

# UPSC CURRENT AFFAIRS NOTES 07-12-2023

## GOOGLE'S AI MODEL GEMINI



Google Gemini is a novel multimodal general AI model introduced by Google, positioned as a versatile and powerful tool.

This AI model has been developed from scratch, marking it as a collaborative effort by diverse teams within Google.

The aim is to create an AI that feels less like a conventional software and more like a useful and intuitive assistant.

### Key Features and Capabilities of Gemini

**Multimodal Nature:** Gemini distinguishes itself by its multimodal capability, enabling it to process and comprehend various data formats, including text, code, audio, images, and videos.

**Enhanced Power:** Google claims that Gemini Ultra, the largest model, surpasses existing benchmarks in language model research on 30 out of 32 academic benchmarks. It excels in massive multitask language understanding (MMLU) across 57 subjects, demonstrating superior problem-solving abilities.

**Code Generation:** Gemini is designed to understand, explain, and generate high-quality code across popular programming languages like Python, Java, C++, and Go.



## Gemini Sizes and Functionality

**Ultra, Pro, and Nano Models:** Google introduces Gemini in three distinct sizes catering to different complexities and applications.

*Ultra:* Targeted for highly intricate tasks, currently available to select customers, developers, and safety experts for initial testing and feedback.

*Pro:* Meant for scaling across a broad range of tasks, available on Bard for regular users and accessible to developers and enterprise customers through the Gemini API.

*Nano:* Focused on on-device operations, already integrated into Pixel 8 Pro devices and soon available for Android developers through AICore on Android 14.

## Availability and Rollout Strategy

While Gemini Ultra is undergoing trust and safety checks and limited to select users, it's expected to be rolled out to developers and enterprise clients early next year.

Gemini Pro is accessible on Bard for everyday users and via Google AI Studio or Google Cloud Vertex AI for developers and enterprise customers.

Gemini Nano is already operational on Pixel 8 Pro devices and will soon be accessible to Android develop

## Integration and Impact on Google Services

- Google plans to integrate Gemini across various services, including Search, Ads, Chrome, and Duet AI, aiming for enhanced user experiences.
- Initial experiments with Gemini in Google Search indicate faster and improved Search Generative Experience (SGE) with reduced latency and enhanced quality.

## Addressing Concerns

- Acknowledgment of potential issues related to factuality and hallucinations in the AI model.



- Google's efforts to improve accuracy in responses and implementing additional safety protocols to address concerns like bias, toxicity, cyber-offense, persuasion, and autonomy.

### **Comparison with ChatGPT 4**

- Initial observations suggest that Gemini holds an edge over ChatGPT 4 in terms of flexibility, video processing capabilities, and offline device functionality.
- Gemini's current accessibility for free contrasts with ChatGPT 4, which is available to paid users.

### **Introduction to AI Models**

- Artificial Intelligence (AI) models are algorithms or systems designed to simulate human-like cognitive processes, enabling machines to perform tasks that typically require human intelligence.
- These models utilize large datasets, sophisticated algorithms, and computational power to learn, reason, and make decisions.

### **Significance of AI Models:**

AI models have revolutionized numerous industries by enabling automation, prediction, and data analysis at unprecedented scales. Their significance lies in:

- Enhancing efficiency and accuracy in tasks like data analysis, pattern recognition, language processing, and decision-making.
- Powering innovations in healthcare, finance, manufacturing, autonomous vehicles, and various other sectors.
- Enabling personalized user experiences, recommendation systems, and natural language understanding.

### **Types of AI Models:**

#### **Machine Learning (ML):**

- Subfield of AI that enables systems to learn and improve from experience without explicit programming.
- Types include supervised learning, unsupervised learning, reinforcement learning, and semi-supervised learning.



### Deep Learning:

- Subset of ML that uses neural networks with multiple layers to extract intricate patterns from data.
- Widely used in image and speech recognition, natural language processing, and autonomous systems.

### Natural Language Processing (NLP):

- AI model focused on understanding and processing human language.
- Applications include language translation, sentiment analysis, chatbots, and text summarization.

### Computer Vision:

- AI models enable computers to interpret and understand visual information.
- Used in image recognition, object detection, facial recognition, and medical image analysis.

### Applications of AI Models:

- **Healthcare:** Diagnosis assistance, drug discovery, personalized medicine, and predictive analytics.
- **Finance:** Fraud detection, algorithmic trading, risk assessment, and customer service.
- **Manufacturing:** Process optimization, predictive maintenance, quality control, and supply chain management.
- **Autonomous Systems:** Self-driving cars, drones, robotics, and smart home devices.

### Challenges and Ethical Considerations:

#### Bias and Fairness:

- AI models can inherit biases from training data, leading to unfair outcomes.
- Ensuring fairness and mitigating biases remains a challenge.

### Privacy and Security:

- Concerns over data privacy, unauthorized access, and potential misuse of AI-powered systems.

### Transparency and Accountability:

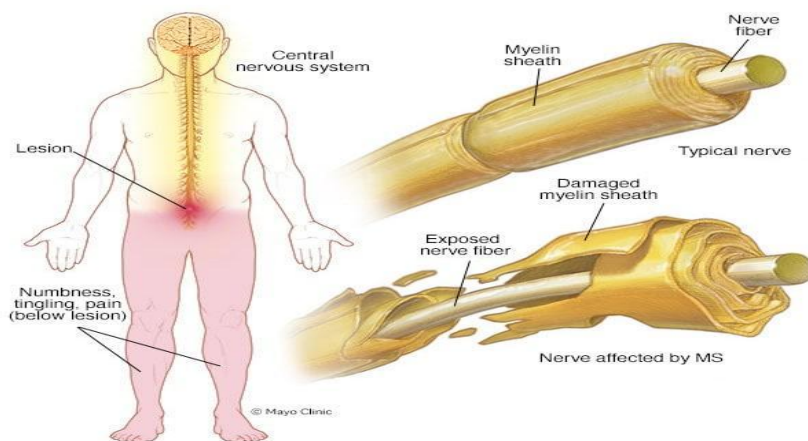
- Understanding the decision-making process of AI models and holding them accountable for their actions.

### Future Prospects and Developments

- **Explainable AI (XAI):** Focuses on making AI models more interpretable and transparent to enhance trust and accountability.
- **Federated Learning:** A privacy-preserving approach where AI models are trained across decentralized devices without centralizing data
- **Quantum Computing and AI:** Potential synergy between quantum computing and AI for solving complex problems.

## Multiple Sclerosis

Researchers are reporting that in the years leading up to a diagnosis of multiple sclerosis, individuals were more likely to have depression, constipation, urinary tract infections, and sexual problems.



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### About Multiple Sclerosis:

It is a long-lasting (chronic) disease of the central nervous system.



In people with MS, the immune system attacks cells in the myelin, the protective sheath that surrounds nerves in the brain and spinal cord.

Damage to the myelin sheath interrupts nerve signals from your brain to other parts of your body. The damage can lead to symptoms affecting your brain, spinal cord, and eyes.

Eventually, the disease can cause permanent damage or deterioration of the nerve fibres.

MS affects women more than men. The disorder is most commonly diagnosed between ages 20 to 40, but it can be seen at any age.

There are many possible causes of MS, including:

Autoimmune disorders;

Infectious agents, such as viruses;

Environmental factors;

Genetic factors;

### **Signs and symptoms:**

It varies widely between patients and depends on the location and severity of nerve fibre damage in the central nervous system.

Some people have mild symptoms, such as blurred vision, and numbness, and tingling in the limbs.

In severe cases, a person may experience paralysis, vision loss, and mobility problems.

Treatment: There's no cure for multiple sclerosis. However, there are treatments to help speed the recovery from attacks, modify the course of the disease, and manage symptoms.



## PANCHAYAT DEVELOPMENT INDEX



### Panchayat Development Index (PDI)



The Union Minister of State for Panchayati Raj mentioned in Lok Sabha that the Panchayat Development Index (PDI) is a comprehensive tool to assess and monitor the development progress of Panchayats across the country.

#### About Panchayat Development Index (PDI)

The PDI is a comprehensive assessment tool developed by the Union Ministry of Panchayati Raj.

- The Index aimed at evaluating and measuring the progress made by grassroots-level institutions, specifically Panchayats, in achieving localized Sustainable Development Goals (SDGs) aligned with the broader UN Agenda for Sustainable Development by 2030.

#### Assessment Framework

- The PDI evaluates progress across themes, likely covering areas such as education, healthcare, infrastructure, environmental sustainability, etc.
- It uses 577 local indicators and 144 local targets to gauge development progress.
- 642 unique data points are utilized to monitor progress towards achieving these localized goals.

#### Performance Evaluation & Recognition

- **National Panchayats Award (NPA):** The best-performing Panchayats are incentivized through awards based on their performance in attaining SDGs. This initiative fosters healthy competition among Panchayats.

- **Thematic Scores & Composite PDI Score:** These scores enable an assessment of progress across the nine themes and provide an overall view of a Panchayat's development status.

### Encouraging Development and Sharing Best Practices

- The PDI aims to **motivate Panchayats to plan and work towards development goals**, fostering a competitive spirit among them.
- **Exemplary practices from well-performing Panchayats are shared and replicated in other areas** through workshops, films, learning modules, visits, and setting up Panchayat Learning Centers.

### Institutionalization & Outcome-Oriented Goals

- The Ministry is working on institutionalizing the PDI through various strategies, ensuring its effective adoption and utilization by states and Panchayats.
- **PDI helps measure incremental progress by assessing scores achieved by Panchayats**, aiding in setting local targets for evidence-based Panchayat Development Plans.

### Knowledge Dissemination & Implementation

- **State-level Workshops & Initiatives:** Various initiatives are undertaken to increase awareness and institutionalize the use of PDI among stakeholders.
- **Development of Learning Modules & AV Films:** These resources aim to enhance understanding and strategies for implementing PDI effectively.

## LAKADONG TURMERIC



### Lakadong Turmeric

Lakadong Turmeric from the hills of Meghalaya is known for its high curcumin content, the main reason behind all of its therapeutic properties. It is in fact, the best therapy for skincare. Add a percent of lakadong turmeric to your curries, pickles, stew, or soups and get the desired color, flavour, and taste.





**Context:** Geographical Indication (GI) tag awarded to Meghalaya's Lakadong turmeric, along with other traditional products such as Garo Dakmanda (traditional dress), Larnai pottery, and Garo Chubitchi (alcoholic beverage).

### Lakadong Turmeric

Lakadong turmeric has been granted the GI tag. A GI tag is a form of intellectual property rights that recognizes and protects products associated with a particular geographical origin and possesses qualities, reputation, or characteristics that are essentially attributable to that place of origin.

Lakadong turmeric is specifically from the Lakadong area of Jaintia Hills in Meghalaya.

This variety of turmeric is considered one of the best globally, known for its high curcumin content (around 6.8 to 7.5 per cent). It has a darker colour and is grown organically without the use of fertilizers.

The GI tag is expected to aid farmers in marketing and provide customers with access to an authentic product. It serves as a unique selling point and can contribute to fetching better market prices for the farmers.

### Other Products Awarded GI Tags

**Garo Dakmanda:** This is a handwoven ankle-length lower garment and is part of the traditional attire of Garo women in Meghalaya.

**Garo Chubitchi:** This is an alcoholic beverage consumed by the Garo community during feasts and ceremonies. It is a rice-based fermented drink.

**Larnai Pottery:** This type of pottery is made of black clay from Larnai village. The art form has been passed down through generations.

### Significance and Impact

The GI tags for these products aim to enhance their market competitiveness, both domestically and internationally.

The recognition is expected to create more livelihood opportunities for the farmers and artisans associated with these products.

The acknowledgement of Lakadong turmeric's high quality and unique characteristics through the GI tag is likely to boost its popularity and demand in the market.

## SECTION 34 of IPC



The recent Supreme Court clarification on Section 34 of the Indian Penal Code underscores that common intention requires shared purpose and design among all co-accused, without mandating explicit discussions, allowing for its psychological emergence before or during the crime.

### Section 34 of the Indian Penal Code (IPC)

- Section 34 of the Indian Penal Code (IPC) is a provision that deals with the criminal liability of several persons who act in furtherance of a common intention.
- It states that when a criminal act is done by several persons in furtherance of the common intention of all, each of such persons is liable for that act in the same manner as if it were done by him alone.

This means that if two or more people commit a crime together with a shared purpose, they can be held equally responsible for the crime, regardless of their roles or actions. For example, if A and B plan to rob C and in the course of the robbery, A kills C, then both A and B can be charged with murder under Section 34 IPC.

The rationale behind this provision is to deter people from joining criminal gangs or conspiracies and to punish them for their collective guilt. It also reflects the principle that the act of one is the act of all when they have a common intention.

## Summary

Section 34 IPC is an important provision because it helps to bring justice to the victims of crimes committed by several persons. It also helps to prevent people from escaping liability by claiming ignorance or innocence of their co-accused's actions. It ensures that everyone who participates in a criminal act with a common intention is held accountable for it.

## Jamun tree

Recently, researchers at the Indian Institute of Science Education and Research, Bhopal (IISER Bhopal), have completed the first-ever genome sequencing of the jamun tree (*Syzygium cumini*).

### About Jamun tree:

- It is also known as jambolan, or black plum tree and is a Myrtaceae plant family tropical tree.
- Its natural range includes the Indian sub-continent and South-East Asia.
- The genus *Syzygium* contains 1,193 recognised species, including jamun.

### Soil





It can be grown on a wide range of soils.

However, for high yield potential and good plant growth, deep loam and a well-drained soil are needed.

It can grow well under salinity and waterlogged conditions too.

### **Climate**

It prefers to grow under tropical and subtropical climate.

It is also found growing in lower ranges of the Himalayas up to an altitude of 1300 metres.

It requires dry weather at the time of flowering and fruit setting.

In subtropical areas, early rain is considered to be beneficial for ripening of fruits and proper development of its size, colour and taste.

### **Benefits:**

In Ayurveda the black plum is used to treat ailments such as **stomach discomfort, arthritis, cardiac problems**, flatulence, asthma, diarrhoea, and stomach spasms.

## **Kopili fault zone**

Recently, researchers from the Indian Institute of Geomagnetism (IIG) have identified seismogenic liquefaction features in the active Kopili Fault (KF) zone.

### **About Kopili fault zone:**

It is a 300 km long and 50 km wide lineament situated in the northeastern region (NER) of India.

It extends from the western part of Manipur to the tri-junction of Bhutan, Arunachal Pradesh, and Assam.

It is closer to Himalayan Frontal Thrust.

This is a seismically active area falling in the highest Seismic Hazard Zone V.



It is associated with collisional tectonics because of the Indian Plate subducting beneath the Eurasian Plate.

The fault itself is a transpressional fracture that generates lower crustal dextral strike-slip earthquakes.

A tectonic depression filled up by the alluvium of the Kopili river and its tributaries, the Kopili fault zone has witnessed many seismic activities in the past including the 1869 earthquake (7.8 magnitude) and the 1943 earthquake (7.3 magnitude).