Financial Services Data and Analytics Newsletter

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Introduction

ChatGPT has become a buzzword across corporate boardrooms and coffee shops. Google's Bard, a conversational AI chatbot powered by Language Model for Dialogue Applications (LaMDA) is said to be the future of search engines. Apart from ChatGPT and Bard, many generative AI-based chatbots have been launched and many more are in the pipeline.[1] Though generative AI is gaining popularity, there are questions concerning its potential to replace humans in fields such as media (content creation, advertising), technology (coders, programmers, data analysts), teachers, customer-service agents, etc.

This newsletter discusses chatbots based on generative AI language tools and evaluates the application of this technology in the financial services sector. It also contains news on partnerships and alliances between industry stalwarts and new-age companies to offer an improved customer experience and optimise the efficiencies of the financial service ecosystem.

Happy reading!

Topic of the month: Generative AI-based chatbots

Generative AI uses AI algorithms to produce content in audio, video, image, code or text formats. Given below are two examples of generative AI-based chatbots:

ChatGPT

ChatGPT is a combination of two words: chatbot and generative pre-trained transformer (GPT). In 2018, OpenAI marked the beginning of the GPT series.[2] In GPT 1.0, training data consisted of 4.5 GB of text which increased to 570 GB in GPT 3.0.[3] There was a substantial increase in model parameters as well. GPT 3.0 had 100 times more model parameters than GPT 2.0.[4]

Based on GPT-3, OpenAI made multiple task-specific models like code completion, text generation, image creation, etc., which allowed the users to leverage GPT-3 according to their requirements. These services are available on the OpenAI platform. GPT-3 was fed with computer codes to create an application called Codex which can create code from human instructions. DALL-E is an image creation tool which can create images from human prompts. ChatGPT was one such application.

Google Bard (LaMDA)

LaMDA is a large language model (LLM) used by Google for creating conversational bots. LLMs use deep learning techniques to absorb huge quantities of text data, ingest millions of sentences, paragraphs and sample dialogue to generate human-like text. Bard is an experimental, conversational AI service that is powered by a lightweight and experimental version of LaMDA. It provides up-to-date information and combines the power of intelligence and creativity with large language models.

Reinforcement learning from human feedback (RLHF)

To make Generative AI-based chatbots more effective, it is necessary to leverage the feedback given by users/trainers to fine-tune language models. RLHF uses reinforcement learning algorithms to optimise the language models with human feedback. RLHF can make the chatbots more robust and improve their performance.

Let's see how RLHF works:

Supervised fine tuning: A pre-trained language model is fine-tuned by human trainers on a relatively small amount of demonstration data through supervised learning. The questions are collected from actual users and AI trainers answer from both perspectives – as a user and as an AI bot. This approach is known as supervised fine-tuning (SFT).

Reward model: The second step is to give a score to the SFT model outputs, i.e. to describe how desirable the given outputs are for humans. AI trainers rank the answers from best to worst if there are multiple answers for the question asked. The ranked output is now used as a new labelled dataset.

Proximal policy optimisation: The last step is to use a reinforcement learning mechanism called proximal policy optimisation. Here, the algorithm asks a question to SFT which will generate an appropriate response. This answer will be scored by the reward model based on its accuracy and correctness. Proximal policy optimisation will then update SFT, and the process is iterated several times to improve the overall performance.

Topic of the month: Generative AI-based chatbots

OpenAI's ChatGPT is an example of RLHF as it uses a combination of both supervised learning and reinforcement learning to fine-tune the base unsupervised model. It involves two stages. The first stage is where the model is initially trained using unlabelled data (unsupervised learning). In the second stage, the model is fine-tuned according to the task which is to be performed (supervised learning) and further fine-tuned based on the feedback given by the trainers using RLHF.

Applications of generative AI-based chatbots

Every organisation has its own domain knowledge which is specific to its products and services. Businesses can access existing chatbots models through APIs, supplement them with their own data and customise the models as per the business needs.

Some of areas where generative AI can be applied in the financial services sector are:

1. Programming in the financial services sector

Generative AI-based chatbots can help in code generation in several programming languages. A chatbot is generally trained in natural language as well as millions of lines of codes. For the financial services sector, a chatbot can perform the following functions:

•   help to interpret information within programming codes

•   turn comments into code

•   complete subsequent function or line in context

•   rewrite code efficiently.

Although generative AI has numerous benefits, the results shared by these models may not always be error free or optimal for the intended task and should be reviewed by the user.

2. Customer service in financial services

A generative AI-based chatbot can automate customer queries at any stage of the banking process. Advanced chatbots can provide the required information and solutions for any ad hoc queries that customers have, thereby making traditional banking customer experience smoother and experiential.

Unlike existing traditional rule-based chatbots which can only respond to limited and specific commands and patterns which have been fed to the chatbot's database, generative AI-based chatbots can understand the context and meaning behind a wide range of inputs and generate responses that are relevant to the context. Traditional customer chatbots can answer a specific set of questions and their ability to answer ad hoc questions is limited. On the other hand, generative AI-powered chatbots can search and learn through structured and unstructured data and enhance their learning based on the previous queries. They can also add contextual awareness from various sources and personalise responses for various customers.

For example, ChatGPT can automatically provide a personalised response to customers based on a query received. It can also formulate suitable responses to customer reviews and comments on various banking products by analysing customer emotions.

Topic of the month: Generative AI-based chatbots

3. Personalised counselling for the customer

Good customer service can often lead to a successful cross-selling or upselling of services. Generative AI tools can act as personal finance management assistants for the customers by providing monthly or quarterly spending patterns and recommending savings plan, insurance and other offerings.

A chatbot can be a creative marketing assistant for financial services organisations and help them to:

- generate fresh ideas and content

- streamline market research and provide a solid foundation of audience insights

- provide hyper-personalised content for each customer and guide them in making informed purchase decisions.

4. Coaching and training of front-office

Generative AI chatbots can be used as a language model to replicate and create prompts for successful sales and service calls. The chatbots can also be used to train and coach front-office staff based on the training materials produced by generative AI. This will not only help in first call resolution but also help the organisation to provide an enhanced customer experience. Often, the data for generative AI chatbots is mapped to customer segments and comprises best calls from departments such as customer service, policy service and sales. After mapping the data, the model is trained to develop a step-by-step response for incoming calls and requests. For example, the model can be trained on the transcripts of top five agents of the sales department. This training material can be used to train the customer service executives.

Responsible use of generative AI

It is important to understand the inherent challenges that come with generative AI in order to use this technology responsibly and optimise its benefits. Given below are some areas organisations should be mindful of when they adopt generative AI:

1. Ethics and regulations

Educational institutions have banned the use of generative AI tools as many students use them to write their assignments, essays and research papers. Since the content produced by generative AI tools resembles the   content created by humans it is difficult to detect whether it is AI-generated content or written by an actual student.

2. Bias and fairness

Generative AI is trained on data produced by humans which could lead to biases in the data. Such biases can impact the accuracy of the content produced by generative AI-based models. One way to avoid such biases is to train generative AI models on inclusive training data.

3. Interpretability

- Generative AI-based models can provide wrong answers: While these models are trained continuously to improve accuracy, their answers may not always be correct. Generative AI-based models may fail to answer simple logical questions correctly and respond with unreasonable or incorrect answers.

- Data used is outdated: Generative AI-based models are usually trained on the information from the database. If the data is not updated regularly, the output of the models may not be correct or up to date.

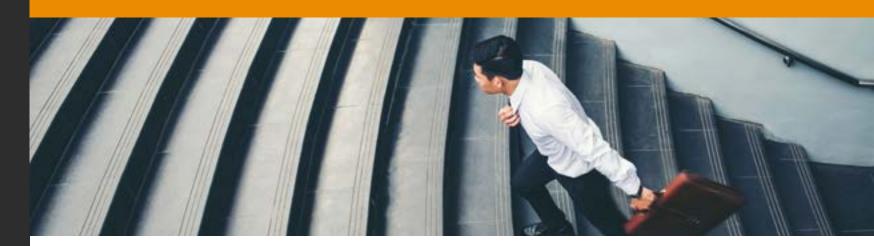# Topic of the month: Generative AI-based chatbots

4. Robustness

- Generative AI-based models lack semantic knowledge: The models are trained to generate words based on a given input but lack the ability to interpret the meaning behind those words. Therefore, the responses generated by the tools are likely to lack the depth and insight which a human response may be able to provide.

- Emotional intelligence: While generative AI tools do assist and enhance human interactions, they do not understand the emotional context of the input and cannot respond with empathy.

Conclusion

A generative AI-based chatbot is a robust language model with applications in various fields. It can also be used to enhance customer experience. A chatbot's ability to interpret data and respond to questions makes it an excellent tool for tasks such as text classification and machine translation. Generative AI-based chatbots can help businesses achieve consistency in service and operations and deliver high-quality results which are not driven by human sentiments and individual perception.

However, users of generative AI should ensure that the information in the database is from authentic sources. To limit errors in the data produced by generative AI, feedback on erroneous outputs should be taken into consideration and the database should be updated regularly. Thus, it is important to use generative AI tools responsibly as sometimes it becomes difficult to determine whether the output is human generated or AI generated. The potential to drive innovation and efficiency through generative AI is immense, and it will be interesting to see how it evolves in the future.

Industry news

1. **Saraswat Bank partners with Tagit to implement omnichannel digital banking solutions**

   Saraswat bank has collaborated with Tagit – a Singapore based digital banking solutions provider – to develop omnichannel digital solutions for its corporate and retail customers. The bank aims to utilise Tagit's Mobeix digital banking platform to boost customer experience by offering an array of seamless and secure digital banking solutions.

2. **Infibeam Avenues becomes the first payment platform to process Digital Rupee**

   CCAvenue, the primary payment brand under Infibeam Avenues, has become the first payment gateway provider to support Central Bank Digital Currency (CBDC) or Digital Rupee transactions for online retailers. CCAvenue has processed CBDC transactions for one of India's top private sector banks, in an effort to further bolster India's digital payments sector. It aims to grow rapidly by integrating its technology with new banking partners.

3. **State Bank of India (SBI) participates in Singapore and India's first cross-border, real-time UPI-PayNow payments system**

   SBI has announced that it has integrated its BHIM UPI with the new cross-border, real-time payment system. This new payment system facilitates cross-border digital money transfers between India and Singapore, thereby enabling quicker and more transparent financial transfers between the two nations. The SBI users could avail this facility to transfer funds through SBI's BHIM SBIPay mobile application.

4. **Bajaj Finserv obtains a Securities and Exchange Board of India (SEBI) licence to launch a mutual fund business**

   Bajaj Finserv announced that it had received final registration from SEBI to begin its mutual fund business operations under the name Bajaj Finserv Mutual Fund which will be managed by Bajaj Finserv Asset Management Limited (BFAML).

5. **Kotak Life Insurance joins hands with Association of Registered Investment Advisers (ARIA) to manage death claim amounts**

   Kotak Life Insurance and ARIA have entered a tie-up where they will help insurance nominees to manage death claim amount with a proper financial plan. This initiative, led by women investment advisers of ARIA, will also include the plan for obtaining the amount through will, nomination, transmission of assets, assessing the financial risks involved, goals, future financial plans and then planning the investment.

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