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Original Article

An Overview of Generative Artificial Intelligence based Einstein GPT for Salesforce

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Abstract *- In the last decade, we have seen artificial Intelligence improve at performing tasks that we previously believed could only be performed by humans. This has inspired us to envision a utopian, artificial intelligence-filled future that is still far away. However, with the inception of ChatGPT in early 2023, researchers started believing that the future had already arrived. Suddenly, artificial Intelligence is responding to complex queries that appear to have been written by a human. GPT, created by OpenAI, is a generative pre-trained transformer that writes coherent paragraphs by assuming the meaning of each new word as it appears in a sentence. This incredible predictive power of generative AI is also now available for customer relationship management. Salesforce has built its own GPT called Einstein GPT, which is integrated directly with Salesforce to help users find answers to their daily problems. This paper provides an overview of the applications, benefits, future trends, and challenges of Einstein GPT. This paper will also cover how Einstein GPT should be used ethically.*

Keywords *- Artificial Intelligence, Cloud Computing, Generative AI, Generative pre-trained transformer, Salesforce.*

1. Introduction

Artificial Intelligence that replicates human creativity by producing original and unique content is popularly termed Generative AI. Unlike other AI techniques applied for predictive or analytical purposes, Generative AI creates something new that does not exist. [1] Generative AI utilizes generative models to create unique content by examining patterns and structures in the massive datasets on which they are trained. [2] Generative models create data similar to the original data taught. These models are made to discover a dataset's underlying relationships and patterns and then use that understanding to produce fresh data samples.

A variety of techniques can be used to train generative AI models, including:

Generative Adversarial Networks (GANs): GANs comprise a generator that generates new data and a discriminator that tells the difference between natural and produced data. To provide more precise and realistic generated data, the generator network is trained to have data that can deceive the discriminator network [10].

Variational Autoencoders (VAEs): VAEs are generative models that employ an encoder to map the input data into a latent space. From there, the decoded data is transformed into a new output comparable to the input data [11].

Autoregressive Models: Models forecasting the likelihood of the following data point in a sequence using a probability distribution are known as autoregressive models. From there, the model creates new data by taking samples from the predicted probability distribution [12].

Generative Pre-trained Transformer (GPT) is a form of AI intended to produce text in a natural language comparable to human language. Large-scale neural language models of the GPT class were created by OpenAI [3]. These models can produce responses to a range of prompts and questions in natural language because they were trained on enormous volumes of text data using unsupervised learning techniques.

Chatbots, language translation, text summarization, and content creation are just a few of the uses of GPT. One of the widely popular applications of GPT is ChatGPT. ChatGPT is a chatbot built by OpenAI and launched in November 2022. Using its dialogue format, it is trained to answer questions, write emails, poems, code, and much more [4]. Another recently introduced application of GPT is Einstein GPT. Einstein GPT is a generative AI chatbot launched by Salesforce for Customer Relationship Management in March 2023.

Being an intelligent customer relationship management platform, Salesforce runs in the Cloud. It gives companies access to tools and programs for managing client

interactions, sales, marketing, customer support operations, etc. [5] explains Salesforce in detail. Salesforce users will receive generative AI capabilities right out of the box thanks to the integration of Einstein GPT and OpenAI.

Einstein GPT blends public and private AI models with CRM data, which means users can use Einstein GPT in any of the forms explained below.

1.1. Private AI Model

Private AI models are built by Salesforce and can be leveraged by customers.

1.2. ChatGPT Integration

Owing to the collaboration between Salesforce and OpenAI, businesses have direct access to OpenAI's ChatGPT technology, which offers generative AI capabilities out of the box.

1.3. Public AI Model

You can use Einstein GPT in addition to your external model(s) because it is open and adaptable.

The remaining paper is organized as follows. After this introductory section, Section 2 explains the Salesforce architecture. Section 3 describes the applications and benefits of Einstein GPT. Principles that ensure AI is built ethically are listed in Section 4. Section 5 describes implementation challenges. Section 6 gives some future perspectives on Einstein GPT. Section 7 briefly concludes this paper.

2. Salesforce Architecture

Salesforce's architecture is created to be highly scalable, adaptable, and customized to fit the requirements of various organizations [5]. Salesforce architecture and objects are explained in greater detail in [6]. Critical components of Salesforce architecture are outlined below.

2.1. Multi-Tenant Architecture

Multiple organizations share a single instance of the software under the multi-tenant architecture [20]. Salesforce uses multi-tenant architecture, which provides each organization with unique data, configurations, and modifications.

2.2. Platform

Salesforce was created using a metadata-driven design, distinguishing the application logic from the underlying data model. As a result, the platform may be tailored with greater flexibility and agility to suit specific business requirements. To help developers integrate with the platform and create original apps, Salesforce offers a variety of APIs, including REST, SOAP, and Bulk APIs. Salesforce's architecture is divided into layers to provide security, scalability, and performance. These layers consist of:

2.2.1. Presentation

The platform's user interface and front-end elements, such as the Lightning Experience and Visualforce, are included in the presentation layer.

2.2.2. Application Layer

This layer includes application services, including workflow rules, validation rules, and triggers, as well as business logic.

2.2.3. Database Layer

This layer houses the Salesforce database and the underlying data model.

2.2.4. Integration Layer

This layer allows you to connect to external systems and data sources through integration.

2.3. Applications

Salesforce offers several applications that can be used in customer processes. Some examples of the applications provided by Salesforce are Sales, Service, Commerce, Marketing, etc. Along with the applications provided by Salesforce, customers can find and install pre-built applications and components to increase Salesforce's capabilities on AppExchange.

Like a database, Salesforce includes the following elements:

Objects : An object is a database table that contains information about a particular entity, like an opportunity, contact, or account. Objects in Salesforce can be of two types: Standard and Custom. Salesforce offers standard objects, while users create custom objects to build custom applications. Columns and rows in the database table are equivalent to fields and records in Salesforce.

Fields: A field is a particular piece of data saved in an object, like a person's name, email address, or phone number.

Relationships: Relationships are how two objects are linked. One-to-many and many-to-many relationships are the two most common types in Salesforce. When one record in one object is associated with numerous records in another, one-to-many relationships are used. When numerous records in one item are connected to multiple records in another object, many-to-many relationships are used. High-level Salesforce architecture is shown in Fig. 1.

Security governance is a critical element in the Salesforce ecosystem. Salesforce instances and data are protected by processes, rules, and technologies that make sure they are used in compliance with legal guidelines and industry best practices. [15] explains Salesforce security governance in greater detail.

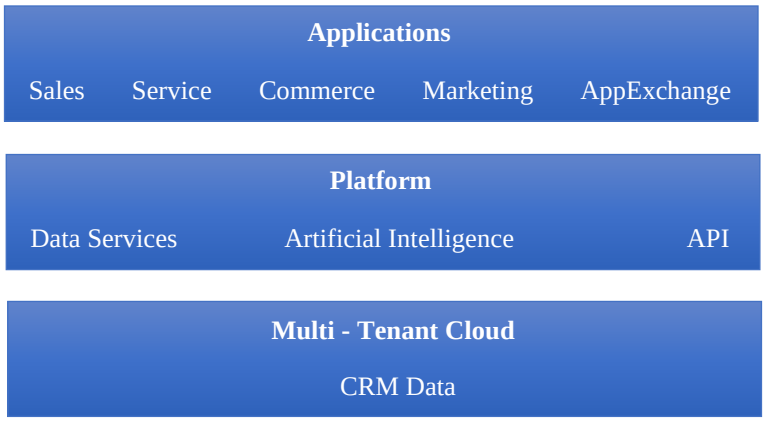

Fig. 1 Salesforce architecture

3. Applications and Benefits

Salesforce Einstein is a collection of artificial Intelligence-enabled tools and technologies built into the Salesforce platform to assist businesses in automating procedures, customizing user experiences, and coming to more intelligent decisions. Some of the applications and benefits of Salesforce Einstein GPT are explained below.

3.1. Applications

Salesforce offers several products for different business verticals, such as Sales Cloud, Service Cloud, Marketing Cloud, etc. Einstein GPT is plugged within Salesforce products to provide automation that saves time and produces personalized, AI-generated content. The applications of Einstein GPT in Salesforce CRM are explained below.

3.1.1. Sales

Einstein GPT is integrated into the Salesforce Sales Cloud product. The intelligent bot will assist in all sales-related operations, from composing emails to scheduling meetings.

3.1.2. Service

The service Cloud is a Salesforce product that views all customer service-related information in one console. Einstein GPT, when integrated with the Service Cloud, can suggest relevant knowledge articles and generate personal replies for agents to expedite service operations.

3.1.3. Marketing

For marketing users, Einstein GPT can provide personalized content on demand to engage clients and prospects through advertising, mobile, online, and email.

3.1.4. Slack

Using Einstein GPT, customers can receive insightful summaries of sales prospects and background information on accounts in Slack. Slack is a collaboration platform built by Slack technologies and acquired by Salesforce. [16] explains features of Slack.

Developers: Developers can use Einstein GPT to generate code and get help for languages like APEX. Through calls to the API, developers can use the object-oriented programming language Apex to perform flow and transaction control statements on Salesforce servers. APEX syntax resembles Java and functions like stored procedures in databases [13]. [14] Explain Apex in detail.

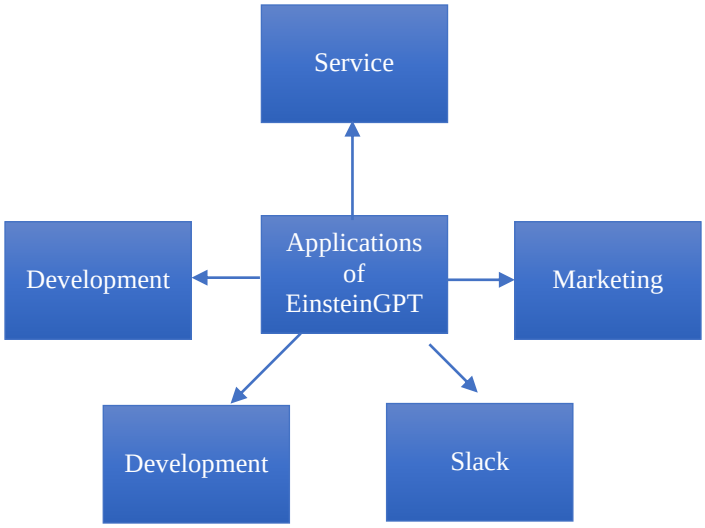

Fig. 2 Applications of Einstein GPT

3.2. Benefits

EinsteinGPT is projected to have numerous benefits for Salesforce users.

3.2.1. Better Decision-Making

Salesforce Einstein GPT can offer insights and recommendations to assist businesses in making data-driven decisions by utilizing the strength of machine learning and NLP. [17] provides an overview of NLP.

3.2.2. Streamlined Workflows

Companies may automate routine activities using Salesforce Einstein GPT, giving users more time to concentrate on challenging projects and essential goals.

3.2.3. Improve Customer Service

With Salesforce Einstein GPT, customer service agents can react to customer inquiries more accurately and rapidly, resulting in higher customer satisfaction.

4. Ethical Use of Generative AI

While generative AI has incredible benefits, the ethical risks of AI for users, developers, people, and society as a whole are vast. For instance, issues with bias and fairness in the model's output and privacy and security issues with the data used to train and run the model. As with any AI technology, there are ethical concerns to be aware of while using Einstein GPT [18]. These ethical implications must be carefully considered, and actions must be taken to reduce such risks. [8] explains AI ethics in much detail. AI applications should be handled ethically by practicing the principles outlined below.

4.1. Fairness

AI systems should not differentiate against any specific group of individuals in their design or implementation. This involves ensuring that algorithms are not biased against any one group and that the data used to train the AI is representative of the population.

4.2. Transparency

Users should be able to comprehend how decisions are made, and AI systems should be transparent when operating. This involves explaining any recommendations or conclusions the AI makes and ensuring the data it uses to train itself is openly accessible.

4.2.1. Accountability

The judgments made by AI systems should be subject to individual and organizational accountability. This involves ensuring there is a transparent chain of responsibility for the creation and application of the AI and that people are held accountable for any damage the AI may create.

4.2.2. Privacy

AI systems should respect people's right to privacy, and data should only be gathered and utilized with that person's express consent. This involves ensuring that information is maintained securely and only used for what it was meant for.

4.2.3. Safety

AI systems should be developed and put into use in a way that assures both the personal safety of users and the safety of society at large. This involves ensuring AI isn't being used maliciously and that the proper safety measures are in place to stop mishaps or unwanted consequences.

4.2.4. Robustness

AI systems should be developed and put into use in a way that guarantees their reliability and robustness. This entails carefully testing the AI before deployment and ensuring it can handle unforeseen circumstances or inputs.

5. Implementation Challenges

As generative models have incredible applications and benefits, challenges [9] must be addressed while implementing these models. Like any other generative AI model, Einstein GPT has implementation challenges, which are explained below.

5.1. Data Quality

Ensuring that the data required to train the model is high quality is one of the significant hurdles in adopting Salesforce Einstein GPT. The data quality used to train the model substantially impacts its accuracy. Therefore, organizations must ensure that their data is accurate, clean, and free of biases.

5.2. Training

A lot of computational power and knowledge are needed to properly train an NLP model like Salesforce Einstein GPT. Organizations must invest in the proper hardware and software infrastructure to train and deploy the model. Additionally, they want professionals with data science and machine learning knowledge to oversee the training program.

5.3. Integration

Integrating Salesforce Einstein GPT with current procedures and systems can be difficult. The model must easily integrate with an organization's existing customer service and sales procedures. It may also need custom development effort.

5.4. User Acceptance

Getting users to accept Salesforce Einstein GPT can take time and effort. Customers must be more responsive to delegating customer support or sales responsibilities to an AI-powered system. Companies must ensure their users are trained to utilize and comprehend the system's benefits. A change management program may be required to assist users in adapting to the new system.

6. Future Trends

Salesforce Einstein GPT has a promising future and the ability to give organizations of all sizes access to even more cutting-edge AI capabilities. Some of the future trends are explained below.

6.1. Enhanced Integration

As more companies embrace Salesforce Einstein GPT, there may be greater integration between Salesforce Einstein GPT and other AI tools and platforms. This can entail integrating with additional NLP tools for more complex text analysis or computer vision technologies for image analysis and recognition [19].

6.2. Expanding Use Cases

Although Salesforce Einstein GPT is mainly used for sales, marketing, and customer support, there may be future expansion into additional company functions like finance, human resources, and commerce operations.

6.3. Enhancements to Personalization

As the GPT-3 language model develops, we might see increasingly more sophisticated capabilities, such as delivering more precise recommendations and tailored goods and services.

6.3. Improved Customer Insights

Salesforce Einstein GPT may give businesses insights into customer behaviour and preferences by utilizing the power of machine learning. We might see even more sophisticated customer insights as the platform develops, allowing firms to understand their clients better and offer more individualized experiences.

6.4. Increased Automation

As AI develops, firms using Salesforce Einstein GPT may experience even higher degrees of automation.

7. Conclusion

Einstein GPT by Salesforce has the potential to transform how companies communicate with their clients. Einstein GPT allows sales teams to automate tedious operations, streamline customer support contacts, and customize their connections with consumers by utilizing the latest natural language processing and machine learning progress. One of its primary features is Einstein GPT's capacity to learn from big datasets of human language and adjust to novel use cases and circumstances. This makes it possible for enterprises to modify the technology to suit their requirements and enhance its performance over time. Because Einstein GPT is linked with the Salesforce platform, companies may use the technology in their sales, marketing, and customer service workflows. This integration allows teams to work together more effectively, procedures to be streamlined, and customers to have a more seamless experience. This paper provides an overview of Einstein GPT by summarizing its background, applications, benefits, and ethical principles. This paper is a good place for anyone interested in Einstein GPT to begin their research by giving them enough background information and a general overview.

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