Prelim Bits 14-12-2023 | UPSC Daily Current Affairs

Graph Networks for Materials Exploration (GNoME)

GNoME, an AI tool, is accelerating the materials discovery using artificial intelligence (AI).

- It is a state-of-the-art ***graph neural network (GNN)*** model that uses ***'active learning'*** to enhance its performance, allowing it to predict the stability of new materials.
- **Launched by** – ***Google DeepMind***
- **Aim** - To generate novel candidate crystals and to predict their stability.

Deep learning is a method of artificial intelligence (AI) where it is taught to process data in a way that is inspired by a human computer.

- **Working** – GnoME can generate predictions for the structures of novel, stable crystals which were then tested, resulting in high-quality training data fed back into model training.
- The final step in their approach exploits ***Density Functional Theory (DFT)***, a method to verify the stability of the new structures, which are then used as new training datasets for the tool.
- ***The Materials Project*** is the original datasheet for GNoME.

The Materials Project *is a multi-institution, multi-national endeavour to compute the properties of all inorganic materials and provide the data for every materials researcher free of charge.*

- **Significance –** It has ***boosted the precision rate*** for predicting materials stability from 50% to around 80%.
- It ***increases the number of 'stable materials'*** by 10-fold including inorganic crystals that modern tech applications use.
    - It has published a list of 381,000 of the 2.2 million crystal structures that it predicts to be most stable.

References

1. The Indian Express| Graph Networks for Material Exploration
2. AI Magazine | GNoME

UN Resolution demanding Gaza Ceasefire

India votes in favour of UN resolution demanding Gaza ceasefire in an UNGA Emergency Special Session.

- **UN Resolution** – The ***193-member*** *United Nations* General Assembly (UNGA) expressed grave concern over the catastrophic humanitarian situation in the Gaza Strip and the suffering of the Palestinian civilian population.
- **2 key demands**
  - An immediate *humanitarian ceasefire*.
  - Immediate and unconditional *release of all hostages*, as well as ensuring *humanitarian access*.
- It also reiterated that all parties shall comply with international humanitarian law to protect the civilians.
- **Voting** - It was adopted with ***153 nations voting in its favour***, *10 voting against (including the US) and 23 abstentions*.

  This is the 1st time India supported such a resolution since the Israel-Hamas conflict began in 2023. India had abstained from the earlier resolution.

- **Impact** – Unlike UN Security Council resolution, UNGA resolution are ***not legally binding*** but the overwhelming support of the resolution serves as *an indicator of global opinion*.

UNGA Emergency Special Session
• It happens *when the UNSC is deadlocked*. • UN Member States can *request the Assembly President* to make appropriate recommendations for collective measures, including calling for ceasefires, use of armed force, etc. • If adopted by a ***two-thirds majority***, the non-binding General Assembly resolution *provides guidance for nations*.

Reference

The Indian Express| India supports for Gaza ceasefire

Kidney Transplants in India

The Indian government has ordered a probe into an allegation that poor Myanmarese villagers were being lured into giving their kidneys to rich patients.

- **Regulated by**– ***Transplantation of Human Organs and Tissues Act, 1994.***
- A transplant can be either
  - From organs of *deceased persons* donated by their relatives
  - From a *living person* the recipient knows

Only 16% of the total transplants in the India use deceased organs.

- **Types of donations**
  - Donations from close relatives
  - Donations from unrelated persons ***(Altruistic donations)***

Donations from close relatives	Donations from unrelated persons
• The 1994 Act allows living donations, in most cases, from close relatives (parents, siblings, children, spouse, grandparents, grandchildren). • For donations involving either Indians or foreigners, documents establishing their identities, family tree, proving the donor-recipient relationship and financial standing of the donor have to be submitted.	• It involves donations from distant relatives, in-laws, or long-time friends are allowed after additional scrutiny. • For donations from unrelated persons, documents and photographic evidence showing their long-term association have to be submitted which is then *examined by an external committee*.

- Organ donations and transplants in ***exchange for money are forbidden*** in India.
- **Punishment** - Offering to pay for organs or document forgery is punishable by jail *up to 10 years and a fine of up to Rs 1 crore*.

National Organ and Tissue Transplant Organization (NOTTO) *under the Ministry of Health and Family Welfare, is the apex centre for coordination and networking for the registry, donation and transplantation of organs and tissues in India.*

- **Reasons for higher kidney transplantation scam**
  - Higher demand for kidney due to increase in kidney failures
  - Least risk to the donor
  - Cheaper than other transplantations
  - Higher survival time of kidneys

Kidney can survive up to 24-36 hours outside the body, the largest among other organs while the lungs remain viable only for 4-6 hours, and the liver for 8-12 hours.

Reference

The Indian Express| Kidney transplants in India

Global Status Report on Road Safety 2023

According to the 5th edition of Global Status Report on Road Safety, road fatalities dropped globally, but India sees a rise.

- **Launch year** – 2009
- **Released by** – World Health Organisation (WHO)
- **Objectives** – To describe the *road safety situation* in United Nations (UN) Member States and *assess the changes* with a particular focus on the evolution of the burden and responses since 2010.
- **Data source** – Based on survey and review of legislation in which *170 UN Member States and 2 territories* participated.
- **2023 Report**– It provides the first complete overview of progress made during 2011–2020 and sets a baseline for the Decade of Action for Road Safety 2021–2030.

Key Findings

- **Road traffic deaths** – ***108 UN member nations*** reported a drop with 10 countries succeeded in reducing by over 50%.
    - *WHO's South-East Asia Region* tops while the European Region reports the largest drop in deaths since 2010
    - Top cause of deaths for children and youth between the ages of *5 to 29 years*
    - 92% of deaths occur in *low- and middle-income countries.*
- **Status of India** – It registered a ***15% increase in fatalities*** (1.34 lakh in 2010 to 1.54 lakh in 2021).
- **Share of fatalities – *30% by 4-wheel vehicle occupants*** followed by pedestrians, 2- and 3-wheeler users, respectively.

Only 6 countries have reached WHO best practice legislation on 5 risk factors – speeding, drink driving, motorcycle helmet use, and seat-belts and child restraint systems.

References

1. The Hindu| A decline in road fatalities globally
2. WHO| Global Status Report on Road Safety 2023

Budgett Frog

Researchers from the Indian Institute of Science's (IISc) have identified that peptides (short protein) produced from Budgett's frog can combat enzymes of disease causing pathogens.

- Other common names are ***Hippo Frog*** and the ***Freddie Kruger Frog.***
- **Scientific name** - *Lepdibatrachus laevis*
- **Habitat** – In inland waters in Paraguay, Argentina and Bolivia.
- **Growing condition** – Being ***carnivorous***, they mainly feed on other frogs (particularly tadpoles), snails and insects.
- During dry season, it remains in burrows and they will shed skin layers from to ***form a waterproof cocoon*** to keep them moist.
- In rainy season, it will go back into the water to breed and feed.

- **Characteristics** – They are ***highly intelligent*** and very aggressive.
- When frightened, they inflate themselves, stand up on their short legs and attack the potential with an open huge mouth followed up by a *high-pitched scream*.
- They do not have teeth, but they do have two sharp-edged structures in the jaws.
- **Protection status**
    - ***Least Concern*** in the IUCN Red List.

Frogs *are the 1st vertebrates to conquer the land and because of this, they have developed a defensive mechanism through their skin to generally combat the microorganisms and other harmful things.*

Reference

The Hindu| Budgett frog's defence mechanism

Other Important News
'AKTOCYTE' • AKTOCYTE is a nutraceutical developed by the Department of Atomic Energy (DAE) and IDRS Labs. • The tablets are intended for radiotherapy patients, especially those with pelvic cancer suffering from radiotherapy-induced Cystitis (Blood in urine).
'Mission Antarctica' • Union Minister of State for Defence flagged in a team of Himalayan Mountaineering Institute, Darjeeling that carried out 'Mission Antarctica' in New Delhi Recently. • The team hoisted the national flag atop Mt Rhenock in Sikkim Himalayas, recorded in the Asia Book of Records and India Book of Records. • During the expedition, the team also displayed the Tri-colour over Mount Vinson Peak, which is the ***highest peak of the South Pole***.
Pro Bono Legal Service Programme • It is an initiative of the Department of Justice, launched in April 2017. • It aimed at enhancing "access to justice" for marginalised sections of the society and the state's constitutional obligation of providing "free legal aid" for all. • Pro bono is a Latin phrase that means ***"for the good of the people".***

Women in Science and Engineering-KIRAN (WISE-KIRAN)

• WISE-KIRAN is a program from the Department of Science and Technology (DST).
• The scheme's goal is to increase women's participation in science and technology (S&T) and achieve gender parity.

Valparai plateau

• The Valparai plateau is situated in the Coimbatore district of Tamil Nadu.
• It is surrounded on all sides by protected areas Anamalai Tiger Reserve, Parambikulam Tiger Reserve and Eravikulam National Park.
• Valparai is known for its tea and coffee plantations, around 7-8 national and international companies spread over 54 tea and coffee estates in Valparai.

Koodankulam Nuclear Power Plant (KKNPP)

• Kudankulam Nuclear Power Plant is the largest nuclear power station with a current installed capacity of ***2GW*** in India.
• It is situated in Kudankulam, Tirunelveli district of Tamil Nadu.
• It is a Civilian Nuclear Power Plant, built by India in joint-collaboration with Russia.
• It is being developed by the ***Nuclear Power Corporation of India (NPCIL).***

Nyholm prize

• Professor Savita Ladage received the Royal Society of Chemistry's Nyholm Prize recently.
• It is an ***annual award*** from the Royal Society of Chemistry that recognizes achievements in chemical sciences education.
• The prize honors the life and work of Sir Ronald Nyholm, an Australian-born chemist who served as president of the Royal Society of Chemistry from 1968 to 1970.
• The prize alternates between being open to international nominations and being open only to nominations from the UK and Ireland.

International Debt Report

• The report is released by ***World Bank*** recently.
• **Recent Findings –** Currently, about 60% of low-income countries are at high risk of debt distress.
• Debt-service payments, which include principal and interest, increased by 5% over the previous year for all developing countries.
• The 75 countries eligible to borrow from the World Bank's International Development Association, which supports the poorest countries in 2022.

Pension Fund Regulatory and Development Authority (PFRDA)

• The Pension Fund Regulatory and Development Authority (PFRDA) is a regulatory body that oversees and regulates pensions in India.
• It was established in 2003 and operates under the Ministry of Finance.
• In 2003, the PFRDA launched the National Pension Scheme (NPS), which was extended to all citizens in 2009.
• The PFRDA regulates the NPS ecosystem, which is subscribed to by employees of the Government of India, State Governments, and private institutions.

Kanduri Urs Festival

• The annual 'Kanduri Urs' festival starts with the flag-hoisting ceremony in Nagapattinam district of Tamil Nadu recently.
• The 14-day festival commemorates the ***death anniversary of saint Abdul Qadir*** and attracts followers from different faiths across the world.

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