Good afternoon, everyone! I'm Monika Mittal and I am here to discuss a transformative technology that is reshaping industries across the globe—Get AI -> Generative AI."

Slide 2

Generative AI refers to systems that can generate new content by themselves. Unlike traditional AI that simply analyzes data and makes predictions, generative AI goes a step further by producing new and original outputs. At its core, this technology utilizes machine learning and neural networks. Think of it as teaching a computer model to understand a specific form of content, whether it's legal documents, customer queries, or financial reports, and then asking it to create something similar on its own. The backbone of generative AI includes Machine Learning and Natural Language Processing. These technologies enable the AI to not only understand and process language but also to write and converse in ways that are indistinguishable from human interaction. What makes generative AI particularly impressive is its versatility. It can be adapted to various formats—text, images, even music and video—making it an invaluable tool across multiple sectors

Slide 3:
Before diving deep into the Generative AI potential use case or a bit into the understanding of various techniques let's see how these AI technologies which has been with us for years are enhancing our everyday tools

When we use Google to search something or send an email the suggestion or automatic reply that pops up as we type are basically generative AI that is based upon analyzing billions of similar queries and responses. This is a basic form of Generative AI creating text based on learned patterns.

Voice activated assistants like Siri and Alexa's ability to provide personalized responses and learn from our or user interaction involves GenAI. It doesn't only retrieve information but generates new sentences to match the context of the query we have

And next example about the autonomous car is majorly an example of AI enabling self driving cars to interpret sensory data to navigate safely but at the same time the decision making system in these cars which generate, predict to react to the situation on the road with appropriate responses basically to ensure safety is fulfilled and definitely pushing the boundaries of what machines can do. So yes this is an exciting frontier in AI technology

Slide4 :

The AI in Gen AI is artificial intelligence and it’s basically creating system that can replicate human intelligence and problem solving abilities. AI has evolved dramatically since its conceptual beginnings in the mid-20th century. Initially, AI was simple rule-based algorithms that could perform specific tasks under constrained conditions. In the 1980s and 1990s, the field saw significant advancements with the development of machine learning, where systems could learn from data and improve their performance over time. The introduction of deep learning in the 2000s marked a revolution, leveraging massive amounts of data and powerful computational resources to train neural networks. This breakthrough led to the modern era of AI, characterized by the systems capable of understanding and generating human-like text, recognizing complex images, and making decisions with minimal human intervention. Today, AI is not just a research field but an integral part of industries and everyday technology, continuously evolving and expanding its capabilities.

Slide 5
The first step in generative AI is gathering a robust dataset. This data can be anything from text and images to more complex data like financial transactions or customer interactions. The key is quantity and quality—the more comprehensive the data, the better the AI can learn. Once we have our dataset, the next step is training. This involves algorithms learning from the data's patterns, structures, and nuances. It’s similar to how a musician might learn to play music by studying various songs and then experimenting with their compositions.After training, the AI can start generating new content. This isn’t just random output; it’s based on the deep insights and patterns learned during training. For example, an AI trained on customer service data could generate responses to new customer queries that it has never seen before. t’s important to note that this is an iterative process. The AI continuously learns and improves over time, adjusting its outputs based on feedback and new data. This means the quality of the AI’s creations can improve significantly as it gains more experience.

The revolution models like open AI chat gpt or google gemini is they are trained on enormous amount of data with billions of parameters.

Slide6
AI can be used across different media
Starting with text, generative AI can create anything from entire articles to personalized responses in chatbots. These tools are used widely in customer service and content marketing, automating tasks that traditionally required human creativity."
In the realm of images, AI now has the capability to create visuals that are indistinguishable from photographs taken by humans. This technology is not only used for creating digital art but also has practical applications in fields like

healthcare, where it can help visualize medical scans."
For audio, generative AI can produce realistic voice synthesis. This is the technology behind the voices of virtual assistants and can be used to create new music compositions without the need for human musicians. If we talk about Vedio AI can edit or create video content from scratch. Just need to provide prompts.This includes everything from making minor edits to existing videos to generating realistic 'deepfake' videos, which blend and superimpose existing footage to create entirely new content.

Slide7

We have seen how Generative AI enhances everyday technology and can be used across different media.I will just highlight some of the applications that is been explored.

Large Language Models can revolutionize how we manage and summarize complex documents. By automating the summarization process, these models allow us to quickly grasp and respond to critical information.
Like Consider the real world application of daunting task of reading and summarizing a 40-page annual report into a summary of 500 words. Traditionally, this would be time-consuming, requiring meticulous reading to understand context and extract key points, often leading to errors and inefficiencies."
Once trained, LLMs can handle these tasks with ease. They can predict the theme or the main ideas revolving around the documents. They excel in predicting next words and understanding textual contexts, enabling them to generate summaries that are not only quick but also accurate and coherent

Slide8

While LLMs offer remarkable utility let’s have a deep look into the primary techniques used for summarizing documents namely abstractive and extractive summarization."

Extractive Summarization basically involves the AI selecting key sentences or fragments directly from the text and putting them together to form a coherent summary. It's akin to extracting pieces of a puzzle and assembling them to reflect the full picture. **Where** “as In contrast, abstractive summarization involves the AI understanding the entire document and then rewriting it entirely in new words, often generating new sentences that capture the essence of the document without directly copying and it can mimic human style of writing

So based upon the need of the task or our use case or the end result we wan t from the documents we can train them accordingly.

In the financial sector, the accuracy of summaries is crucial due to strict regulatory standards. Any oversight or error in summarization could lead to non-compliance penalties."

The widely available LLM models provide challenges for Financial documents as these documents are highly confidential and not publicly avaialble and often contain complex jargon

Slide 9
To ensure our LLMs are not just functional but excel within our specific regulatory and operational framework, we employ several advanced training strategies.

First, let’s delve into the concept of prompt engineering. This process involves giving precise instructions or providing the right context to our AI model to ensure it performs tasks accurately. It does not involve coding but rather the art of effectively communicating what we need is use over here.

So Consider the example of directing someone to take a photograph that captures a specific scene. If you tell a friend, 'Take a picture of the park,' they could capture anything from a wide shot of the entire park to a close-up of a single flower. However, if you specify, 'Please take a wide-angle photo of the park with the cherry blossoms in the foreground and the fountain as the central focus under the evening light,' you're much more likely to get a pictres that matches your vision. So similarly we can provide some example in the prompt that we taken or done in past.

So In a similar manner, prompt engineering with AI works best when we provide clear, detailed instructions.

Slide 10
For instance, if we need to extract the summary consisting main points from a financial document, a detailed prompt like on the right hand side might give us a better overview. This specificity guides the AI to generate an output that closely aligns with our requirements, ensuring the summary is both relevant and concise.

Slide 11

The other way of effective model training involves Fine tuning and RAG: retrieval augmented Generation.

Considering the previous example like the photograph take in good but not perfect. To enhance it, you adjust the brightness, contrast, and color balance to suit the specific scene we wan to captured,These adjustments are precise and tailored to bring out the best in that particular image

So similarly fine tuning an AI model involves adjusting its parameters specifically for the tasks it needs to perform or the data it will process. This might mean training on specific financial documents to ensure the model understands and generates content that is relevant and accurate in the context of financial analysis, adjusting the model to better interpret the unique jargon and formats financial reports.

another method is RAG where it can cleverly leverages external data sources that the model has not been directly trained on due to confidentiality constraints or was not available at the time model was trained. Considering the same example now the photographer has the acess to a library of images and the specific settings with which the pictures were clicked similar to what we want (assume this library in personal and he don’t wan to share with other photographers) . when generating summaries of financial documents, RAG can dynamically incorporate additional context or historical data points from secure, external documents. This integration is managed without ever training directly on these confidential sources, ensuring compliance with privacy regulations. The summaries produced are not only concise but also rich with informed insights, providing a deep understanding that is both current and highly relevant.

Slide 12

The another potential use case can be leveraging LLM for Question and Answer and efficient information search and retrieval from the documents like if we want to retrieve all the cybersecurity policies or any controls that are applicable firmwide so basically based upon this query the search will made throughout the documents to find and then rank the most relevant context based on query. Once the information is identified then we can use LLM model to synthesize and generate precise answers Further the system can be designed to handle real-time updates.

Slide 13

Along with the exciting opportunities generative AI can provide, there are

important challenges that we may encounter and should keep in mind. These include ensuring that AI systems are understandable and accountable, strictly following regulatory rules, and maintaining transparency and ethical integrity in our processes. A key issue is addressing hallucination in AI outputs, where the AI generates false or misleading information that does not correlate with real data and that why we need human supervision. The collaboration between AI and humans is crucial for driving innovation and ensuring our progress remains true to our core values and requirements.