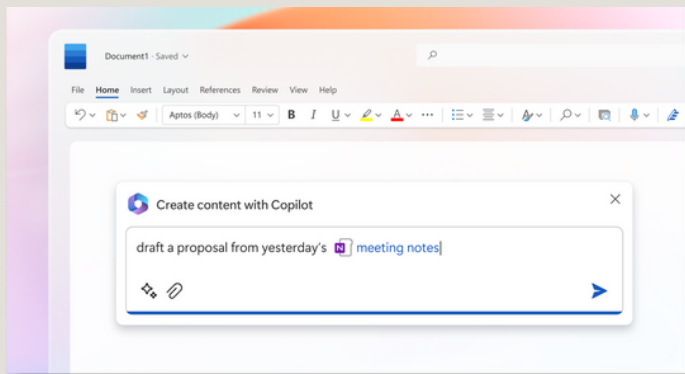
Global spending on conversational commerce channels reached \$41 Billion in 2021. In Europe, one in five direct-to-consumer e-commerce companies planned to invest in AI and chatbots (according to Statista, 2022). Interestingly, Indian consumers had the highest appreciation for customer service via chatbots. Scandinavian respondents indicated the most considerable scepticism for the benefit of a global survey, revealing key cross-cultural differences in integrating AI chatbots.

Meta is preparing to launch a range of AI chatbots with personas to retain users and compete against social media upstarts such as TikTok and ChatGPT. These bots will provide new search functions and offer recommendations to entertained users.

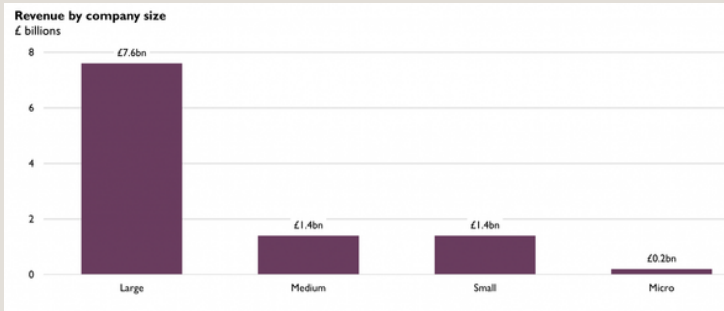
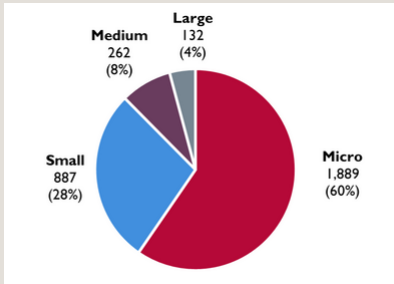
However, a double-edged sword exists in Meta's ambitions with the plan to use chatbots to collect vast new data on users' interests and habits. A survey by Twitter and Morning Consult in 2023 indicated that 74% of adults in the US were concerned with the impact of AI on their personal data privacy.



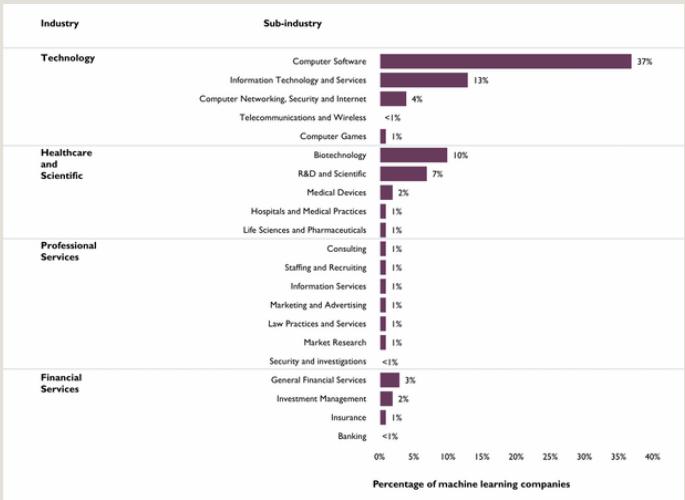
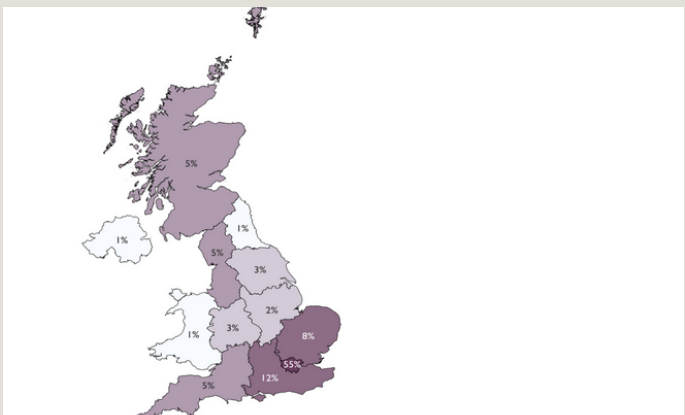
In March 2023, Microsoft introduced the 365 Copilot aimed at “unlocking a new wave of productivity growth”; fundamentally, it is the integration of ChatGPT in Microsoft 365. It can be used within Word to provide a first draft to edit and iterate on, analyse patterns in Excel and automate PowerPoint creation through simple prompts. Microsoft also launched Business Chat, allowing users to generate status updates from emails, meetings and calendars.



Research from the Office for AI and the Department for Science, innovation and Technology identified 3,170 AI companies active in the UK as of 2022, generating £10.6bn in AI-related revenue. The size profile of UK AI companies in and the UK revenue by firm size in 2022 is shown below in the respective charts.

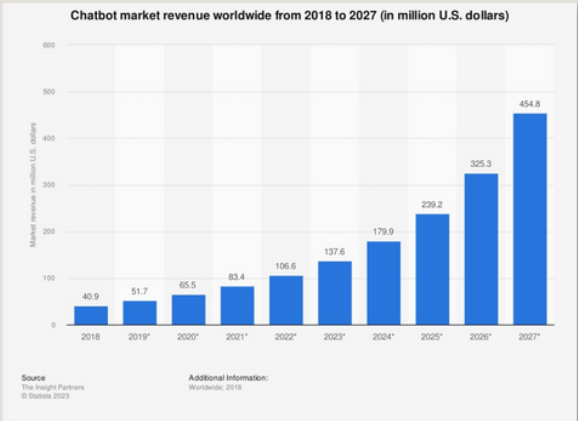


Furthermore, regionally, the highest amount of AI activity is in London at 55%, followed by the South East of the UK and the East of England. In addition, the sub-industry with the most significant number of machine learning companies in the UK was (unsurprisingly) found to be computer software at 37%.



The Future of AI Chatbots

Global Chatbot market revenue is expected to grow exponentially between 2023 and 2027, with the most significant increment of growth predicted between 2026 and 2027.





As with any technological revolution, repetitive and trivial tasks tend towards becoming fully automated and perspectives of the most valuable skills in the labour industry shift drastically. Major firms such as OpenAI and Google seek to create and perfect artificial general intelligence, emulating the full functionality of the human brain.

Within the legal industry, Harvard Law School suggests that AI tools will become more prominent in the future for helping to resolve less complex legal matters, with “90% of people living below the poverty line and a majority of middle-income Americans receive no meaningful assistance when facing important civil legal issues.” However, with the implementation of AI Chatbots as a more accessible and affordable alternative for legal advice comes the concerns of unauthorised practice, algorithmic bias and consumer protection.

The CIPD (Chartered Institute of Personnel and Development) predict that the demand for summarising skills may shift to that of checking and editing, especially regarding the accuracy of the information. Moreover, human-related skills are likely to have higher priority in the workplace, such as determining the morality of action and the interpersonal, relational skills that connect people.

It could also be argued that AI Chatbot tools may introduce human bias at a larger scale from the AI’s training data if the information is callously inputted. Furthermore, AI will become increasingly essential for firms, and workplace training must adapt to this change to prepare employees thoroughly.

A report commissioned by the UK government firm PWC in 2021 found that 7% of jobs in the UK labour market were at high risk of being automated in the next five years, rising to 30% after 20 years. The manufacturing sector was revealed to be at risk of losing the most jobs over the next 20 years, creating structural unemployment. The health and social work sector was highlighted as most likely to see the most significant job gains, as well as the professional, scientific, education, information, and communications sectors. In addition, jobs in lower-paid clerical and process-orientated roles were most likely at risk of being lost.

Moreover, the House of Commons Business, Energy and Industrial Strategy Committee published a report in April 2023 speculating that “by 2035 AI could boost UK labour market productivity by 25%”, based on Deloitte research. An analysis published by OpenAI in March 2023 indicated that higher wage occupations tend to be more exposed to LLMs, with programming and writing skills demonstrating a positive association with LLM exposure and science and critical thinking skills strongly negatively associated with exposure.



The UK government published a National AI Strategy in September 2021 as part of a ten-year plan. The three high-level aims are the following:

- Invest and plan for the long-term needs of the AI ecosystem to continue our leadership as a science and AI superpower
- Support the transition to an AI-enabled economy, capturing the benefits of innovation in the UK and ensuring AI benefits all sectors and regions
- Ensure the UK gets the national and international governance of AI technologies right to encourage innovation investment and protect the public and our fundamental values.

It is currently ambiguous if consumer rights law and tort law will provide adequate protection in products integrated with AI or services based on AI. However, As of April 2023, the government announced £100 million in funding for a Foundation Model Taskforce, responsible for growing the UK's AI capability in a safe and reliable manner across the economy. The foundation models include ChatGPT and Google Bard.

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