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Comprehensive Survey On Generative AI, Plethora Of Applications And Impacts

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Abstract–
The primary objective for the AI subfield of "generative artificial intelligence" is to develop systems that may produce new, novel and creative content including text, photos, audio, music, and movies. These models are able to generate fresh content that nearly mimics realistic content created by humans by utilizing deep learning techniques. These models of Gen AI have gained significant importance in research and have plethora of applications in wide varieties of fields. The impact of GenAI is not just on abled but also on disabled communities who are sometimes unnoticed.
This survey provides a thorough overview of general artificial intelligence (GenAI), its applications, the cutting edge models at the moment, its effects on the disabled groups, and its challenges going forward with the future aspects.
Index Terms- *Generative Artificial Intelligence, Deep learning techniques, applications, challenges, future scope.*

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I. Introduction

Balagopal Ramdurai and Prasanna Adhithya [1] claimed in their research that generative artificial intelligence, or generative AI, is a branch of artificial intelligence which mainly focuses on developing systems capable of autonomously generating new and creative content[1].That means unlike the traditional way of prediction and classification the Generative AI goes beyond that capabilities and revolutionizes the creativity and imagination by producing humanlike contents in a very short time. This study gives a comprehensive understanding on the Generative AI and the need for Generative AI and classification ,their potential applications across multiple industries.

This literature survey also summarizes the work carried out by various researchers on Generative AI that covers the engagement the disabled communities in the generative AI and it's impacts as well. The survey also focuses on the challenges, future scopes of Generative AI. Ethical considerations were also followed as the composition of this study.

Along with these key findings, without the knowledge of working and processes involved in bringing out this current marvel technology of Generative AI the core understanding will be incomplete. This extensive survey covers the understanding of working models and the powerful algorithms implemented for giving the desired outputs in respective approaches. With the advent AI and ML , it's subfield Generative AI was initially introduced in the chatbots during 1960's but it marked a huge advancement in 2014 with the study of GANs and is currently causing an upsurge in the industry and still expanding it's scope and advancements giving out potential benefits to human society through it's advanced capabilities.

Need For Generative Ai ?

From the research work carried out by Balagopal Ramdurai and Prasanna Adhithya [1] they mainly categorized the need of Generative AI into 8 different categories across various domains.

Creative Content Generation:

Researcher states that Generative AI produces creative and realistic contents that resembles humanly generated forms. This addresses the need for novel and diverse content in multiple fields such as the arts, entertainment,design, and marketing. [1].According to the research work carried out by Balagopal Ramdurai [1] on Generative AI applications,impacts and advancements that indicates this actually saves enormous time from monotonous work and opens up new possibilities for creativity and imaginative works.

Data Augmentation:

The researcher claims that by creating synthetic data, generative AI's content-generating skills can be utilized to enhance already-existing datasets. This is especially helpful in circumstances when collecting or labelling real data is expensive, time consuming, or limited. By generating additional training examples, generative AI enhance robustness and generalization of AI models[1].

Simulation and Modeling:

Generative AI is useful in simulating and modeling complex systems. It enables scientists and researchers to produce realistic artificial data that can be used for testing hypotheses, predicting outcomes, and understanding underlying patterns. This is valuable in fields such as physics, biology, and economics, where experiments may be costly or impractical [1].This shows that these capabilities of simulation has huge benefits of saving times and resources in practical approaches.

Scenario Generation and Planning: Generative AI can generate diverse scenarios and possible outcomes, aiding in decision-making and strategic planning. But this can be applied in the exploration of alternative options, identification of risks, and evaluation of potential consequences. This is relevant in areas such as game design, logistics, urban planning, and disaster management [1].

Personalization and Recommendation Systems:

Personalized content and recommendations based on user preferences can be achieved through the usage of generative AI. Generative AI improves user experiences and engagement by producing customized content, such as news articles, movie suggestions, or personalized product recommendations. [1]

Design and Creativity Assistance: Generative AI can assist designers, artists, and creatives by generating initial ideas, design variations, or prototypes.[1]This creative ability that produces authentic data can be used by humans to expand their imagination and can result in more improved work or can give new ideas to explore underlying possibilities for their work.

Scientific Discovery and Exploration: Generative AI plays a role in scientific discovery by generating new hypotheses, suggesting experiments, and exploring uncharted areas. It can assist in the discovery of new materials, drug design, and understanding complex biological systems [1].Gen AI is revolutionalizing the research industry by assisting the researchers in consolidating their reviews and even performing peer-reviews in various domains of research and has gained potential impact in drug discovery researches.

Bridging Gaps in Data:

Generative AI can fill gaps in incomplete or missing data by generating plausible information. This is useful in circumstances where data is few or incomplete, enabling AI systems to make informed decisions or predictions[1].

This analysis shows that Gen AI can give a new path for AI systems in enhancing it's capabilities across various domains.

II. Potential Industries

Applications for generative AI could be found in many different fields and sectors. The following are some instances of sectors where generative AI can be applied:

Art and Creative Industries: The research carried work by Balaguruswamy [1] summarizes that Gen AI can assist artists, designers, and creative professionals by generating unique and inspiring content. It able to be employed to create digital art, generating music compositions, designing virtual environments, and exploring new aesthetic possibilities.[6]

Entertainment and Media: The entertainment and media sectors can benefit from generative AI since it can produce lifelike visuals and special effects for films, TV series, and video games. Additionally, it can be utilized to personalize content recommendations, generate engaging storylines, and create interactive experiences.[1].

Fashion and Retail: : From the researchers Y. Li, G. Wang, Z. Zhang, Y. Xu, X. Y in their work states that this Generative AI can be used in fashion design by generating new clothing designs, textures, and patterns. It can assist retailers in creating virtual try-on experiences, suggesting personalized outfits, and optimizing inventory management.[7]

Architecture and Design: By researchers Taylor & Francis [9] and BuHamdan S, Alwisy A, Bouferguene A. on their survey work of Generative AI on architecture and engineering states that Generative AI can aid architects and designers in generating innovative 3 building designs, urban planning simulations, and interior layouts. It can assist in creating optimized structures based on specific criteria, such as energy efficiency or spatial utilization.[8][9]

Healthcare and Medicine: From the research work carried out GenAI usage healthcare industries [10][11] that gives the knowledge that Generative AI can contribute to healthcare and medicine by creating artificial medical data for training AI models, simulating biological processes, and designing personalized treatment plans. Through the creation of novel molecular structures and the prediction of properties. This highlights that GenAI has shown significant achievements in the case of drug discovery and aiding in the research processes involved and further expanding it's avenues.

Advertising and Marketing: According to Smith J and Johnson [11] in their work that states Generative AI can help marketers in generating personalized advertisements, creating targeted content for specific audiences, and optimizing campaign strategies. It can assist in generating product visuals, slogans, and marketing materials.[11]

Education and Training: Generative AI can aid in educational settings by generating personalized learning materials, virtual tutors, and interactive simulations. It can create adaptive learning experiences tailored to individual student needs.[1]. Like this, GenAI can be used for education purposes.

Financial Services: According to "Generative AI for Financial Forecasting: Enhancing Accuracy and Decision-Making" by Johnson, R., Smith, E., Anderson, M. Journal: Journal of Financial Analytics Year: 2021 states that Generative AI can be applied to the financial industry to produce financial models, predicting market trends, and optimizing investment strategies. It can also assist in fraud detection and risk assessment.[12].As we know the technology can be used in predicting credit card scores and loan repayment predictions.

These are a few of the examples summarizing the stated potential industrial applications of Gen AI from the research work on Impacts, Advancements and applications of Gen AI[1].

III. Conversation Application Of Generative Ai

Conversation AI systems are designed to simulate human-like conversations and provide assistance or information to users. They are applicable to various applications, such as customer support, virtual assistants on websites or mobile apps, and social messaging platforms. [13].They interact with the users and can engage in conversations and provide necessary outputs and these can be integrated into other systems.

Google Assistant: Google Assistant is a virtual assistant developed by Google that uses generative AI to provide conversational interactions. It can answer questions, perform tasks, provide recommendations, and engage in natural language conversations.[1]

Amazon Alexa: Alexa, developed by Amazon, is another popular virtual assistant that employs generative AI to enable voice-based interactions.

Users can engage in conversations with Alexa to get information, Play music, manage smart home appliances many more.[1]

OpenAI ChatGPT: You are presently conversing with OpenAI's ChatGPT, a conversational AI model that uses generative AI to deliver text-based responses in a conversational style. It is capable of having engaging discussions, responding to queries, and offering knowledge on a variety of subjects.[1]

IBM Watson Assistant:

IBM Watson Assistant is a conversational AI platform that utilizes generative AI techniques to build virtual assistants and chatbots. It enables companies to design unique conversational bots for information retrieval, customer service, and other applications.[1]

WeChat Chatbots: WeChat, a well-known messaging app in China, encourages the creation of chatbots that communicate with users through generative artificial intelligence. Within the WeChat ecosystem, these chatbots can offer a variety of services, respond to inquiries, and deliver information.[1]

Gemini: The biggest and most powerful AI model created by Google —and the next step on our journey toward making AI helpful for everyone. Built from the ground up to be multimodal, Gemini can generalize and seamlessly

understand, operate across and combine various information formats, such as text, pictures, and audio, video and code. This means it has sophisticated multimodal reasoning and advanced coding capabilities.[14]

IV. Non-Conversational Application Using Generative Ai

Generative AI is used in various fields.As the benefits they offer are readily available,eliminate monotonous tasks,fast and creative approaches in generation of content. These surpass the human abilities of being involved just in a particular field.These are some of the applications where GenAI is exhibiting it's work.

Music:
OpenAI MuseNet: MuseNet is a deep learning network created by OpenAI that produces original music compositions in a variety of genres and styles. It permits users to generate, modify, and explore music compositions using a user-friendly interface.[1]

Images:
DALL-E : DALL-E 2 is undoubtedly the most well-known AI picture generator currently in use. Based on words, this Open AI text to image system can produce realistic graphics and artwork based on text input.[18]

IBM Watson Studio: Generative AI is one of the many AI services provided by IBM Watson Studio, an AI-powered platform.It offers materials and tools for developing and implementing generative AI models for a range of uses, including data augmentation, text production, and image synthesis.[1]

Videos:
Synthesia : This is the video generation AI's absolute pioneer. You may easily type content into their user-friendly internet platform to produce videos with live presenters. Select from more than 160 AI avatars (modeled after actual performers) that can speak more than 140 languages.[18]

Art:
DeepArt: DeepArt is a platform that uses generative AI to transform photos into artistic masterpieces. Users are able to submit their images and apply different artistic styles to generate unique and personalized artworks.[15]

Research:
Semantic Scholar : This keeps you abreast of the most recent developments in your field of study. It can quickly extract important conclusions from over 2 million academic research publications that it indexes. This research AI will also locate important literature for you to quote, and it will alert you to any new articles or citations of your interest.[18]

Automation:
Excel formula bot : With the help of this productivity tool, you may avoid the aggravation of utilizing complicated Excel formulae by just describing your problem and it will transform it into a formula in seconds.[18]

Buisness:
Otter : Otter takes notes for you in real time, freeing you up to participate in other activities while paying attention. Because it integrates with Zoom, Google Meet, and Microsoft Teams, people use it for both virtual and in-person lectures and other meetings. With the help of the mobile or online app, you can view and edit your notes from anywhere.[18]

Education:
Hello History: Hello History an artificial intelligence tool that lets you talk to famous historical figures. This cutting-edge app, accessible on iOS and Android, goes beyond traditional teaching methods by offering a dynamic and thought-provoking experience that vividly and interestingly brings history to life.[18]

Code and Software:
Text-to-Application Creation Concerning app creation, there are many Generative AI technologies that are suitable for app generation. With reference to apps, Berri AI, Debuild AI, Flutterflow, Google Generative App Builder, Imagica AI, Literally Anything IO, Scale Spellbook, Second AI and ZBrain are examples of Generative AI technologies that allow users to easily create web apps through text prompts. Even LLM app creation has become easily available to non-technical professionals through text and data inputs.[24

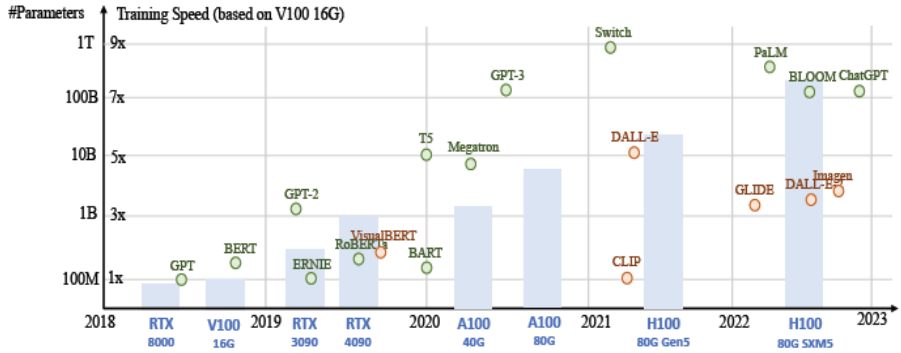

Fig 1. Statistics of model size and training speed across different models and computing devices.[28]

This graph is obtained from the Comprehensive Survey of AI-Generated Content (AIGC) :A History of Generative AI from GAN to ChatGPT by YIHAN CAO [28] that studied the statistical data obtained from the model size and the resulting training speed. As the model size increases particularly for large language models like GPT, the training speed tends to slow down due to greater number of parameters, computational complexity, required resources. This graph visually represents this trade-off, showing that while larger models provide better outcomes, the cost in training grows significantly.

Table no 1 : Shows the comparison between types of Generative AI, uses and their areas of applications

Types of Generative AI	AI	Uses	Area of application
Conversational AI	Google Assistant[1]	NLP based query processing. Responds to user queries and perform tasks, recommendations.	Integration to mobile and web applications for users.
Conversational AI	ChatGpt[1]	Text based responses to queries.	Academia, Research, Education
Conversational AI	Gemini[14]	Generates multimedia responses to user queries ,manages integrated tasks ,produces human like voices	Software applications like Android and web.
Conversational AI	Amazon Alexa[1]	Voice based interactions, control smart devices.	IOT applications
Conversational AI	IBM Watson Assistant[1]	Customer support, information retreival	Buisnesses
Nonconversational AI	DeepArt[15]	Photos to artisitic masterpieces.	Art
Nonconversational AI	OpenAI MuseNet[1]	Generates modify and explore music compositions	Music
Nonconversational AI	DALL-E[18]	Text to realistic images	Imaging
Nonconversational AI	Synthesia[18]	Text to video by AI generated video presenters	Video
Nonconversational AI	Semantic Scholar[18]	Extract key findings from academic research papers	Research
Nonconversational AI	Excel formula bot[18]	Provides excel formulas	Automation
Nonconversational AI	Otter[18]	Takes notes in real time during virtual meetings.	Businesses
Nonconversational AI	Hello History[18]	Interactive and intellectual simulating experience to converse with historical personalities.	Education
Nonconversational AI	ZBrain	Web app creation using text prompts	Coding

V. Algorithm Behind Generative Ai

The study on GenAI carried out by Prasanna Adhithya and Balagopal Ramdurai [1] comprised of the algorithm behind generative AI that can vary depending on the specific model or approach being used. However, one commonly used algorithm for generative AI is the Generative Adversarial Network (GAN). [19]

Their research focused on Generative Adversarial Networks (GANs), which are made up of a discriminator and a generator neural network. According to the study, the discriminator network learnt to discern between produced and actual data samples, while the generator network learned to create new data samples, such as text or images.[20]

The generator and discriminator networks then engaged in a competitive game as part of the GAN training process. The discriminator's goal was to accurately categorize those genuine and created samples, while the generator concentrated on creating realistic examples to trick the discriminator. Both networks gained knowledge from these contrast processes, which helped them perform better.

The generator created samples based on random input—also known as noise or a latent vector—that it received during training. After receiving created samples from the generator as well as actual samples from the training dataset, the discriminator evaluated the authenticity of each sample by providing feedback. On the other hand, the discriminator changed its parameters to more effectively discern between produced and actual samples, while the generator changed its parameters to produce samples that are more likely to trick the discriminator.

Like this adversarial training process continued iteratively until the generator produced samples that were increasingly difficult for the discriminator to distinguish from those of real samples. The objective here was to reach an equilibrium where the generator could generate high-quality and realistic samples that were identical to the actual data. GANs have shown effective in a range of generative applications, including text production, picture synthesis, music composition, and more. Their contributions have been crucial in propelling the domain of generative AI forward and facilitating the production of imaginative and lifelike results. Here, the researcher primarily focused on the GAN model, algorithm, and operation. They added that it's crucial to remember that generative AI employs a variety of different algorithms and methodologies, including flow-based models, autoregressive models, and variational autoencoders (VAEs). Every strategy has unique qualities, benefits, and use cases; the selection of an algorithm is contingent upon the particular task at hand and requirements.

What Is Generator

The researcher Balagopal Ramdurai [1] in his work summarized the overview of GenAI's model that is GAN, and stated the generator is a crucial component of generative models, such as Generative Adversarial Networks (GANs) [21]. The generator's main responsibility will be to produce fresh data samples which are similar to the training set. Usually, a deep neural network—a neural network that processes random input, sometimes referred to as noise or a latent vector—is used to create the generator. It produces output samples that correspond to the intended data distribution. The generator's architecture and structure can change based on the particular model and task being utilized.[22]

The following are some salient features of the generator that are provided in research studies:

Input: The generator taken a random input vector or noise as its input. This input was usually sampled from a straightforward probability distribution, such a Gaussian distribution or a uniform distribution.

Transformation: The generator network thus transformed the random input into a higher-dimensional space and mapped it to the space of the desired output data. It consisted of multiple layers, such as fully connected layers or convolutional layers, which progressively transformed and reshaped the input.

Learnable Parameters: The generator's parameters, including biases and weights of the network, are learned during this training process. These parameters were updated through techniques like backpropagation and gradient descent to optimize the generator's performance.

Non-linear Activation Functions: Each layer of the generator typically incorporated non-linear activation functions, such as ReLU (Rectified Linear Unit) or tanh (hyperbolic tangent), the addition of non-linearity to the model and it captured complex patterns in the data.

Output: The generator produced output samples, like pictures, words, or music, based on the learned mapping from the random input. The goal was to generate samples that resembled the training data as closely as possible.

Training Objective: The generator's training objective is often tied to the adversarial objective of the entire generative model. In GANs, the objective was to generate samples that could deceive the prejudiced person into thinking they are real. Other generative models might have different training objectives, such as maximizing the likelihood of generating high-quality samples.

Evaluation: Depending on the application, a variety of metrics, including visual inspection, perceptual similarity metrics, or domain-specific metrics, were used to assess the quality of the generator's output samples. To maximize its performance, the generator collaborated synchronously with other generative model elements, such as the discriminator in GANs.

The knowledge acquired includes the fact that the generator's parameters were iteratively modified in response to input from the discriminators or other components ,the generator improved its ability to generate more realistic and high-quality samples.

The Gan Model

The author's work also given insights on the mathematical formulation of the Generative Adversarial Network (GAN) which consisted of two main components: the generator and the discriminator. These components were trained adversarially to optimize their respective objectives.

Generator The generator taken random noise 'e' as input and produced generated samples **G(e).**

Discriminator:

The discriminator taken as input either a real data sample c or a generated sample **G(e)** and provided a probability **D(e) or D(G(e))** thus indicated the likelihood of the input being **real (D(e) close to 1)** or generated **(D(G(e)) close to 0).**

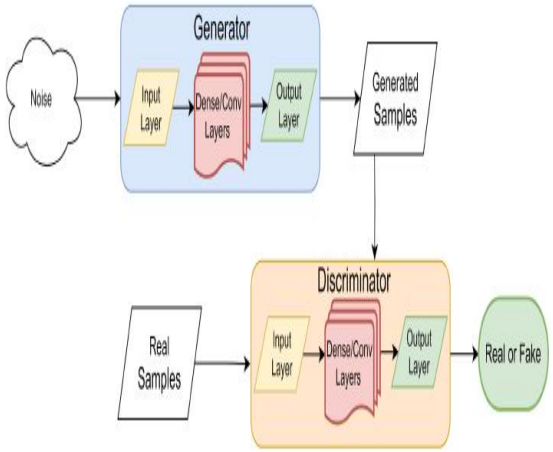

Fig 2 : Typical structure of GAN(Figure obtained [28]).

The above figure shows the structure of GAN with the respective components that are explained.

Training Objective:

The objective of the discriminator was to correctly classify the real and generated samples. It maximized the probability that was assigned to real samples and minimized the probability that was assigned to generated samples.

The objective of the generator was to produce generated samples that could fool the discriminator. It aimed to maximize the probability assigned by the discriminator to generated samples.

Loss Functions:

The GAN training process involved optimization of the parameters of the generator and discriminator networks. This was however typically achieved by as they minimized loss functions.

The discriminator loss function **(L_D)** was defined as the cross-entropy loss between the true labels (1 for real samples, 0 for generated samples) and thus predicted probabilities:

L_D = -[log(D(e)) + log(1 – D(G(e)))]

The generator loss function **(L_G)** was typically defined as the cross-entropy loss between the generator's output and the target labels (1 for real samples):

L_G = -log(D(G(e)))

Adversarial Training:

As we can understand by the above working model that the generator and discriminator were trained iteratively in an adversarial manner. The training process involved alternating updates between the generator and discriminator networks. In each iteration, the generator generated samples using random noise, and the discriminator was trained using both real samples and generated samples. The gradients were back propagated through the networks to update their respective parameters.[1]

VI. Potential Applications:

Biotechnology: The review work from Roberto Gozalo-Brizuela and Eduardo Eduardo Garrido Merchan on Generative AI applications [24] outlined how Gen AI is being used in biology. The article describes how GenAI is used in biotechnology studies to model molecules. therefore supporting the processes of protein folding and drug discovery. The author enumerated the biotech firms utilizing GenAI in the drug development process like Absci Corporation. According to their survey work they highlighted that GenAI through it's capability of producing realistic structures is able to takeup the success rates by 20% in protein modelling.We can understand

that GenAI is making workflows faster and making the research experiments easier when debugging of modelling was a very complex task.

Their work listed a number of companies that use Generative AI for drug creation including Atomic AI, BigHat AI, Exscientia, Menten AI and ProteinQure.

They took example of usage of BigHat AI that demonstrated capabilities in the field of drug discovery, where the company designed antibody therapies for patients using machine learning and synthetic biology.

Their output demonstrates that these businesses are already using their own proprietary machine-learning models for designing hundreds of molecules at a time. As the molecular properties are then measured and this information is incorporated into the model. This is how through Generative AI and feedback from testing, drug discovery companies are making their processes more efficient. Through all these usage of Gen AI in this field We may comprehend that such companies are able to make their processes efficient.

In terms of protein modeling, their work listed some of the found models like BARTSmiles which is a generative language model for molecular representation, and Alphafold a computer program that is capable of predicting protein structures for the whole human genome.

Their work emphasized a company called Cradle to understand a better use case of AI in Protein design, they state that Cradle used Alphafold's model that predicted the structure of an individual sequence or multimer.Thus Cradle could optimize the thermostability of your proteins with models trained on large datasets. We can understand by generative AI they are using it in biotechnology field to design the proteins, in predicting their performance, and visualizing results. Likethis they are using the obtained results to further improve their company models.

VII. Disabled Communities And Generative Ai:

The workshop paper by DEEPAK GIRI and ERIN BRADY [26] proposed a platform for including disabled communities also when Generative AI is developed, As Artificial Intelligence (AI) systems, especially generative AI technologies are becoming more relevant in our society. Tools like Chat-GPT are being used by members of the disabled community e.g., Autistic people may use it to help compose emails.[26] Thus GenAI is used by broad range of people.Their work states that the growing impact and popularity of generative AI tools have prompted them to examine their relevance within the disabled community. They highlight the fact in the design and development phases often neglect this marginalized group, leading to inaccurate predictions and unfair discrimination directed towards them. This could result from bias in data sets, algorithms, and systems at various phases of creation and implementation.

So inorder to improve inclusivity ,their work proposed a venue for incorporating the disabled community in the development of generative AI systems. This platform , aimed to gain insight into the factors that contribute to bias in the outputs generated by generative AI when this was used by the disabled community[5]

They outlined keypoints for considerations in the process:

The influence of experts' opinions in the voting process in the expert-mediated publics might created such biases in decision making. For tackling this consequences,they used a methodology that involved these factors ,the first tactic they proposed was to compile an expert pool that was diversified in terms of geography, culture, academic and professional backgrounds, etc. By incorporating experts with diverse perspectives thus aided in reducing the danger of homogeneous biases and encouraged a more impartial and thorough decision-making process. Another strategy involved ensuring that experts presented their viewpoints in a balanced manner, discussing both pros and cons, while maintaining impartiality. The final intervention was to tackle expert bias should be implemented on the participant's end. Every time a participant recasts their vote during the second round of voting in the expert-mediated publics, they were required to justify their new or unchanged position.

These justifications allowed them to finally determine whether or not expert opinions actually biased the voting.[25]

VIII. Impacts On Blind People:

The survey on Generative AI for the blind people focused on the usage of GenAI for the blind communities by Maitraye Das and Rudaiba Adnin [26].

In an effort to close the knowledge gap about blind people's use of generative AI, they presented data from interviews with 19 blind individuals who are into the mainstream usage GenAI tools like ChatGPT and Be My AI in their everyday practices. Their findings revealed how blind users navigate accessibility issues, inaccuracies, hallucinations, and idiosyncracies associated with GenAI and to develop interesting (but often flawed) mental models of how these tools work.They discussed key considerations for rethinking access and information verification in GenAI tools, unpacking erroneous mental models among blind users, and reconciling harms and benefits of GenAI from an accessibility perspective.

IX. Challenges:

There are serious challenges to be considered in this field.The main challenge is ethical consideration as the models are being trained extensively through internet data,this can result in potential bias,privacy,fairness issues on the society from wrong data.. Large language models (LLMs) are continuously processed actual and synthetic data sources; yet, as many well-known models have shown, they frequently largely rely on the latter. When artificial intelligence (AI) generates potentially biased content for LLMs to be trained on, the model's performance may gradually decline or, as researchers describe it, could develop MAD (Model Artifact Degradation).[29]

Shankar J, a brain-computer interface researcher, dives deep into domain specifics like neural networks, data analysis and electronics design as part of his coursework Shankar says models trained using GenAI content tend to amplify their own biases and errors. Degradation of models, reduced novelty, bias amplification and hallucination, he says, are some common symptoms of MAD-ness[29].Many popular LLM's are prone to MAD.One more challenge is the high computational power needed in Generative AI models that cannot be supplied with classical datacenters.

X. Conclusion

From this survey that sheds light on Generative AI, this technology with immense ability to produce new and novel contents that can surpass human imagination can give out exciting opportunities and ideas. The content creation capability of AI is making it a powerful tool in today's software industry and gaining immense demands and increasing users day by day. There are various Generative AI models and algorithms used like GAN, Autoencoders, Transformers. The working of Generative Adversial Networks where Generator and discriminator are involved to train the model adversially are discussed .Followed by the potential applications in biotechnology especially in modelling , protein folding and drug discovery where Generative AI models are used in simulations that ease research process in modelling techniques and designing of molecules in drug discovery through various models process makes the work simpler and efficient. Consideration of disabled communities in developing of Generative AI through various methodologies and impacts on the blind people using GenAI is also studied.

XI. Future Scope

GenAI has strong power and capabilities of producing desired data creatively.But as addressed There are difficulties with data generated resulting negative impacts the survey has to be updated in future with the advancements related to mitigating these impacts and making Generative AI more ethical,responsible to users for fair usage.Regarding the high computational power Generative AI models are taking with increasing demands this has to further studied.

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