Navigating the Complexities of Generative AI

This editorial is based on **"The potential of generative AI: creating media with simple text prompts"** which was published in The Hindu on 09/01/2023. It talks about applications of Generative AI and related challenges.

Generative [Artificial Intelligence](#) **is a rapidly-evolving field** that has the potential to revolutionise the way we create and interact with technology. With the ability to **generate new data or content, generative AI h**as a wide range of applications in a variety of industries, from **entertainment to finance.**

While **generative artificial intelligence has the potential to enable efficiency and productivity** across multiple industries and applications, it can also create harm and adversely impact society through **misuse, perpetuating biases, exclusion, and** [discrimination.](#)

As a result, generative AI should be understood in its **pros and cons** before it is incorporated into the **technological arena.**

What is Generative AI?

- Generative AI is a type of artificial intelligence that **involves creating new, original content or data using machine learning algorithms.**
  - It can be used to **generate text, images, music, or other types of media.**
- Generative AI works by training a model on a **large dataset and then using that model to generate new, previously unseen content** that is similar to the training data.
  - This can be done through techniques such as **[neural machine translation](#)**, **image generation, and music generation.**
- Generative AI has the potential to revolutionise many industries by **automating the creation of content and enabling the generation of new ideas and concepts.**

What can be the Applications of Generative AI?

- **Computer Graphics:** Generative AI can be used to **create realistic images and animations.**

For example, researchers have used generative models to create **photorealistic images of faces and animals**, and to animate virtual characters in real-time.

- **Music and Art:** Generative AI can be used to compose **music and create art.** For example, researchers have used generative models to create **new pieces of music that are similar in style to a given artist.**
  - Also, many startups are exploring services like **DALL.E2, Bing Image Create, Stable Diffusion, and MidJourney** to create their **brand logo and to align the same with Generative AI text messaging.**
- **Language and Content:** Generative AI can be used to generate natural language text. For example, researchers are using **ChatGPT** **to generate news articles, poetry, and even code.**
  - These models can be **fine-tuned to use a specific writing style,** or to generate text based on a specific topic or theme.
- **Medical and Drug Discovery:** AI-assisted drug discovery has the **potential to accelerate the drug discovery process significantly.**
  - Generative AI models can be used to **predict the properties of new compounds** and predict their potential efficacy as drugs.
- **Robotics**: Generative AI can be used to design and control robotic systems. Generative models can be used to simulate the **behaviour of a** robot**, and to generate control commands** that enable the robot to perform a specific task.

What are the Issues Associated with Generative AI?

- **Job Displacement:** Generative AI has the **potential to displace jobs and lead to job loss**. For example, **generative AI models can be used to automate tasks that were previously done by humans,** such as writing news articles or composing music.
  - While this can lead to **increased efficiency and cost savings,** it can also lead to **job loss for those who were previously employed in these roles.**
- **Reducing Human Cognition:** Generative AI can reduce the need for human cognition**, as the models can perform tasks that would otherwise require human intelligence.**
  - This could lead to a decrease in the **overall cognitive abilities of a population, especially young children who will see AI as their friend to do their homework.** Consequently, **people may rely less on their own abilities and more on technology to perform tasks.**
- **Societal Bias:** It can also lead to the replication of **societal biases** present in the mind of its trainer or programmer, this can also have a negative impact on **marginalised groups and lead to further discrimination.**
- **Misinformation and Mistrust:** Generative AI may lead to the **manipulation of information, by creating** fake text**,** speech**, images or videos** which can be used to deceive people, this can lead to further **misinformation and mistrust.**
- **Potential of Concentration of Power:** There is also the concern that once **generative AI gets premium, the development and deployment of these models will be concentrated in a few large companies and countries,** leading to a concentration of power and potential for misuse.

What should be the Way Forward?

- **Transparency:** Developing ways to make the inner workings of generative AI models **more transparent, so that the public can understand how and why the model is making certain decisions.**
  - This could include **providing explanations for why a specific output was generated or providing information about the data** that was used to train the model.
  - Also, ensuring that generative AI models **do not perpetuate or amplify societal biases.** This could include using diverse training data, as well as techniques like **fairness constraints or adversarial training to mitigate bias.**
- **Accountability:** There is a need to establish mechanisms for **holding individuals, organisations, or government entities accountable** for the actions of generative AI models.
  - This could include having a designated **"AI ethicist" or "AI ombudsman"** at the organisation that is **responsible for the model or creating a regulatory body** that oversees the development and deployment of generative AI.

- **Maintaining Privacy:** Protecting the **privacy of individuals whose data is used to train and test generative AI models.**
  - This could include implementing strict data handling and storage practices, as well as developing techniques for removing sensitive information from training data.
- **Human in the Loop:** Designing systems that involve **human oversight and decision-making at key points in the generative AI process,** in order to ensure that the model is behaving as intended and that any unintended consequences can be quickly identified and addressed.
  - Also, encouraging collaboration between human and AI in the decision making process where **AI can be used as a support system while humans make the final decision**, which will keep humans in control over the outcome.
- **Keeping in Mind the Consequences:** Continually assessing the potential consequences of generative AI models, both intended and unintended, and **making adjustments as needed to minimise any negative impact are necessary.**

__Drishti Mains Question__

Generative AI has been at the forefront of research in recent years. Discuss the challenges and ethical implications of using generative AI models.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q1. With the present state of development, Artificial Intelligence can effectively do which of the following? (2020)

1. Bring down electricity consumption in industrial units
2. Create meaningful short stories and songs
3. Disease diagnosis
4. Text-to-Speech Conversion
5. Wireless transmission of electrical energy

Select the correct answer using the code given below:

(a) 1, 2, 3 and 5 only
(b) 1, 3 and 4 only
(c) 2, 4 and 5 only
(d) 1, 2, 3, 4 and 5

Ans: (b)

Q2. Consider the following pairs: (2018)

	Terms sometimes seen in news	Context/Topic
1.	Belle II experiment	Artificial Intelligence
2.	Blockchain technology	Digital/Cryptocurrency
3.	CRISPR–Cas9	Particle Physics

Which of the pairs given above is/are correctly matched?

(a) 1 and 3 only
(b) 2 only
(c) 2 and 3 only
(d) 1, 2 and 3

Ans: (b)