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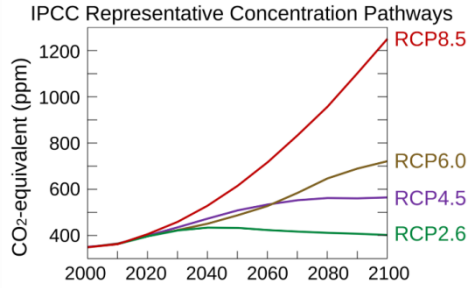
Representative Concentration Pathways (RCPs)

Context: *The word Representation Concentration Pathway was seen in news recently in relation to the recently held COP 28 of UNFCCC.*

➢ **Definition and Purpose:**
- Emission scenarios are trajectories depicting the emissions of greenhouse gases and aerosols resulting from human activities over time.
- Scientists use these scenarios to input data into climate models, predicting future global temperatures and sea levels.

➢ **Representative Concentration Pathways (RCPs):**
- The latest approach to emission scenarios is the Representative Concentration Pathways (RCPs).
- RCPs specify concentrations of greenhouse gases leading to a targeted increase in radiative forcing by 2100 relative to pre-industrial levels.



➢ **Radiative Forcing and RCP Pathways:**
- Representative Concentration Pathways (RCPs) are greenhouse gas concentration trajectories adopted by the IPCC for climate modelling.
- RCPs describe different climate change scenarios based on varying levels of greenhouse gas emissions.
- The labels of RCPs correspond to possible radiative forcing values in the year 2100, ranging from 2.6 to 8.5 W/m^2.
- Total radiative forcing measures the difference between energy entering and leaving Earth's atmosphere, expressed in watts per square meter.
- Four main RCP pathways are RCP8.5, RCP6, RCP4.5, and RCP2.6 (also known as RCP3PD, where 'PD' signifies Peak and Decline).
- The numbers in RCPs represent the expected change in radiative forcing from 1750 to 2100.

➢ **Interpreting RCP Warming Levels:**
- **RCP2.6 (RCP3PD):** Best-case scenario with an additional radiative forcing of 2.6 watts per square meter. Global temperature increase is projected to be 1.6 degrees Celsius compared to pre-industrial levels.
- **RCP4.5:** Intermediate scenario with a global temperature increase of 2.4 degrees Celsius.
- **RCP6:** Another intermediate scenario where the global temperature rises by 2.8 degrees Celsius.
- **RCP8.5:** Worst-case scenario with a concentration of greenhouse gases three times higher than the present, resulting in a temperature increase of 4.3 degrees Celsius by 2100.
- New RCPs, including RCP1.9, RCP3.4, and RCP7, are being considered alongside Shared Socioeconomic Pathways since the IPCC's Fifth Assessment report.

➢ **Basis and Methodology:**
- Emission scenarios are determined based on existing literature and synthesized values for scientific and socioeconomic data, including population growth, GDP, air pollution, land use, and energy sources.
- RCPs are not forecasts or policy recommendations but serve to represent a broad range of climate outcomes.

➢ **Significance of 1750 as Base Year:** The Intergovernmental Panel on Climate Change (IPCC) considers 1750 as the base year, predating the Industrial Revolution, to establish a stable baseline for radiative forcing measurements.

➢ **Application and Limitations:**
- RCPs are utilized to project a spectrum of climate outcomes but should not be mistaken for precise predictions.
- They provide valuable insights for policymakers and researchers, guiding discussions on mitigating climate change impacts.

Large Language Model

Context: *Since the debut of OpenAI's remarkable chatbot ChatGPT, discussions surrounding artificial intelligence have proliferated, spanning from casual conversations in living rooms to strategic deliberations in boardrooms.*

➢ **Introduction to LLMs:**
- Initially, computers followed instructions, but today, they possess learning capabilities, thanks to Generative AI.
- Generative AI, exemplified by Large Language Models (LLMs), enables computers to converse, think, and perform tasks once exclusive to humans.

➢ **What is an LLM?**
- LLMs, according to Google, are large general-purpose language models pre-trained and fine-tuned for various language-related tasks.
- These models are trained on vast datasets, enabling them to solve common language problems across industries.

➢ **Key Features of LLMs:**
- "Large" refers to both the extensive training data and the parameter count, crucial for solving specific problems.
- LLMs are "General Purpose," capable of solving general language problems irrespective of specific tasks or resource constraints.

➢ **Types of LLMs:**
- Architecturally, LLMs include autoregressive, transformer-based, and encoder-decoder models.
- Based on training data, LLMs are categorized as pretrained and fine-tuned, multilingual, and domain-specific models.
- LLMs can also vary in size and availability, being open-source or closed-source.

➢ **Functionality of LLMs:**
- LLMs utilize "deep learning" techniques, training artificial neural networks to predict words or sequences based on previous context.
- Similar to how babies learn language, LLMs learn patterns and relationships between words in training data without explicit instructions.

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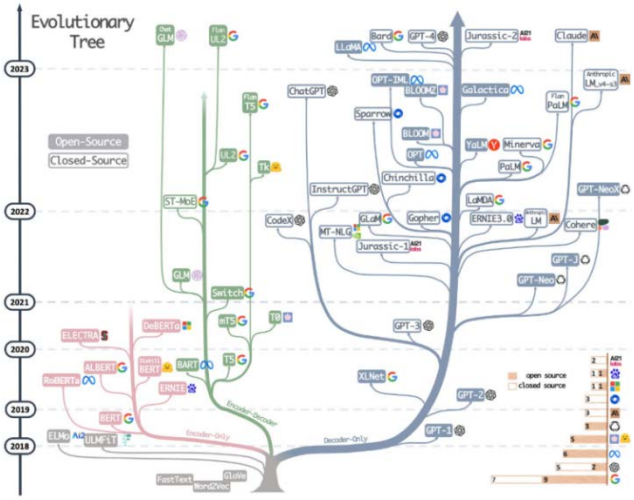
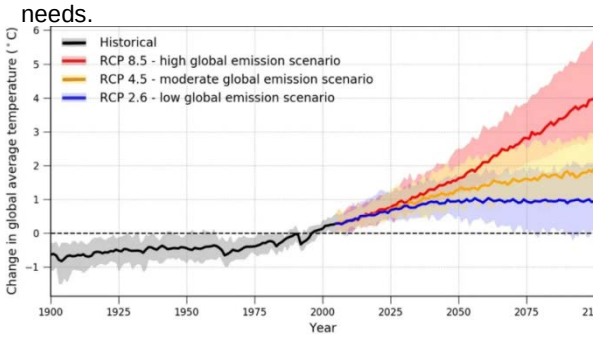


➢ Applications of LLMs:

- LLMs are versatile, generating human-like content, engaging in conversations, and serving as virtual assistants.
- They excel in language understanding tasks like sentiment analysis, translation, and text summarization.
- LLMs contribute to content creation, personalization, and marketing strategies, offering tailored solutions to diverse needs.



➢ Advantages of LLMs:

- LLMs are adaptable, capable of performing various tasks with a single model.
- They generalize patterns learned from extensive training data, even with limited domain-specific data.
- With continuous updates and parameter enhancements, LLMs improve their performance over time.

Aspect	NLP (Natural Language Processing)	LLM (Large Language Model)
Definition	Branch of AI for language tasks	Advanced AI model for generating human-like text
Focus	Understand, interpret, generate	Generate human-like language, understand context
Tasks	Text classification, sentiment analysis, language translation, speech recognition	Text generation, conversation modeling, language understanding
Examples	Virtual assistants, chatbots, search engines	GPT (Generative Pre-trained Transformer) models
Techniques	Tokenization, part-of-speech tagging, named entity recognition, syntactic parsing	Deep learning algorithms, pre-training on vast datasets
Applications	Wide range of language processing tasks	Text generation, conversation modelling, language understanding across domains
Scope	Broader field encompassing various language tasks	Specific subset specialized in generating human-like text
Advancements	Constant evolution with diverse applications	Recent advancement offering enhanced text generation capabilities

Foreign Portfolio Investors (FPIs) fraud warned by SEBI

Context: *The Securities and Exchange Board of India (SEBI), the market regulator, has issued a caution to individuals regarding fraudulent trading platforms that falsely assert or imply association with its registered Foreign Portfolio Investors (FPIs).*

➢ Modus Operandi of Fraudulent Platforms:

- Deceptive trading platforms entice individuals through online trading courses, seminars, and mentorship programs in the stock market.
- Leveraging social media platforms like WhatsApp or Telegram, as well as live broadcasts, to reach potential victims.
- Impersonating employees or affiliates of SEBI-registered FPIs, urging individuals to download applications for trading shares and subscribing to IPOs, falsely promising 'institutional account benefits' without requiring an official trading or Demat account.
- Employing mobile numbers registered under false names to execute fraudulent schemes.

➢ SEBI's Clarification:

- SEBI clarified that the FPI investment route is unavailable to resident Indians, except for limited exceptions as outlined in the SEBI (Foreign Portfolio Investors) Regulations, 2019.
- There is no provision for an 'Institutional Account' in trading, and direct access to the equities market requires investors to have a trading and Demat account with a SEBI-registered broker/trading member and depository participant (DP) respectively.
- SEBI emphasized that it has not granted any relaxations to FPIs regarding securities market investments by Indian investors.

➢ Safety Measures for Investors:

- SEBI advises investors to exercise caution and avoid social media messages, WhatsApp groups, Telegram channels, or apps claiming to facilitate stock market access through FPIs or FIIs registered with SEBI.
- Such schemes are fraudulent and lack SEBI's endorsement.

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➢ **Foreign Portfolio Investors (FPIs)**

- Foreign Portfolio Investment (FPI) entails the possession of financial assets originating from a country other than that of the investor.
- FPI holdings encompass a variety of assets such as stocks, ADRs, GDRs, bonds, mutual funds, and exchange-traded funds.
- Foreign Portfolio Investors maintain passive ownership, lacking control over ventures or direct ownership of property or stakes in companies.
- Investments made by Non-Resident Indians (NRIs) are not considered part of FPI.

NEWS IN BETWEEN THE LINES

Permanent Commission

Recently, the Chief Justice of India, leading a three-judge Bench, directed the Indian Coast Guard to ensure women are granted permanent commission.

About the Permanent Commission:

- A Permanent Commission (PC) in the I**ndian Army allows an officer to serve** in the army until they retire.
- Officers who opt for a PC are commissioned as officers and can serve until they are **60 years old**, as long as they are mentally and physically fit.
- The Indian Army has granted permanent commission (PC) to women officers (WOs) in **12 arms and services**, as well as the Army Medical Corps, Army Dental Corps and Military Nursing Service.
- In **2020, the Supreme Court ruled** that the absolute exclusion of women from PC in the Army is discriminatory.
- The court also rejected the Centre's stand on their "**physiological limitations**" as being based on "sex stereotypes" and "gender discrimination against women".

Sepahijala Zoo and Wildlife Sanctuary

Recently, amidst controversy, the Tripura government suspended its top forest official following the transfer of a pair of lions named Akbar and Sita from Sepahijala Zoo and Wildlife Sanctuary to North Bengal Wildlife Park in Siliguri, West Bengal.

About Sepahijala Zoo and Wildlife Sanctuary:

- Sepahijala Wildlife Sanctuary is a protected area, situated approximately 25 kilometers from Agartala, **Tripura**.
- Established in **1972** with the aim of conserving and propagating biodiversity, the Sepahijala bio-complex was later upgraded to Sepahijala Wildlife Sanctuary in early **1987**
- The sanctuary is drained by several rivers, including the Muhuri, Howrah, and Khowai rivers, which contribute to its diverse ecosystem.
- **Flora:** Sepahijala Wildlife Sanctuary boasts an impressive array of 456 plant species, including various **bamboo species**, **grasses** and **medicinal plants**.
- **Fauna:** This sanctuary hosts a diverse array of wildlife, including various primate species, predators like **Leopard** and **Clouded leopard**, as well as avian species such as storks, **Whistling teal** and **White ibis**.

Baleen Whales

Recently, the scientists have discovered how Baleen whales, such as humpbacks, produce their haunting vocalizations, which are heard over vast distances in the ocean.

About Baleen Whales:

- Baleen whales, also known as **whalebone whales** are **large marine mammals** that **belong to the cetacean order**.
- They encompass **14 species,** including the **Blue whale** (the largest animal on Earth), **Humpback** whale, **Gray** whale, fin whale and **Minke** whale, among others.
- Unlike most mammals that have teeth, baleen whales use baleen, **a large rack of fine, hair-like keratin, to filter out small krill from the water.**
- Baleen whales are **known for their complex vocalizations**, often referred to as "**songs**."
- These vocalizations play a **crucial role in communication, mating rituals and navigation in the vast ocean.**
- In humans, speech involves vocal folds of the **larynx** (vocal cords) supported by **small cartilage** structures called **arytenoids** whereas in baleen whales, arytenoids are **large and stiff**, forming a ring that presses against the laryngeal cushion, leading to sound production when the whale exhales.
- All species of baleen whales are **listed under CITES Appendix I,** which is the most endangered category of CITES-listed animals and plants.

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Personality in News

Vinayak Damodar Savarkar

Recently, the Prime Minister of India paid tributes to freedom fighter Vinayak Damodar Savarkar 'Veer Savarkar' on his death anniversary.

Vinayak Damodar Savarkar (28 May 1883-26 February 1966)

Vinayak Damodar Savarkar, an Indian politician, freedom fighter and writer was born at Bhagur village near Nashik in **Maharashtra**.

Contributions:

- Founded by Vinayak Damodar Savarkar and his brother Ganesh Damodar Savarkar in **1904**, the **Abhinav Bharat Society** aimed to promote revolutionary activities.
- Savarkar was associated with **India House**, **founded by Shyamji Kishan Verma** in **1905** in London, which aimed to foster nationalist sentiments among Indian students abroad.
- Established by Savarkar in London in **1906**, the **Free India Society** was inspired by the ideals of Italian nationalist Giuseppe Mazzini.
- Veer Savarkar authored several influential works, including "**Joseph Mazzini** - Biography and Politics" and "**The Indian War of Independence (about the Indian rebellion of 1857)**."

Honour:

- In recognition of his contributions, the airport at **Port Blair, Andaman and Nicobar's capital, was named Veer Savarkar International Airport**.

Ethical Values: Integrity, Patriotism, Leadership, Courage, etc.

Place in News

Hungary

Recently, the Hungary's Parliament approved Sweden's NATO accession, clearing the last hurdle before the historic step by the Nordic country whose neutrality lasted through two world wars and the simmering conflict of the Cold War.

Hungary (Capital: Budapest)

Location: Hungary is a **landlocked country** situated in Central Europe.

Political Boundaries: Hungary shares its border with **Romania** (East), **Austria** (West), **Slovakia** (North), **Ukraine** (Northeast), **Serbia** (South) and **Croatia** and **Slovenia** (Southwest).

Physical Features:

- The highest point in Hungary is **Kekes**, which is located in the **Bukk Mountains** in the northeastern part of the country.
- The major rivers in Hungary include the **Danube**, **Tisza**, **Drava** and **Szamos**.
- Hungary's mineral resources include **bauxite**, **coal**, **natural gas** and various industrial minerals such as **barite**, **gypsum**, and **kaolin**.
- **Lake Balaton** is the largest freshwater lake in Hungary and Central Europe, located in the Transdanubian region.
- **Lake Heviz, the largest thermal lake** in the world is located in Hungary, near the western end of Lake Balaton.

Political System: Hungary is a parliamentary republic with a unicameral legislature called the **National Assembly or Orszaggyules.**

Historical Significance: Hungary has a rich historical background, including being part of the **Austro-Hungarian Empire**, experiencing **Ottoman rule** and playing a significant role in **World War I and World War II.**

POINTS TO PONDER

- On the banks of which river is the Statue of Unity, recently seen in the news, located? **– Narmada River**
- At which institute has India's first 'Gati Shakti Research Chair' been established, as reported recently? **– IIM Shillong**
- In which state is the Gujrai Solar Power Station, recently making headlines, situated? **– Uttar Pradesh**
- What was India's ranking in the global cybercrime report for 2023, according to recent findings? **- 80th**
- Located in which state is the Kali Tiger Reserve, which has been in the news lately? **– Karnataka**

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