Google DeepMind’s Genie

For Prelims: Google DeepMind’s Genie, ChatGPT **and** deep fakes**,** Generative Artificial Intelligence**,** Machine learning.

For Mains: Google DeepMind’s Genie, Issues Associated with Generative AI, AI and Ethics.

Source: IE

Why in News?

Recently, **Google DeepMind** has introduced **Genie AI (Artificial Intelligence)**, a new model that can generate interactive video games from just a text or image prompt.

- Google DeepMind is a British-American AI research laboratory that is a subsidiary of Google. DeepMind is based in London and has research centres in Canada, France, Germany, and the US.

What is Genie?

- **About**:
  - **Generative Interactive Environments (Genie)** is a foundation **world model that is trained on videos sourced** from the Internet.
    - The model can “generate an endless variety of **playable (action-controllable) worlds** from synthetic images, photographs, and even sketches”.
  - It is the first generative interactive environment that has been trained in an unsupervised **manner from unlabelled internet videos.**
- **Significance:**
  - Genie can be prompted to generate a **diverse set of interactive and controllable environments** although it is trained on video-only data.
    - Genie learns not only which parts of an observation are generally controllable, but also infers **diverse latent actions that are consistent across** the generated environments.
  - Genie is a breakthrough as it makes playable environments from a single image prompt. Genie can be prompted with images it has never seen. **The same can be done with sketches.**
    - This includes real world photographs, sketches, allowing people to interact with their imagined virtual worlds.
    - This opens up many possibilities, especially new ways to create and step into virtual worlds.
  - The model’s ability to learn and develop new world models signals a **significant leap towards general AI agents** (an independent programme or entity that interacts with its environments by perceiving its surroundings via sensors).

What is Generative Artificial Intelligence (GAI)?

- **About:**
  - GAI is a rapidly growing branch of AI that focuses on generating new content (such as images, audio, text, etc.) based on patterns and rules learned from data.
  - The rise of GAI can be attributed to the development of advanced generative models, such as **Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs).**
    - These models are trained on large amounts of data and are able to generate new outputs that are similar to the training data. For example, a GAN trained on images of faces can generate new, synthetic images of faces that look realistic.
  - While GAI is often associated with ChatGPT **and** deep fakes, the technology was **initially used to automate the repetitive processes** used in digital image correction and digital audio correction.
  - Arguably, because **machine learning** and deep learning are inherently focused on generative processes, they can be considered types of GAI, too.
- **Applications:**
  - **Art and Creativity:** It can be used to generate new works of art that are unique and innovative, helping artists and creatives explore new ideas and push the boundaries of traditional art forms.
    - **DeepDream Generator** - An open-source platform that uses deep learning algorithms to create surrealistic, dream-like images.
    - **DALL·E2 -** This AI model from OpenAI generates new images from text descriptions.
  - **Music:** It can help musicians and music producers explore new sounds and styles, leading to more diverse and interesting music.
    - Amper Music - creates musical tracks from pre-recorded samples.
    - AIVA - uses AI algorithms to compose original music in various genres and styles.
  - **Computer Graphics:** It can generate new 3D models, animations, and special effects, helping movie studios and game developers create more realistic and engaging experiences.
  - **Healthcare:** By generating new medical images and simulations, improving the accuracy and efficiency of medical diagnoses and treatments.
  - **Manufacturing and Robotics:** It can help optimise manufacturing processes, improving the efficiency and quality of these processes.
- **Significance for India:**
  - As per NASSCOM data, the **overall AI employment in India** is estimated at about 416,000 professionals.
  - The **growth rate** for the sector is estimated at about **20-25%.** Further, AI is expected to contribute an additional **USD 957 billion to India's economy, by 2035.**

What are the Concerns Related to GAI?

- **Accuracy:** One of the biggest challenges is **ensuring that the outputs generated by GAI are of high quality and accurate.**
  - This requires the development of advanced generative models that can accurately capture the patterns and rules learned from data.
- **Partisan GAI Models:** GAI models are trained on large amounts of data, and if that data is biassed, the **outputs generated by GAI may also be biassed.**
  - This can lead to discrimination and reinforce existing societal biases.
- **Privacy:** Training GAI models requires access to large amounts of data, which could include personal and sensitive information.
  - There is a risk that this **data could be used for unethical purposes,** such as for **targeted advertising or for political manipulation.**
- **Accountability for Misinformation:** Since GAI models can generate new content, such as images, audio, or text it **may be used to generate fake news** or other malicious content, without knowing who is responsible for the output.
  - This could lead to ethical dilemmas over responsibility.
- **Automation and Lowering Job:** GAI has the potential to automate many processes, which could lead to **job displacement for people** who are skilled in those areas.
  - This raises questions about the ethics of using AI for job displacement and the potential impact on workers and society.

What are India's Initiatives for Generative AI?

- **Generative AI Report:** INDIAai**,** the Government of India's National AI Portal, conducted numerous studies and hosted three roundtable discussions with some of the most prominent voices in Generative AI, AI Policy, AI Governance and Ethics, and academia to examine the impact, ethical and regulatory questions, and opportunities it brings to India.
- **Co-Founding** Global Partnership on Artificial Intelligence (GPAI)**:** In 2020, India joined forces with 15 other countries to form the GPAI. The purpose of this alliance is to establish frameworks for the responsible utilisation of emerging technologies.
- **Fostering an AI Ecosystem:** The Indian government has been dedicated to fostering an AI ecosystem within the country by investing in R&D, supporting startups and innovation hubs, creating AI policies and strategies, and promoting AI education and skilling.
    - **National Strategy for Artificial Intelligence:** The Government has published the National Strategy for Artificial Intelligence with the objective of developing an ecosystem for the research and adoption of Artificial Intelligence.
    - **National Mission on Interdisciplinary Cyber-Physical Systems:** Under this Mission, Technology Innovation Hubs (TIH) has been established on AI & ML at IIT - Kharagpur, which aims to provide the state-of-the-art training and capacity building for the creation of next-generation scientists, engineers, technicians, and technocrats in the field of Artificial Intelligence.
    - **Artificial Intelligence Research, Analytics and Knowledge Assimilation Platform:** It is a Cloud computing **platform**, aiming to make India a pioneer amongst emerging economies with regards to AI and transform sectors like education, health, agriculture, urbanisation and mobility.

Conclusion

- Generative AI is a powerful and promising technology that can bring many benefits. However, it also poses many challenges and risks that need to be addressed by effective and responsible regulation.
- India should adopt a proactive and balanced approach to generative AI implementation that ensures its safety, security, and ethical use.

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)