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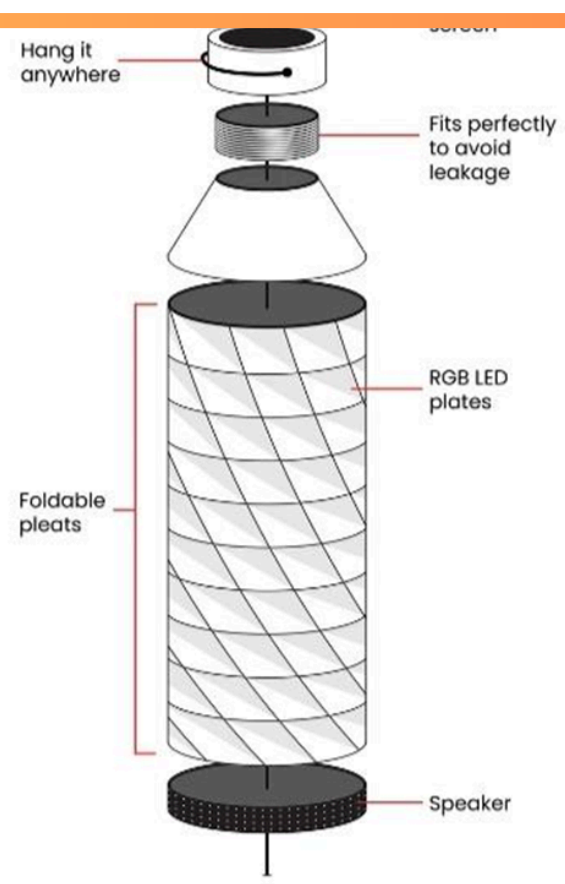

Editorial Board

S.V. KUMAR

Principal,
Government Polytechnic,
Pilllaripattu

MESSAGE BY PRINCIPAL

It is with great pleasure that we present this edition of our College Journal, which reflects the creativity, talent, and academic spirit of our students. The journal features thoughtful technical and non-technical articles, a beautiful poem, and drawings—showcasing both intellect and imagination. Our institution remains committed to providing quality education and fostering holistic development in an environment that encourages innovation and excellence. This journal stands as a testament to the collective effort of our college community.

I sincerely appreciate the tireless efforts of Sri A.C. Kishore Kumar, Head of Mechanical Engg.Section, Sri K.V.Nagabhushanam, Head of Computer Science Engg section, Sri S.V.Gouri Sankar, Head of General section, Sri M.Amarnath, Head of Electronics and Communication Engg. Section, Sri K.M.Velayudachari, Head of Civil Engineering section, Ms A.Jemimah, Lecturer in English, Sri V.S. Dinesh, Lecturer in Computer Science Engg. Section, Sri C.H.Durga Prasad, Lecturer in Electronics and Communication Engg. Section, Sri V Ravi Sankar, Lecturer in Electronics and Communication Engg. Section and Smt. G. Jyothi Lakshmi, Librarian who meticulously reviewed and guided the preparation of this journal. Their mentorship played a crucial role in shaping the confidence and capabilities of our learners.

My gratitude also goes to all the staff who continuously support and motivate our students in their academic and creative pursuits.

Most importantly, my heartfelt congratulations to the students whose contributions have brought this journal to life. May you continue to think creatively, write confidently, and achieve greatly. Your enthusiasm and hard work make this publication truly meaningful.

With best wishes for continued excellence.

S.V. Kumar, M.Tech.,
Principal

TECHNICAL ARTICLES

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NON TECHNICAL ARTICLES

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Advantages and Disadvantages of Mobile Phones

Author: P. Yashovardhan
PIN: 25155-M-035

Advantages of Mobile Phones

- **Enhanced Communication**: They allow for easy and cheap communication through calls, texts, and social media platforms, enabling constant connection with others.
- **Information and Entertainment**: Users can access the internet for information, educational resources, news, and a variety of entertainment options on the go.
- **Productivity and Convenience**: Smartphones are useful for remote work, online shopping, mobile payments, and managing tasks with various apps, boosting productivity.
- **Safety and Emergencies**: They provide a way to call for help and stay safe during emergencies, acting as a crucial tool for personal security.
- **Navigation**: Built-in GPS and mapping apps help with navigation, making it easier to find places and get around.
- **Multi-functionality**: Mobile phones serve multiple purposes, combining cameras, calculators, and internet access in a single device.

Figure: Visual representation of mobile phone advantages

Disadvantages of Mobile Phones

- **Addiction and Distraction**: Over-reliance on mobile phones can lead to addiction, constant distractions, and a reduced ability to focus on work, studies, or other activities.
- **Health Risks**: Heavy use is linked to eye strain, headaches, sleep disturbances, and even potential issues like anxiety and stress.
- **Privacy and Security Concerns**: Users risk compromising their privacy as personal data, photos, and location information can be accessed or exposed.
- **Cyberbullying and Online Safety**: Mobile phones facilitate cyberbullying and online harassment, posing risks to mental health and well-being.
- **Reduced Social Interaction**: While connecting people virtually, overuse of phones can decrease face-to-face interactions and potentially lead to social isolation and less empathy.
- **Accidents**: Using phones while driving or performing other tasks that require attention can increase the risk of accidents.

Figure: Visual representation of mobile phone disadvantages

Bridging the Gap in Quantum Key Distribution

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Abstract

Quantum Key Distribution (QKD) theoretically offers unconditional security guaranteed by the laws of physics. However, a significant "Valley of Death" exists between theoretical perfection and industrial adoption due to hardware imperfections (side-channel vulnerabilities) and throughput limitations caused by signal attenuation over long distances. This paper proposes a hybrid architecture that bridges this gap. We implement a Side-Channel-Secure (SCS) QKD protocol capable of accommodating imperfect sources via mathematical mapping, achieving secure transmission over 200 km. Furthermore, to address the low bit-rate of standard QKD, we introduce a deterministic chaotic expansion layer using the Lorenz Attractor system. This hybrid approach utilizes QKD to generate high-entropy seeds, which are then expanded into high-bandwidth key streams. The results demonstrate a >100x enhancement in key rates and successful deployment in high-latency critical infrastructure environments.

Keywords: *Side-Channel Security (SCS), Quantum Key Distribution (QKD), Chaotic Key Expansion, Lorenz Attractor, Optical Networking, Critical Infrastructure Security.*

1. Introduction

Background

In the era of increasing cyber threats, Quantum Key Distribution (QKD) stands as the gold standard for secure communication, leveraging quantum mechanics to detect eavesdropping. However, standard protocols like BB84 rely on "perfect" vacuum states and ideal hardware, which do not exist in reality.

Problem Definition

The commercial adoption of QKD is hindered by two main factors (the "Reality Gap"):

1. **The Hardware Gap:** Real-world devices have "side channels"—imperfect vacuum states and frequency leaks—that attackers can exploit. Previous SCS protocols required impossible perfect vacuum states to function.
2. **The Speed Gap:** Quantum signals attenuate exponentially over fibre optic lines. At 200 km, the secure key rate drops to approximately 1.29×10^{-7} bits/pulse, which is insufficient for real-time applications like video conferencing or smart grid control.

Objectives

- To implement a practical SCS-QKD protocol that secures imperfect sources over long distances (200 km).
- To develop a software-based Chaotic Key Expansion module using the Lorenz system to amplify throughput by >100×.
- To validate the system's resilience in industrial environments.

2. Literature Survey

Title/Author	Methodology	Advantages	Disadvantages
Standard BB84 Protocol	Uses polarization states of single photons	Theoretically secure	Vulnerable to side-channel attacks

Title/Author	Methodology	Advantages	Disadvantages
Decoy-State BB84	Sends decoy pulses to detect attacks	Improved security against specific attacks	Does not address all side-channels
Zhou et al. (2025)	Experimental SCS-QKD over 200 km	Solves the hardware gap	Low bitrate (10^{-7} bits/pulse)
Proposed Hybrid System	SCS-QKD + Chaotic Expansion	Solves both Security and Speed gaps	Requires precise synchronization

Table: Comparative Analysis of QKD Approaches

3. Proposed Work

Methodology

Our approach utilizes a "Hybrid Stack" architecture comprising a Hardware Backbone and a Software Edge.

3. **Hardware Layer (SCS-QKD):** Unlike previous protocols requiring perfect vacuum states, we use the "Mapping Theorem." We measure the projection probability to vacuum of the real, imperfect "mixed states." If the real protocol maps to a virtual perfect one, the transmission is secure.
4. **Software Layer (Chaotic Expansion):** We utilize the QKD output not as the final key, but as a "Seed." This 20-bit quantum seed defines the initial conditions for a Lorenz Attractor system. The system evolves via Runge-Kutta integration to generate a massive stream of pseudo-random bits.

System Architecture

- **Alice (Source):** Generates Quantum Signals via Optical Phase-Locked Loop (OPLL) → Sends over Fibre.
- **Charlie (Measurement Node):** Uses Superconducting Nanowire Single-Photon Detectors (SNSPDs) to measure signals.
- **Bob (Receiver):** Receives projection data.
- **Expansion Engine:** Both Alice and Bob input the shared Quantum Seed into the Lorenz System:

$$\frac{dx}{dt}=\sigma(y-x),\ \frac{dy}{dt}=x(\rho-z)-y,\ \frac{dz}{dt}=xy-\beta z$$

4. Requirement Analysis

Software Requirements

- **Language:** Python (for Chaos logic and Runge-Kutta integration), MATLAB (for simulation).
- **Libraries:** NumPy, SciPy (differential equation solvers).
- **Testing:** NIST Statistical Test Suite (for randomness verification).

Hardware Requirements

- **Detectors:** SNSPD (Superconducting Nanowire Single-Photon Detectors) cooled to 2.2 K (66% efficiency).
- **Transmission Medium:** Ultra-low-loss fiber optic cable (0.17 dB/km).
- **Components:** Optical Phase-Locked Loop (OPLL), Beat frequency offset generator (~300.7 MHz), Encoders.

Dataset/Parameters

- **Distance:** Tested up to 200 km.
- **Seed Size:** 20 bits.
- **Expansion Ratio:** 1:1000.
- **Metric:** Mutual Information decay (to prove security against eavesdropping).

Conclusion

This project successfully demonstrates a path to ubiquitous quantum security by overcoming the "Valley of Death." By engineering a practical Side-Channel-Secure QKD protocol, we achieved secure transmission over a record 200

km distance. Furthermore, by integrating the Lorenz Chaotic Expansion, we bypassed the physical throughput limits of fibre optics, achieving a >100× key rate enhancement. The system passed NIST randomness tests and was validated in a high-radiation nuclear reactor environment.

Acknowledgment

We express our sincere gratitude to our project guide for their mentorship. We also thank our Head of Department, **Dr. Sharvari Govilkar**, for providing the necessary laboratory resources, and our Principal, **Dr. Sandeep M. Joshi**, for his constant encouragement and support.

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6G & The Intelligence Fabric

Authors: M. Haswanth, P. Chaitanya Kumar, and Ch. Durga Prasad
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Abstract

As the telecommunications industry transitions from the 5G "Internet of Things" era, we are entering the 6G "Agent Era," characterized by the symbiotic integration of Artificial Intelligence (AI) and next-generation connectivity. This paper proposes a structural framework for "The Intelligence Fabric," where AI is not merely an add-on but is native to the network architecture (Edge-Native). We analyze three core pillars: AI for Network (autonomous optimization), Network for AI (distributed training/inference), and AI as a Service (AIaaS). The proposed methodology shifts communication paradigms from traditional Shannon-based bit transmission to "Post-Shannon" semantic communication, transmitting meaning rather than raw data. By leveraging O-RAN integration, Digital Twins, and Integrated Sensing and Communication (ISAC), this system aims to achieve zero-touch provisioning and a self-optimizing closed-loop ecosystem.

Keywords: *6G, Artificial Intelligence, O-RAN, Semantic Communication, AI as a Service (AIaaS), Edge Computing, ISAC.*

1. Introduction

Background

The evolution of mobile networks has followed a distinct trajectory: 4G defined the "App Era" by connecting people, while 5G introduced the "IoT Era" by connecting things. We are now approaching the 6G horizon, defined as the "Agent Era" or "Connected Intelligence." In this paradigm, the network acts as a global brain, facilitating machine-to-machine interaction between billions of intelligent agents.

Problem Definition

Current network infrastructures face significant limitations in handling the exponential growth of data and the latency requirements of advanced AI applications. Traditional communication models transmit raw bits (video streams, large datasets) consuming immense bandwidth. Furthermore, network management relies heavily on rule-based systems rather than autonomous orchestration, leading to inefficiencies in energy consumption and resource allocation.

Objectives

5. Design a 6G architecture where AI is "Edge-Native," moving intelligence from central clouds to base stations.
6. Implement a "Post-Shannon" communication model that reduces bandwidth usage by transmitting semantic "intents" or tokens instead of raw bits.
7. Establish a closed-loop system where the network facilitates AI training (Network for AI) and AI, in turn, optimizes the network (AI for Network).

2. Literature Survey

Title/Author	Methodology	Advantages	Disadvantages
AI: The Bridge to 6G (Wen et al.)	Proposes high-level vision of AI enabling 6G	Establishes fundamental need for Native AI	Lacks specific architectural details

Title/Author	Methodology	Advantages	Disadvantages
AIaaS for ORAN-based 6G (Mhatre et al., 2024)	Focuses on O-RAN interfaces for AI delivery	Modular architecture enables interoperability	High complexity in orchestration
GenAI as a Service (Zhou et al., 2024)	Utilizes Generative AI distributed across edge-cloud	Reduces latency and improves privacy	Heavy computational load on edges
End-to-End Edge AI (Tang et al., 2025)	Framework for automatic AI provisioning via slicing	Zero-touch automation	Requires massive datasets for training

Table: Comparative Analysis of 6G-AI Integration Approaches

3. Proposed Work

Methodology

Our proposed approach rests on the "Three Pillars of AI-6G Integration":

8. **The Administrator (AI for Network):** Using AI to autonomously optimize performance, energy, and security.
9. **The Computer (Network for AI):** The network infrastructure facilitates training and inference for external AI models using Edge-Cloud collaboration.
10. **The Product (AI as a Service):** Delivering high-quality AI capabilities directly to users on demand.

System Architecture

The architecture follows a hierarchical O-RAN (Open Radio Access Network) model with Service Management & Orchestration (SMO), Near-RT RIC for real-time decision-making, and O-RAN Radio Units equipped with ISAC Sensors.

4. Requirement Analysis

Software Requirements

- **Operating System:** Linux (Ubuntu/CentOS) for server-side orchestration.
- **Languages:** Python (for AI model development), C++ (for high-performance network functions).
- **Libraries/Frameworks:** TensorFlow or PyTorch for Foundation Models.
- **Databases:** Vector Databases and Time-series databases (Prometheus).

Hardware Requirements

- **Central Cloud:** High-performance GPU clusters (NVIDIA A100/H100) for training Foundation Models.
- **Edge/Base Station:** Edge computing nodes for hosting small models (Mistral-7B).
- **Sensors:** Software Defined Radios (SDR) for simulating ISAC and mm Wave transmission.

Conclusion

This paper presented the architecture for 6G as a "Neural System of Digital Society." By integrating AI natively into the O-RAN architecture, we achieved a closed-loop system where the network learns from the world and the world is optimized by the network. The shift to Semantic Communication offers a viable solution to the bandwidth crunch, while Edge-Cloud collaboration ensures low latency.

Acknowledgment

We express our sincere gratitude to our Project Guide for their mentorship. We also thank our Head of Department, **Dr. Sharvari Govilkar**, and our Principal, **Dr. Sandeep M. Joshi**, for

providing the necessary infrastructure and support.

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A Journey through Time: The History of Indian Railways

Author: Mr. Kumar
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Established in 1853, Indian Railways has been a monumental force in shaping the nation. Its history is a fascinating tale of colonial ambition, technological progress, and a post-independence journey toward national integration.

Figure: Historic Indian Railways emblem

Colonial Foundations (1832–1947)

The idea of railways in India was first proposed in Madras in 1832. The initial purpose was not passenger convenience but economic exploitation.

Early Industrial Lines: The very first rail lines were experimental and used for transporting materials, not people. An early example is the Red Hill Railway, which transported granite in Madras from 1837.

First Passenger Train: The official birth of Indian Railways is marked on April 16, 1853, when the first passenger train ran for 34 kilometers between Bori Bunder (Mumbai) and Thane. Pulled by three steam locomotives—Sahib, Sindh, and Sultan—it carried 400 people and marked the dawn of a new era in Indian transportation.

Expansion for British Interests: Following the Revolt of 1857, the British accelerated railway expansion. The primary motives were military control and the economic benefit of British businesses. By 1900, the network had grown to 25,000 kilometers.

Post-Independence (1947–Present)

After independence, the railway network was fragmented, with nearly 40% of its tracks now in Pakistan.

Nationalization: In 1951, the government nationalized all disparate railway companies into a single entity, Indian Railways, to streamline operations and serve national interests.

Electrification and Modernization: The mid-20th century saw the introduction of diesel and electric locomotives. The first electric train had already run in Mumbai in 1925, but electrification expanded significantly after the 1960s.

Technological Milestones: Innovations included the introduction of the first superfast train, the Rajdhani Express, in 1969; computerized reservation systems in 1986; and online ticketing in 2002.

The Lifeline of the Nation

More than just a mode of transport, Indian Railways is the country's economic lifeline and a major force for social integration, weaving together the diverse fabric of the nation.

Economic Engine

- **Freight Transport:** Carrying vast amounts of bulk goods like mineral ores, coal, and agricultural produce, the railway's freight services are fundamental to India's industrial and agricultural sectors.
- **Economic Integration:** By connecting ports, industrial hubs, and agricultural

regions, the railways foster trade and commerce.

- **Employment Generator:** As one of the largest employers in the world, Indian Railways provides millions of jobs, both directly and indirectly.

Social Integrator

- **Connectivity:** It connects major cities and remote areas, providing an affordable and accessible means of travel for millions daily.
- **Tourism and Culture:** The railways enable domestic tourism and cultural exchange, with special trains and UNESCO World Heritage sites.
- **Disaster Relief:** During natural calamities, the railways play a critical role in transporting relief and rescue teams.

The Modern Age: Advancements and Innovations

The 21st century has ushered in an era of rapid modernization for Indian Railways with new trains, upgraded infrastructure, and a focus on sustainable and digital technology.

High-Speed Revolution

- **Vande Bharat Express:** Manufactured under the "Make in India" initiative, the Vande Bharat Express represents a leap forward in passenger rail technology. It is a semi-high-speed, self-propelled train set with modern amenities like Wi-Fi and bio-toilets, operating on key intercity routes.
- **High-Speed Rail:** The Mumbai-Ahmedabad High-Speed Rail (MAHSR), or "bullet train" project, is a flagship initiative set to redefine passenger travel with speeds of up to 320 km/h.

Technological Upgrades

- **Electrification:** To reduce carbon emissions and reliance on fossil fuels, Indian Railways has committed to 100% electrification of its broad-gauge network.
- **Dedicated Freight Corridors (DFCs):** The Eastern and Western DFCs are crucial projects to separate freight and passenger traffic, boosting economic efficiency.
- **Digitalization:** Modernization efforts include online ticketing through the IRCTC portal, digital surveillance systems at stations, and the "Kavach" automated train protection system.
- **Amrit Bharat Station Scheme:** A major government initiative is redeveloping and upgrading over 1,300 railway stations with world-class facilities.

Challenges and Opportunities

Key Challenges

- Aging Infrastructure: Much of the network is old and requires continuous upgrade and maintenance.
- Safety Concerns: While accident rates have dropped, incidents still occur due to human error or equipment failure.
- Network Congestion: Many high-density routes operate at over 150% capacity, leading to delays.
- Financial Constraints: Balancing affordable travel with rising operational costs creates financial pressure.
- Declining Freight Share: Indian Railways' share of freight transport has fallen due to competition from roadways.
- Human Resource Issues: The system faces vacancies and a growing skill gap.

Opportunities and Way Forward

- PPP and Private Investment: Leveraging Public-Private Partnerships can bring in capital, expertise, and technology.
- Revenue Diversification: Reducing reliance on key commodities for freight revenue.
- Technological Adoption: Accelerating deployment of advanced traffic management systems like Kavach.

- Sustainable Practices: Full electrification and renewable energy usage align with net-zero carbon goals.

Interesting Facts about Indian Railways

- World's Oldest Working Locomotive: The "Fairy Queen," built in 1855, holds the Guinness World Record for the oldest working steam locomotive.
- Longest and Shortest Station Names: Venkatanarasimharajuvaripeta near Chennai has the longest name, while Ib in Odisha has the shortest.
- The Diamond Crossing: Nagpur is home to India's unique "diamond crossing," where trains pass from all four directions.
- Station in Two States: Navapur railway station is divided between Maharashtra and Gujarat.
- UNESCO World Heritage Sites: The Chhatrapati Shivaji Maharaj Terminus in Mumbai has been declared a UNESCO World Heritage site.
- First Toilets: Toilets were introduced on Indian trains in 1909, 56 years after the first passenger train.

Looking Ahead: The Future of Indian Railways

The future of Indian Railways is poised for significant transformation, blending cutting-edge technology with ambitious sustainability goals.

Strategic Priorities

- Infrastructure modernization and upgrading existing tracks, stations, and signalling systems.
- Expansion of Dedicated Freight Corridors for boosting freight capacity.
- Investment in high-speed and semi-high-speed corridors.
- Further digitalization of operations and passenger experience enhancement.
- Commitment to 100% electrification and net-zero carbon emissions by 2030.

Bioelectricity

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Early Observations (Ancient Times – 17th Century)

The earliest known interaction with bioelectricity involved electric fish. In **Ancient Egypt**, the shocks from electric catfish were used for medicinal purposes, particularly for pain management. In the **18th Century**, scientists, including John Walsh and Hugh Williamson, investigated the powerful electrical abilities of the torpedo ray and the electric eel.

Figure : Electrical demonstrating bioelectricity

Discovery of Animal Electricity (18th Century)

The field of electrophysiology began in the late 18th century with the work of Italian scientists:

Luigi Galvani (Late 1700s)

The pioneer of bioelectricity, he discovered what he termed "animal electricity" (or galvanism). Galvani observed that the leg muscles of a dissected frog would twitch when touched by a metal scalpel during a lightning storm, and later, when the sciatic nerve was connected to an iron railing via a brass hook. He concluded that an intrinsic electrical fluid was present in the nerves and muscles.

Alessandro Volta

Galvani's contemporary, Volta, argued that the muscle twitching was not due to an "animal fluid" but rather to the contact between dissimilar metals creating an external electric current. While Volta was correct about the external source of electricity, Galvani's subsequent demonstration of muscle twitching without any external metals definitively proved the existence of intrinsic bioelectricity. Volta's work, however, led to his invention of the voltaic pile, the first true battery.

Figure: Historical representation of Galvani's experiments

Modern Era and Future Directions

Modern research has expanded bioelectricity beyond nerves and muscles to include developmental and regenerative biology.

Lionel Jaffe & Richard Nuccittelli (1970s): Introduced the vibrating probe, enabling the non-

invasive, quantitative measurement of tiny extracellular ion currents, which revitalized the study of developmental bioelectricity.

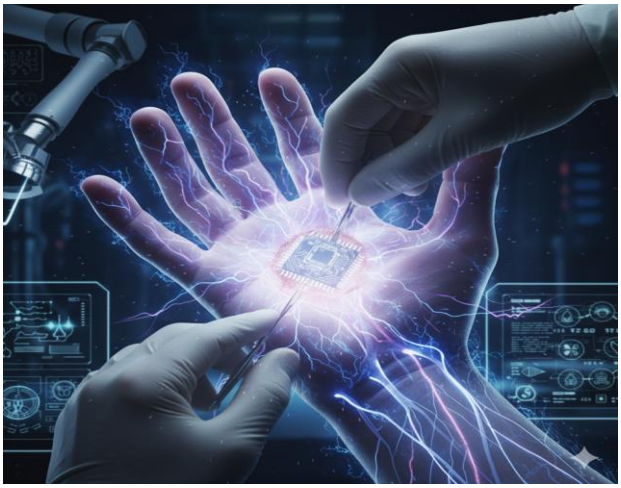

Figure: Modern bioelectricity research tools

Bioelectric Signalling

Current research, pioneered by scientists like Michael Levin, reveals that bioelectricity, specifically the resting potential across cell membranes, acts as a signalling cue that instructs cells on growth, patterning, and regeneration, in a process often called the "bioelectric code."

Current and Future Applications

- **Regenerative Medicine:** Reprogramming bioelectric signals to induce limb or organ regeneration, suppress tumors, or correct birth defects.
- **Bioelectronics/Electroceuticals:** Using implantable or external devices to modulate bioelectric signals to treat diseases such as Parkinson's, epilepsy, chronic pain, and non-healing wounds.
- **Biofuel:** Developing microbial fuel cells that harness the bioelectricity of bacteria to generate power from organic waste.

How Does It Work on Animals?

Bioelectricity in animals works through the movement of ions across cell membranes, creating electrical signals that are essential for everything from basic cellular functions to complex nervous system communication.

Core Principles of Bioelectricity

Resting Potential: All living cells maintain an electrical voltage difference across their membranes, known as the resting membrane potential. This is achieved by ion pumps, notably the sodium-potassium pump, which actively transport ions against their concentration gradients. The pump moves three Na+ ions out of the cell for every two K+ ions it brings in, resulting in a net negative charge inside the cell.

Ion Channels: To enable communication, cells use ion channels, which are pores in the cell membrane that can open or close to allow selective ion flow.

- Voltage-gated channels open and close in response to changes in the membrane's electrical potential.
- Ligand-gated channels open when a specific chemical, like a neurotransmitter, binds to them.

Action Potentials: In excitable cells like neurons and muscle cells, a stimulus can cause a rapid, large-scale change in the membrane potential known as an action potential. When the membrane potential reaches a certain threshold, voltage-gated sodium channels open, causing a flood of Na+ into the cell and a sharp depolarization. This is followed by the closing of sodium channels and the opening of voltage-gated potassium channels, allowing K+ ions to flow out and repolarize the cell back to its resting state.

Gap Junctions: For direct cell-to-cell communication, gap junctions form channels that allow ions and small molecules to pass between adjacent cells, enabling electrical signals to spread across tissues.

Roles of Bioelectricity in Animal Physiology

Beyond nerve and muscle function, bioelectricity is a fundamental signalling cue involved in many biological processes.

Development and Patterning

In embryonic development, spatial patterns of voltage gradients across tissues serve as a blueprint for organ formation and body shape. Altering these bioelectric patterns in developing embryos can lead to predictable changes in anatomical outcomes.

Wound Healing and Regeneration

A wound triggers a localized "injury current" as ions leak from the damaged area. This electric field acts as a directional signal, guiding epithelial cells and other reparative cells to the wound site.

Collective Cell Behaviour

Bioelectric signals help coordinate the collective movement of cell sheets, a process critical for tissue formation and wound repair.

Electro genic Organs

Some animals have specialized electric organs composed of modified muscle cells called electro plaques:

- In the electric eel and electric ray, a large number of electro plaques are arranged in series to generate powerful electric shocks for hunting prey or self-defence.
- Other fish use weaker electric fields as a sensory tool to detect nearby animals or objects in murky water.

Chenab Bridge — World's Highest Rail Bridge

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Figure: Chenab Bridge — world's highest railway arch bridge

"Kashmir to Kanyakumari" is a figurative expression to denote the geographical expanse of India, from its northernmost point to its southern tip, and for the first time in history these are connected by rail. With the inauguration of the 272-kilometre Udhampur-Srinagar-Baramulla Rail Link (USBRL) project which has been 28 years in the making, the Kashmir Valley has been connected to the national rail network.

The tough, unsurmountable topography of the Himalayas challenged the engineering capabilities of the Indian Railways, but it has come out with flying colors. The engineering marvel, the Chenab Rail Bridge that stands 35 meters higher than the Eiffel Tower, is the world's highest railway arch bridge at 359 meters above the riverbed. Spanning 1,315 m, it will endure wind speeds of up to 260 km per hour and has been built to last 120 years.

Nearby, the Anji Khad Bridge rises boldly across the rugged terrain as India's first cable-stayed railway bridge. Towering 331 m above the riverbed and stretching 725 m across, it is anchored by 96 high-tensile cables; 8,200 metric tonnes of structural steel went into its construction.

Built at a cost of ₹43,780 core, the USBRL link witnessed drilling of mountains to set up 36 tunnels that span 119 kilometres and 943 bridges through ridges and mountain passes.

Kashmir's decades of geographical isolation have finally come to an end. The Vande Bharat Express between Srinagar in the Kashmir region and Katra in the Jammu region cuts the surface journey to three hours between the two points. Later this year, a scheduled direct train service between the national capital New Delhi and Srinagar will allow commuters to reach in just 13 hours compared to over 24 hours in the past.

The Vande Bharat Express, a long-distance high-speed service, is bound to end the psychological barriers, multiply the development dividend and act as a game-changer for the economy of Jammu and Kashmir (J&K). The train service has brought renewed hope to the region not long after the Pahalgam terror attack in April 2025 pushed India and Pakistan to a short conflict.

India's 'Operation Sindoor', against terror infrastructure across the border, saw Pakistan ending the ceasefire agreement and targeting civilians, leaving 18 dead and over 1,500 houses damaged. While inaugurating the train service in Katra, Mr. Modi rightly described the rail link as "a symbol of a new, empowered J&K". The bridge will go a long way to bring the people of Kashmir closer to the rest of India.

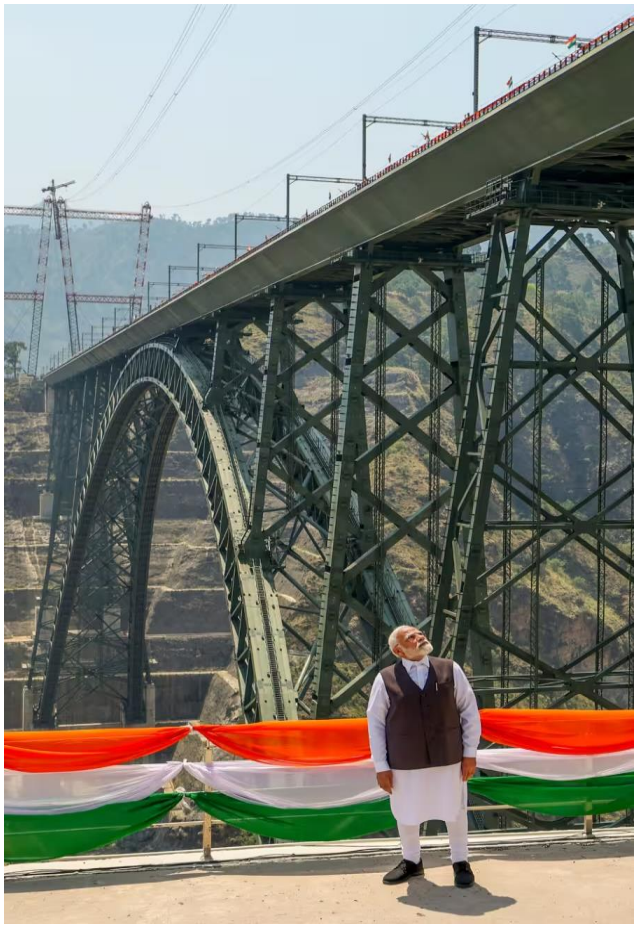

Figure: Architectural design of Chenab Rail Bridge

Conclusion

Indian Prime Minister Narendra Modi has inaugurated the world's highest single-arch railway bridge in Indian-administered Kashmir. The bridge will connect the valley region of Kashmir with the rest of the country by train for the very first time. The showpiece infrastructure project, which is built over the Chenab river, is 35 m (114 ft) taller than the Eiffel Tower and took the Indian Railways more than 20 years to build. It is part of a 272 km (169 miles) all-weather railway line that will pass through Jammu, ultimately going all the way to the Kashmir valley.

Cognitive AI

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A cognitive architecture for AI is a computational model that serves as a blueprint for creating AI systems that mimic the structure and function of the human mind. Instead of just modelling a single behaviour, it aims to create a framework that can learn, reason, and adapt across a wide range of tasks, much like a person can. Some of the most well-known examples include ACT-R (Adaptive Control of Thought—Rational) and SOAR. These architectures are based on the idea of a "unified theory of cognition," which proposes that there are fixed structures in the mind that, when combined with knowledge and skills, produce intelligent behavior.

Figure: Cognitive AI architecture framework

How Cognitive Architectures Can Help with Human Mental Health Issues

Cognitive architectures can be used to model and understand human mental processes, which can in turn help address mental health issues in a few key ways:

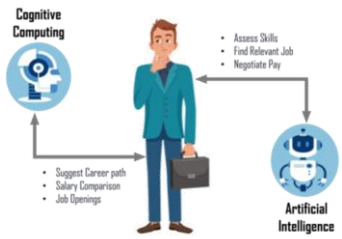


Figure: Cognitive processes and AI interaction model

Understanding and Diagnosis

By creating computational models of a person's cognitive and emotional states, researchers can gain deeper insights into the mechanisms underlying mental disorders. This new field, known as **computational psychiatry**, uses AI to analyse a vast array of data—from speech and physiological signals to behavioural patterns—to identify early warning signs of mental health deterioration.

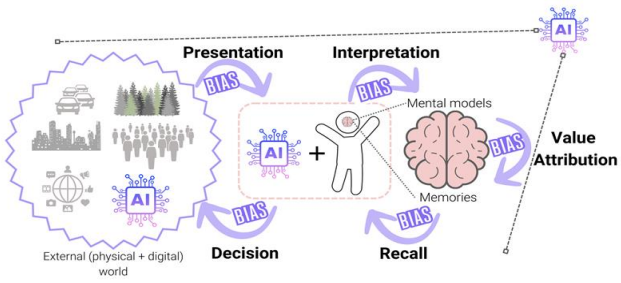


Figure: Computational psychiatry application in mental health monitoring

Personalized Treatment

A key application is the **Cognitive Twin**, an AI-driven digital replica of a person's cognitive and emotional profile. This "twin" can be used to simulate different therapeutic strategies and predict their outcomes for a specific individual before they are implemented in a clinical setting. This allows for highly personalized and data-informed treatment plans.

Complementary Care

AI systems with cognitive architectures can serve as a valuable tool for clinicians. They can handle routine tasks, analyse complex data sets, and provide a new layer of insight that can augment a clinician's judgment. This frees up human therapists to focus on the essential

human elements of care, such as empathy and rapport.

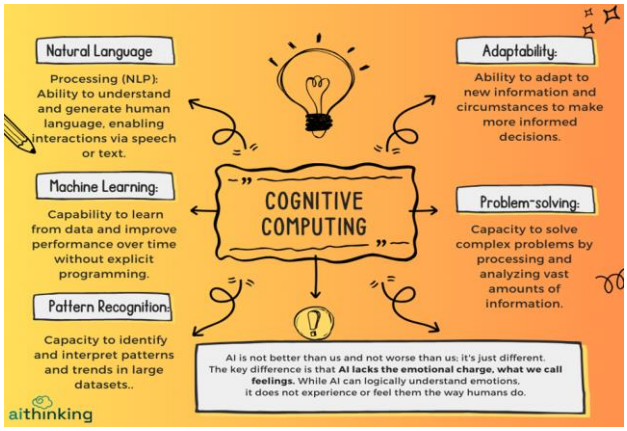


Figure: AI-assisted clinical decision support system

Benefits for Humans

Increased Accessibility

AI-powered mental health tools can provide support to a much wider audience, including those in underserved areas or those who can't access traditional therapy due to cost or wait times.

Reduced Stigma

Some people may feel more comfortable opening up to an anonymous AI system than a human therapist, which can help them seek help without fear of social stigma.

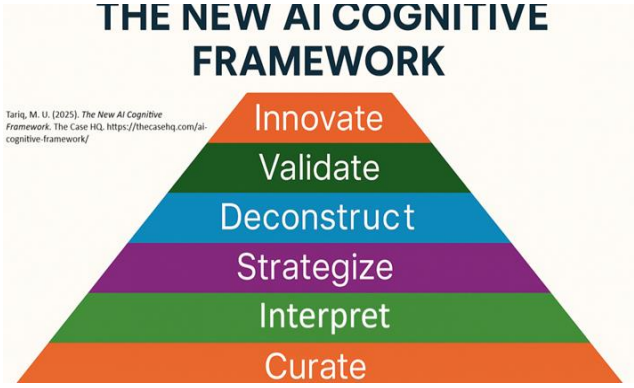


Figure: Digital mental health support ecosystem

Enhanced Self-Management

These technologies can empower individuals to proactively monitor and manage their own well-being by providing real-time feedback and personalized interventions.

Improved Treatment Outcomes

By offering more precise and timely interventions, and by helping clinicians make more informed decisions, cognitive architectures could lead to better outcomes for people with mental health conditions.

Ethical Concerns

Bias and Fairness

If the data used to train these models is not diverse and representative, the AI can amplify existing societal biases, leading to inaccurate diagnoses or ineffective treatment for certain groups.

Privacy and Data Security

Mental health data is incredibly sensitive. The collection and analysis of a person's thoughts, emotions, and behaviours raise major privacy concerns. There's a risk of data breaches, misuse of information, and a lack of transparency about how the data is being handled.

Lack of Empathy and Nuance

An AI cannot truly replicate human empathy, compassion, or lived experience. Overreliance on AI could diminish the crucial therapeutic relationship between a patient and a clinician, which is a cornerstone of effective therapy.

Accountability and Misdiagnosis

It's not always clear who is accountable when an AI system makes an error. An inaccurate diagnosis or a flawed treatment recommendation could have severe consequences for a patient.

Google

Author: K. Munikumar
PIN: 25155-C-007

History

Google began in January 1996 as a research project by Larry Page and Sergey Brin while they were both PhD students at Stanford University in California, USA. The project initially involved an unofficial "third founder", Scott Hassan, the original lead programmer who wrote much of the code for the original Google Search engine, but he left before Google was officially founded as a company.

While conventional search engines ranked results by counting how many times the search terms appeared on the page, they theorized about a better system that analysed the relationships among websites. They called this algorithm PageRank; it determined a website's relevance by the number of pages, and the importance of those pages that linked back to the original site.

Figure: Larry Page and Sergey Brin — Google founders

Page and Brin originally nicknamed the new search engine "BackRub" because the system checked backlinks to estimate the importance of a site. Hassan, as well as Alan Steremberg were cited by Page and Brin as being critical to the development of Google. Rajeev Motwani and Terry Winograd later co-authored with Page and Brin the first paper about the project, describing PageRank and the initial prototype of the Google search engine, published in 1998.

Eventually, they changed the name to Google; the name of the search engine was a misspelling of the word googol, a very large number written 10^{100} (1 followed by 100 zeros), picked to signify that the search engine was intended to provide large quantities of information.

Google was initially funded by an August 1998 investment of $100,000 from Andy Bechtolsheim, co-founder of Sun Microsystems. David Cheriton later also joined in with a $250,000 investment.

Figure: Google headquarters — Mountain View campus

Products and Services

Google indexes billions of web pages to allow users to search for the information they desire through the use of keywords and operators. According to comScore market research from November 2009, Google Search is the dominant search engine in the United States market, with a market share of 65.6%.

Google launched its Google News service in 2002, an automated service which summarizes news articles from various websites. Google also hosts Google Books, a service which searches the text found in books in its database and shows limited previews or the full book where allowed.

Google expanded its search services to include shopping (launched originally as Froogle in 2002), finance (launched 2006), and flights (launched 2011).

Corporate Affairs and Business Trends

From the financial year of 2015, figures are published for Alphabet Inc. Until 2014, the key trends of Google were as follows:

FY	Revenue (USD)	Net Income (USD)	Employees
1999	0.22M	-6.0M	—
2000	19.1M	-14.6M	—
2001	86.4M	6.9M	284
2002	439M	99.6M	682
2003	1.4B	0.10B	1,628
2004	3.1B	0.39B	3,021
2005	6.1B	1.4B	5,680
2006	10.6B	3.0B	10,674
2007	16.5B	4.2B	16,805
2008	21.8B	4.2B	20,222
2009	23.6B	6.5B	19,835
2010	29.3B	8.5B	24,400
2011	37.9B	9.7B	32,467
2012	46.0B	10.7B	53,861
2013	55.5B	12.7B	47,756
2014	66.0B	14.1B	53,600

Table: Google financial trends (1999–2014)

Google's initial public offering (IPO) took place on August 19, 2004. At IPO, the company offered 19,605,052 shares at a price of $85 per share. The sale of $1.67 billion gave Google a market capitalization of more than $23 billion.

Figure 16: Google stock price growth trajectory

Political Controversies

United States

In a 2022 National Labour Relations Board ruling, court documents suggested that Google sponsored a secretive project—Project Vivian—to counsel its employees and to discourage them from forming unions.

Brazil

On May 1, 2023, Google placed an ad against anti-disinformation Brazilian Congressional Bill No. 2630, which was about to be approved, on its search homepage in Brazil, calling on its users to ask congressional representatives to oppose the legislation. The company then promptly removed the ad after government pressure.

Review of ML Model to Predict Spider-Man Box Office Collections

Author: Anand Krishna
PIN: 25115-CM-043

Introduction

The modern film industry is no longer guided solely by creative intuition and star power—data now plays a central role in shaping marketing strategies, production decisions, and revenue forecasts. Yet, predicting box office success remains notoriously difficult, as audience behavior is influenced by a complex mix of cultural trends, marketing reach, and online buzz.

To address this challenge, a machine learning-based prediction system was developed that uses historical box office data and YouTube teaser engagement metrics to forecast movie performance across multiple global markets. The system focuses on the Spider-Man franchise, evaluating four machine learning algorithms: Linear Regression, Random Forest, Support Vector Regression (SVR), and Gradient Boosting.

Why This Model Was Developed

The motivation behind this project is twofold. First, studios and marketers need quantifiable insight into how online hype translates into real-world revenue, especially in an era where digital marketing budgets rival production costs. Second, while industry forecasts often rely on broad historical trends, they rarely integrate granular variables like teaser engagement per country.

Methodology

1. Data Sources

- **Historical Box Office Collections:** Revenue data (in USD) for 10 Spider-Man films released between 2002 and 2023, collected for six major film markets—USA, India, Australia, Russia, Japan, and China.
- **YouTube Teaser Engagement:** Estimated teaser view counts (in millions) from the first 30 days after release, representing online hype and audience interest before a film's premiere.

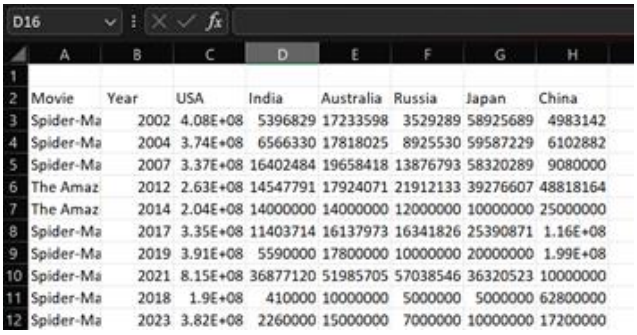
2. Data Preparation

- Box office figures were converted into millions of USD for easier interpretation.
- Release years and teaser views were aligned for each title.
- A binning function categorized box office revenue into three classes—Low, Medium, and High—based on country-specific tercile thresholds.

3. Features and Targets

The model takes two features:

- Release Year: To capture franchise growth, inflation, and market trends.



	A	B	C	D	E	F	G	H
1								
2	Movie	Year	USA	India	Australia	Russia	Japan	China
3	Spider-Ma	2002	4.08E+08	5396829	17233598	3529289	58925689	4983142
4	Spider-Ma	2004	3.74E+08	6566330	17818025	8925530	59587229	6102882
5	Spider-Ma	2007	3.37E+08	16402484	19658418	13876793	58320289	9080000
6	The Amaz	2012	2.63E+08	14547791	17924071	21912133	39276607	48818164
7	The Amaz	2014	2.04E+08	14000000	14000000	12000000	10000000	25000000
8	Spider-Ma	2017	3.35E+08	11403714	16137973	16341826	25390871	1.16E+08
9	Spider-Ma	2019	3.91E+08	5590000	17800000	10000000	20000000	1.99E+08
10	Spider-Ma	2021	8.15E+08	36877120	51985705	57038546	36320523	10000000
11	Spider-Ma	2018	1.9E+08	410000	10000000	5000000	5000000	62800000
12	Spider-Ma	2023	3.82E+08	2260000	15000000	7000000	10000000	17200000

Figure: Feature importance analysis — Spider-Man franchise data

- YouTube Teaser Views: A proxy for pre-release audience interest.

4. Machine Learning Models

- Linear Regression: Baseline model to test linear relationships.

- Random Forest Regressor: Captures non-linear patterns using decision tree ensembles.

```
# Models to evaluate
models = {
    "Linear Regression": LinearRegression(),
    "Random Forest": RandomForestRegressor(random_state=42),
    "SVM": SVR(kernel='rbf'),
    "Gradient Boosting": GradientBoostingRegressor(random_state=42)
}
```

Figure: Model architecture comparison — Linear vs Ensemble methods

- Support Vector Regression (SVR): Uses kernel methods to model complex relationships in smaller datasets.
- Gradient Boosting Regressor: Builds predictions in sequential stages, refining errors at each step.

5. Evaluation Metrics

- R^2 Score: Measures how well predicted values fit the actual data.

```
# Evaluate each model
results = {model_name: {"predictions": {}, "r2_scores": {}, "precision": {}, "cm": {}} for model_name in models}
for model_name, model in models.items():
    text_summary.append(f"\n#### {model_name}")
    for i, country in enumerate(countries):
        y = [data_millions[movie][i] for movie in movies]

        # Train model
        model.fit(X, y)

        # Predict for training data
        y_pred = model.predict(X)

        # R² score (accuracy)
        r2 = r2_score(y, y_pred)
        results[model_name]["r2_scores"][country] = r2

        # Bin actual and predicted values for classification
        y_binned = bin_gross(y, i)
        y_pred_binned = bin_gross(y_pred, i)
```

Figure: R^2 score distribution across all models and markets

- Precision Score: Calculated after binning predictions into low/medium/high categories.
- Confusion Matrix: Visualizes classification accuracy by showing where models misclassified box office tiers.

```
# Precision
precision = precision_score(y_binned, y_pred_binned, average='weighted', zero_division=0)
results[model_name]["precision"][country] = precision

# Confusion matrix
cm = confusion_matrix(y_binned, y_pred_binned, labels=[0, 1, 2])
results[model_name]["cm"][country] = cm

# Predict for three targets
predictions = []
for views in future_views:
    pred = model.predict(np.array([[future_year, views]]))[0]
    pred_adjusted = max(pred, 0)
    if country == "China" and pred_adjusted == 0:
        pred_adjusted = 150
    predictions.append(round(pred_adjusted, 2))
results[model_name]["predictions"][country] = predictions
```

Figure: Confusion matrix heat map — Model classification performance

Results & Analysis

1. Teaser View Trends (2002–2026)

Early Spider-Man films had modest teaser engagement (~5–10M views), but recent titles have surpassed 40–50M. The projection for 2026 indicates strong audience anticipation.

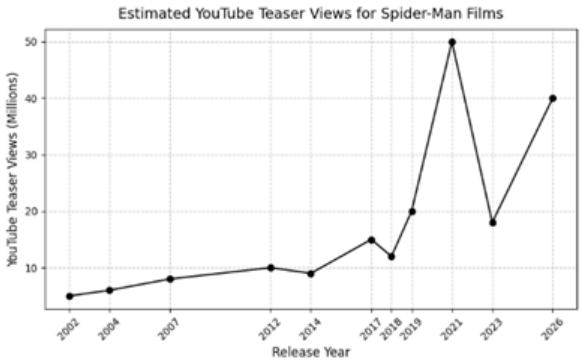


Figure: YouTube teaser views trend analysis over time

2. Global Box Office Distribution by Country

USA leads in revenue, with China showing sharp spikes for certain releases. Japan remains steady, while India, Russia, and Australia contribute smaller but consistent shares.

Figure: Box office collections for Spider-Man films by country

3. Model Accuracy — Selected Scatter Plots

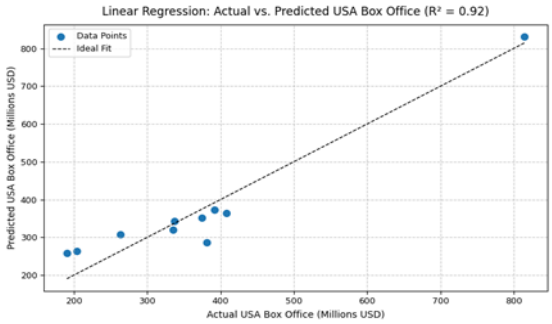


Figure: Linear Regression performance — USA market

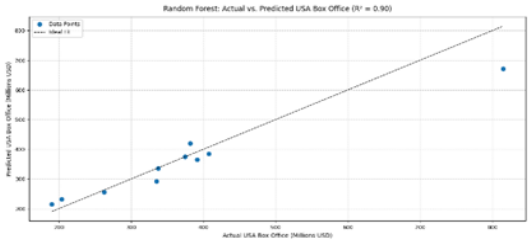


Figure: Random Forest performance — USA market

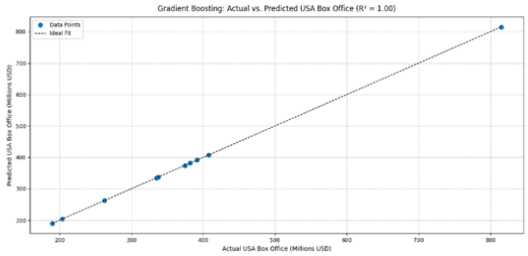


Figure: Gradient Boosting performance — USA market

4. Classification Reliability — Selected Confusion Matrices

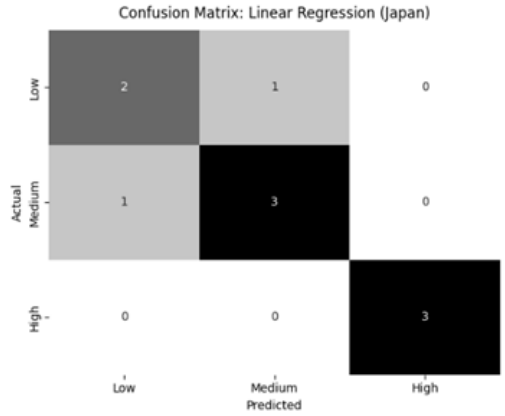


Figure: Linear Regression confusion matrix — Japan

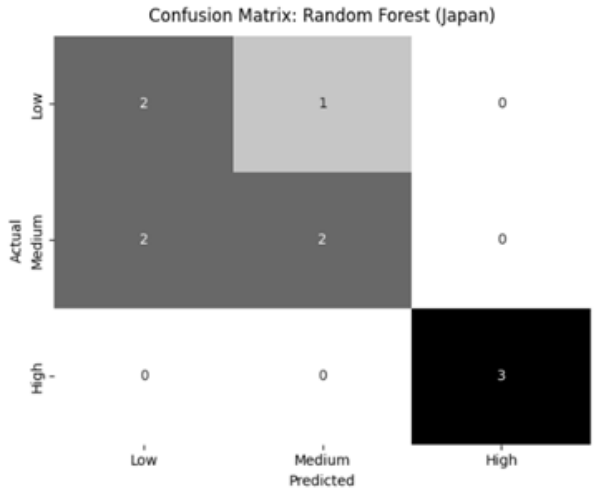


Figure: Random Forest confusion matrix — Japan

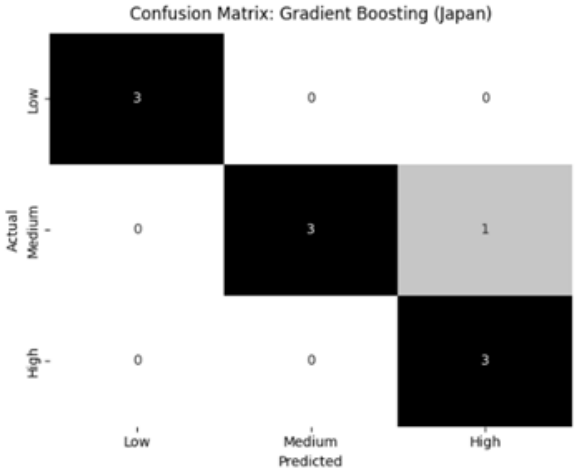


Figure: Gradient boosting confusion matrix — Japan

5. Precision Score Comparison

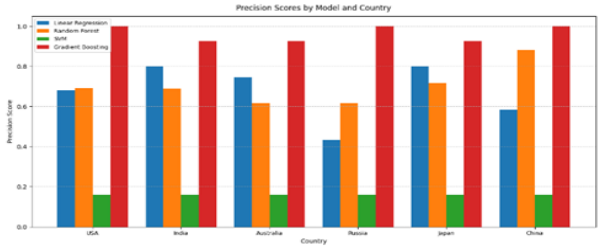


Figure: Precision scores across all models and countries

Random Forest ranked highest in most markets, with Gradient Boosting close behind.

6. Forecasting Spider-Man: Brand New Day (2026)

Medium-hype projections show USA returns of ~$350M–$420M, with China exhibiting high variability. Smaller markets display stable predictions.

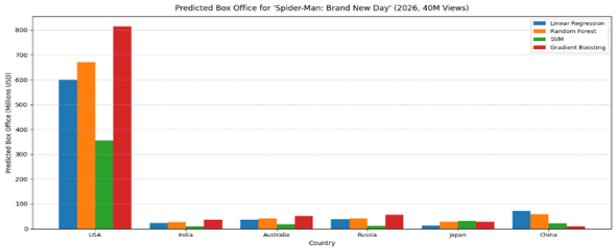


Figure: Predicted box office revenue for 2026 release (medium hype scenario)

Conclusion

The analysis underscores the importance of utilizing a large dataset to enhance the accuracy and reliability of machine learning models in predicting box office performance. However, this review is constrained by the use of only 20 samples, which limits the robustness of the findings. Future efforts should prioritize securing larger, diverse datasets to improve predictive outcomes.

The C Programming Language

Author: P. Muni Likketh
PIN: 25155-CM-041

The C programming language is one of the most powerful, widely used, and influential programming languages in computer science. Developed in the early 1970s by Dennis Ritchie at Bell Laboratories, C was originally created for system programming, particularly for developing the UNIX operating system. Over the decades, C has remained relevant due to its efficiency, flexibility, and close interaction with computer hardware.

Historical Background

The development of C began as an improvement over an earlier programming language called B, which was derived from BCPL (Basic Combined Programming Language). Dennis Ritchie designed C to overcome the limitations of B by introducing data types and better memory handling. In 1978, the language gained popularity after the publication of The C Programming Language by Brian Kernighan and Dennis Ritchie.

To ensure consistency across platforms, C was standardized by the American National Standards Institute (ANSI) in 1989. This version is commonly known as ANSI C or C89. Later revisions, including C99, C11, and C18, added new features while preserving backward compatibility.

Features of C Language

- **Procedural Programming Language:** C follows a procedural approach, meaning programs are structured around functions. This makes programs modular, organized, and easier to debug.

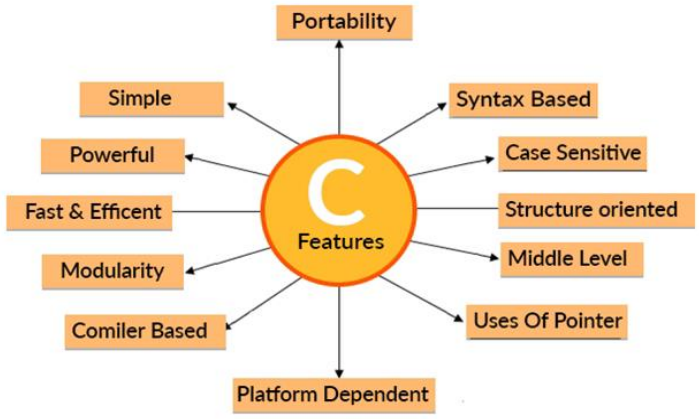


Figure: Key features of C programming language

- **Low-Level Access to Memory:** One of C's most important features is its ability to directly access memory through pointers. This allows programmers to write highly efficient code and interact closely with hardware.
- **High Performance:** C programs execute very fast because they are compiled directly into machine code. This makes C ideal for performance-critical applications.
- **Portability:** C is a portable language. A C program written for one platform can be run on another platform with minimal changes.
- **Rich Standard Library:** C provides a large set of built-in functions for handling input/output operations, string manipulation, mathematical computations, and memory allocation.
- **Modularity and Reusability:** Large programs can be divided into multiple functions and files, promoting code reuse and easier maintenance.

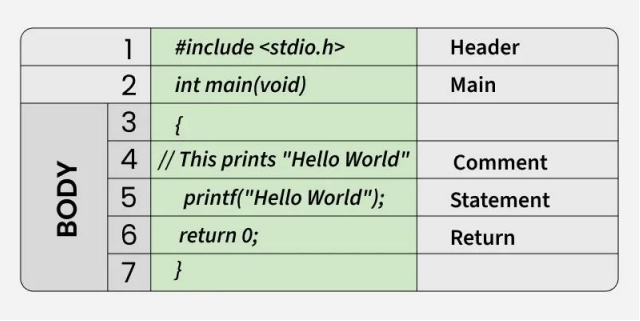


Figure: C program structure and compilation process

Control Statements

C provides various control statements to manage the flow of execution in a program:

- **Conditional Statements:** if, if-else, switch
- **Looping Statements:** for, while, do-while
- **Jump Statements:** break, continue, goto, return

Applications of C Language

- **Operating Systems:** Major parts of UNIX, Linux, and Windows kernels are written in C.
- **Embedded Systems:** C is widely used in microcontrollers, robotics, and IoT devices.
- **Compilers and Interpreters:** Many language compilers are written in C.
- **Game Development:** Used for performance-intensive game engines.
- **Database Systems:** Popular databases like MySQL use C.

Limitations of C Language

- Does not support object-oriented programming directly
- No built-in support for error handling
- Manual memory management can lead to errors if not handled carefully

Conclusion

The C programming language remains highly relevant despite being several decades old. Its speed, efficiency, and control over system resources make it a powerful tool for programmers. Learning C not only helps in developing efficient programs but also builds a strong foundation for understanding advanced programming concepts.

Smart Water Bottle

Author: Puchakayala Thulasi
PIN: 24155-EC-038

Making a DIY smart water bottle involves integrating sensors with a microcontroller (like Arduino or ESP32) to track water levels, typically using an ultrasonic sensor on the lid or a weight sensor. Key components include an Arduino Nano/ESP32, HC-SR04 ultrasonic sensor, buzzer for reminders, LEDs, and a battery. The system triggers alerts when water levels are low or to remind users to drink.

Key Components & Tools

- **Microcontroller:** Arduino Nano, Arduino Nano 33 IoT (for Bluetooth), or ESP32.
- **Sensor:** HC-SR04 Ultrasonic Sensor (for water level detection).
- **Alert System:** Piezo Buzzer and 3mm LEDs.
- **Power:** 3.7V Lithium Polymer Battery + Adafruit Power Boost 1000.
- **Structure:** Water bottle, wires, breadboard, custom 3D printed case or hot glue.

Steps to Make a Smart Water Bottle

- **Set Up the Sensor:** Attach the ultrasonic sensor to the inside of the bottle cap. Drill a small hole to feed the four wires (VCC, GND, Trig, and Echo) out of the cap.
- **Wire the Components:** Connect the ultrasonic sensor, buzzer, and LED to the Arduino/ESP32 on a breadboard.
- **Program the Microcontroller:** Use the Arduino IDE to write code that calculates the distance from the sensor to the water surface. Program the device to trigger the buzzer/LED if the water level remains unchanged or low.
- **Power and Assemble:** Connect the battery and Power Boost to the microcontroller. House the electronics in a waterproof casing attached to the bottle.
- **Alternative Approach (Tube Kit):** For hiking, convert a standard bottle by replacing the cap with a tube kit and adding a bite valve.

Alternative "Smart" Features

- **Weight Sensing:** Instead of ultrasonic sensors, use a load cell to measure water weight, though this is harder to calibrate.
- **NFC/Bluetooth:** Use an ESP32 for Bluetooth to send data to a smartphone.

Figure: Smart water bottle design and circuit implementation

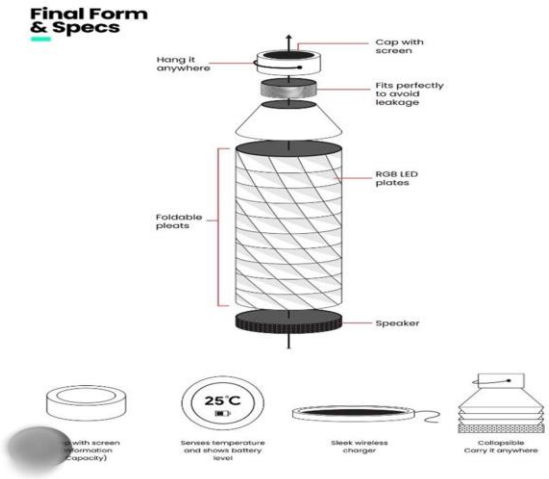


Figure: Smart water bottle prototype with sensor arrangement

Advantages of Smart Water Bottles

- **Improved Hydration Tracking:** These bottles automatically track, record, and sync water intake data with apps to monitor hydration levels, providing personalized insights.
- **Active Reminders:** LED lights and smartphone notifications serve as reminders to drink, which is especially useful for busy individuals or seniors.
- **Health Benefits:** Consistent use can improve energy levels and overall health by preventing dehydration.
- **Additional Functionalities:** Some models include advanced features like UV sterilization, water purity tracking, and temperature regulation to keep drinks cold or hot.
- **Sustainability:** Using a reusable, durable smart bottle reduces the need for single-use plastic bottles.

Disadvantages of Smart Water Bottles

- **High Cost:** Prices typically range from $60 to over $100, which is significantly higher than traditional high-quality bottles.
- **Technical Issues & Maintenance:** Batteries require regular charging, and electronic components make them generally not dishwasher-safe, requiring careful hand-washing.
- **Accuracy Issues:** Sensors can sometimes misread volume, particularly if the bottle is not placed on a flat surface or if it is only partially refilled.
- **Diminishing Novelty:** Some studies show that users may stop using the smart features after a few months, as the motivation wears off.
- **Added Weight:** The built-in technology (sensors, Bluetooth) makes these bottles heavier than traditional options.

Key Applications of Smart Water Bottle

- **Automated Hydration Tracking:** The bottles measure every sip in real-time, sending data to a smartphone app to provide daily, weekly, or monthly consumption reports.
- **Smart Reminders:** Sensors detect if a user has not consumed enough water over a period, triggering visual (LED lights on the bottle) or audible alerts (app notifications).
- **Personalized Health Goals:** Using AI-driven algorithms, the bottles analyse user data—age, weight, and activity level—to determine optimal daily water intake.
- **Fitness and Health Integration:** Smart bottles connect with wearable and fitness apps to adjust hydration requirements based on workouts, calories burned, and environmental conditions.
- **Health Monitoring for Specific Needs:** These devices are used to help the elderly or individuals with specific health conditions maintain adequate hydration levels, with some models even assisting in tracking medication times.
- **Water Quality Assurance:** Certain models feature built-in UV-C technology to clean the water and the inner surface of the bottle.

Key Benefits

- **Improved Health:** Promotes better kidney function, temperature regulation, and joint health by preventing dehydration.
- **Convenience:** Reusable design paired with digital tracking reduces the need to manually track consumption.
- **Gamification:** Many apps include features like challenges, streaks, and social sharing to increase user engagement and motivation

Clean Minds, Clear Goals: The Student Way to a Better Future

Author: N. Nanda Kishore
PIN: 24155-EC-031

Arjun was a bright and cheerful college student. He loved sports, studied well, and had big dreams of becoming an engineer. Everyone in his class liked him for his friendly nature.

But one day, during a college party, some seniors offered him drugs "just for fun." At first, he said no. But after a few days, his friends convinced him to try it once. That one mistake changed his life completely.

Slowly, Arjun began to depend on drugs to feel happy. He started skipping classes, lost interest in studies, and began lying to his parents for money. His health became weak, his marks dropped, and his friendships faded.

One night, he was found unconscious in his room after taking an overdose. His parents rushed him to the hospital, and thankfully, doctors saved his life. But the damage was deep --- he lost a year of college and had to go through long treatment to recover.

"Don't let one wrong decision destroy your whole life. Say no to drugs before it's too late."

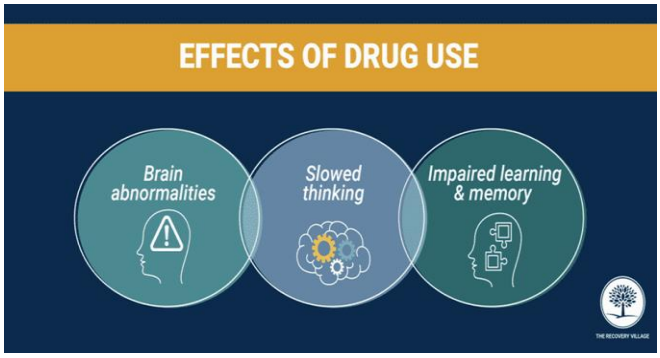


Figure: Anti-drug awareness campaign

Students are the future of our nation. Their energy, ideas, and unity can bring big changes in society. One of the biggest problems today is drug addiction among youth. But students themselves can become the strongest force to fight against it.

Students can start by spreading awareness in their colleges and local communities. They can organize anti-drug campaigns, rallies, and seminars to teach others about the dangers of drug use. Social media can also be used to share real stories and motivational messages to reach more people.

They can form drug-free clubs in their colleges, where students support each other and promote healthy habits like sports, arts, and fitness. Such groups create a positive environment that helps keep students away from bad influences.

Students should also support friends who are struggling with stress or addiction by guiding them to counsellors or rehabilitation centres. Helping even one person recover is a big step toward a better society.

When students stand together with a strong message --- "We choose life, not drugs" --- they inspire others to do the same. Their voice has power. Their unity has strength. Together, they can build a brighter, drug-free future.

Effects of Drugs

1. Effects on the Brain

- Drugs change how the brain works.
- They create false pleasure by releasing high levels of dopamine (a "happy" chemical).
- Over time, the brain gets used to it and cannot feel normal happiness without drugs.

- This causes addiction --- the person always wants more.

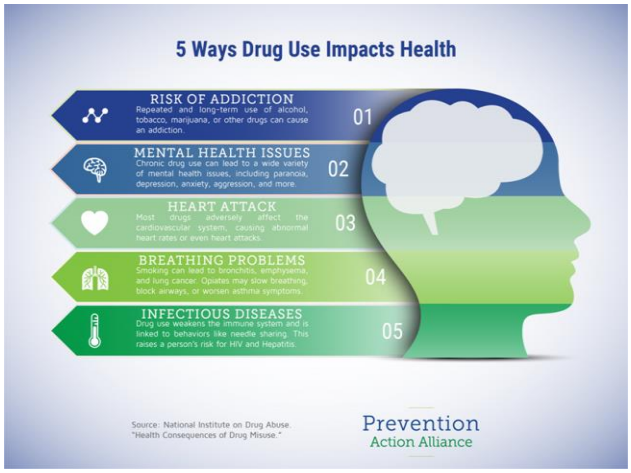


Figure: Students united against drug addiction

2. Effects on the Body

- Heart problems: Irregular heartbeat, high blood pressure, and heart attacks.
- Lungs: Smoking drugs damages lungs and causes breathing issues.
- Liver: Alcohol and some drugs destroy liver cells.
- Kidneys: Toxic substances can lead to kidney failure.
- Weight loss and weakness because appetite decreases.

3. Mental and Emotional Effects

- Mood swings, anger, anxiety, and depression.
- Loss of focus, poor memory, and low confidence.
- Can cause hallucinations --- seeing or hearing things that aren't real.
- Sometimes leads to mental illness if used for a long time.

4. Effects on Family and Society

- Drug users often lose trust and respect from family and friends.
- They may skip studies or work, leading to failure and unemployment.
- Can lead to crime, theft, or violence to get money for drugs.
- Causes sadness and pain in families.

5. Long-Term Dangers

- Permanent brain damage.
- Organ failure (especially heart, lungs, liver).
- Overdose can cause death.
- Hard to recover even after stopping --- takes months or years.

Hidden Environmental Warriors

Author: M. Hashwanth
PIN: 24155-EC-028

Even beggars or daily workers who collect plastic bottles from roads, bins, and surroundings are actually doing a big help for our environment, even if many don't notice it.

- They reduce plastic waste: By collecting bottles, they stop plastic from reaching rivers, drains, and landfills.
- They support recycling: The bottles they sell are cleaned and reused in recycling plants to make new products.
- They help reduce pollution: Less plastic on the ground means less burning and less harmful smoke.
- They work hard for both survival and the planet: Even though they do it for income, their effort also protects nature.

Figure: Environmental waste collectors in action

In fact, they are the silent environmental workers of our society. Many people ignore them, but their small daily actions have a huge positive impact. If more people respected and supported such collectors --- by sorting waste properly, not littering, and encouraging recycling --- our world would be much cleaner.

Turning Waste into Bricks of Hope

An eco-brick is a plastic bottle filled tightly with clean, dry, non-biodegradable waste, such as plastic wrappers, packets, or small packaging materials. When packed firmly, the bottle becomes strong like a brick. These eco-bricks can be used to build walls, furniture, garden spaces, or even classrooms. It's a smart and eco-friendly solution for two big problems --- plastic waste and affordable construction.

Figure: Eco-brick construction demonstration

This idea started with small communities who wanted to keep their surroundings clean. Instead of burning or throwing away plastic, they began collecting bottles and filling them with waste. Slowly, they realized that these bottles could be used to build strong structures. Today, eco-brick projects are being used in schools, parks, and villages in many parts of the world.

The best part about eco-bricks is that anyone can make them. It doesn't need money, machines, or special training. All you need is an empty bottle, some dry plastic waste, and a stick to press the waste tightly inside. It's simple, but it can make a big difference if many people join together.

Eco-bricks teach us an important lesson --- small actions can lead to big changes. Instead of complaining about pollution, we can become part of the solution. One eco-brick might not save the world, but when thousands of people make

them, the effect is powerful. It keeps the environment clean, spreads awareness, and inspires others to act.

So next time you finish a cold drink, don't throw away the bottle. Turn it into an eco-brick. Because every bottle you fill is one less piece of plastic harming our planet. Together, we can build a cleaner, greener, and more responsible world --- one eco-brick at a time.

History of Kalinga War

Author: P. Kesava
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What is Kalinga War

The Kalinga War was a brutal conflict in ancient India, fought around 261 BCE, between the Mauryan Empire under Emperor Ashoka and the independent kingdom of Kalinga, located in present-day Odisha and northern Andhra Pradesh. It is renowned for its scale and the profound impact it had on Ashoka, leading him to renounce warfare and embrace Buddhism.

Figure: Map of Kalinga War region

When It Started

The War of Kalinga was fought in 261 BCE. It was a conflict between the Mauryan Empire, under the rule of Emperor Ashoka, and the state of Kalinga. The war is known for its immense bloodshed and is considered a turning point in Ashoka's life, leading him to adopt Buddhism and renounce warfare.

Why Was the Kalinga War Fought

The Kalinga War, fought around 261 BCE, was primarily motivated by Emperor Ashoka's desire to expand the Mauryan Empire and gain control of the strategic and prosperous region of Kalinga. Kalinga's wealth, its control of vital trade routes to Southeast Asia, and its independent spirit made it a tempting target for Ashoka. Additionally, Ashoka may have also been motivated to avenge his grandfather's earlier failed attempt to conquer Kalinga.

The Kalinga War was fought between the Mauryan Empire under Ashoka and the state of Kalinga. Kalinga, an independent kingdom, was located on the east coast of India, encompassing present-day Odisha and northern Andhra Pradesh. The Mauryan dynasty, under Emperor Ashoka (circa 268-232 BCE), was a period of significant expansion, cultural development, and a notable shift towards non-violence and Buddhism.

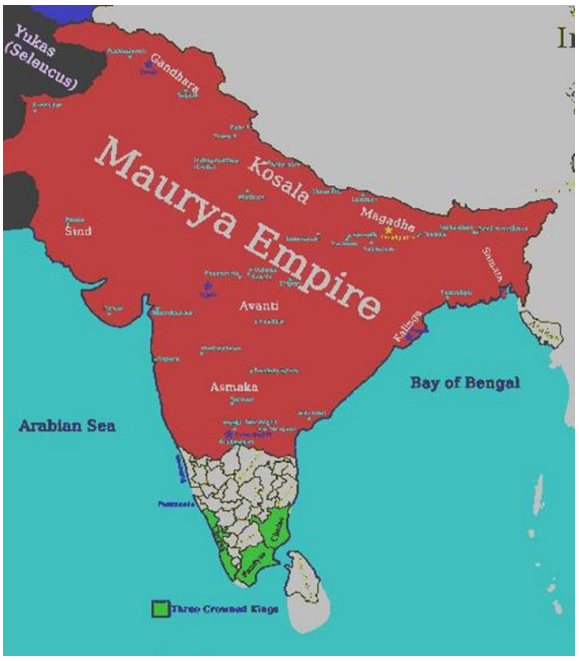


Figure: Historical depiction of the Kalinga War

Who Was the Founder of Mauryan Kingdom

Figure: Chandragupta Maurya -- Founder of the Mauryan Empire

The founder of the Mauryan Empire was Chandragupta Maurya. He established the empire in 322 BCE after overthrowing the Nanda dynasty. Chandragupta was aided by his mentor and advisor, Kautilya (also known as Chanakya), in his rise to power.

King of Maurya Dynasty in the Kalinga War

The Kalinga War was fought between the Mauryan Empire under Emperor Ashoka and the kingdom of Kalinga. Ashoka, the third ruler of the Mauryan dynasty, led the invasion in 261 BCE. The war resulted in a massive loss of life and prompted Ashoka to renounce warfare and embrace Buddhism.

Early Reign and Conquests

Initially, Ashoka was known for his ruthlessness and expansionist policies. He is said to have

Figure: Emperor Ashoka

Conquered Kalinga in a particularly bloody war that deeply affected him. Ashoka was born around 304 BCE, the son of Emperor Bindusara and grandson of Chandragupta Maurya. The experience in Kalinga deeply impacted Ashoka, leading him to renounce violence and embrace Buddhism.

Loss of Wealth and Manpower

The Kalinga War resulted in massive loss of life and wealth. Historical accounts estimate that over 100,000 soldiers were killed in the battle, and an additional 150,000 were taken as prisoners. The war also caused widespread destruction of property and resources, leaving the region devastated.

Loss of Manpower

- Kalinga's Forces: The war led to the deaths of approximately 100,000 Kalinga soldiers.
- Mauryan Forces: A similar number of Mauryan soldiers are believed to have been killed.
- Captives: A further 150,000 Kalinga soldiers were captured by the Mauryan forces.

Loss of Wealth

- Destruction of Property: The war resulted in widespread destruction of property, including homes, businesses, and public infrastructure.
- Disrupted Economy: Kalinga's thriving trade networks were disrupted, leading to economic decline and hardship for the population.

Ashoka's Conversion to Buddhism

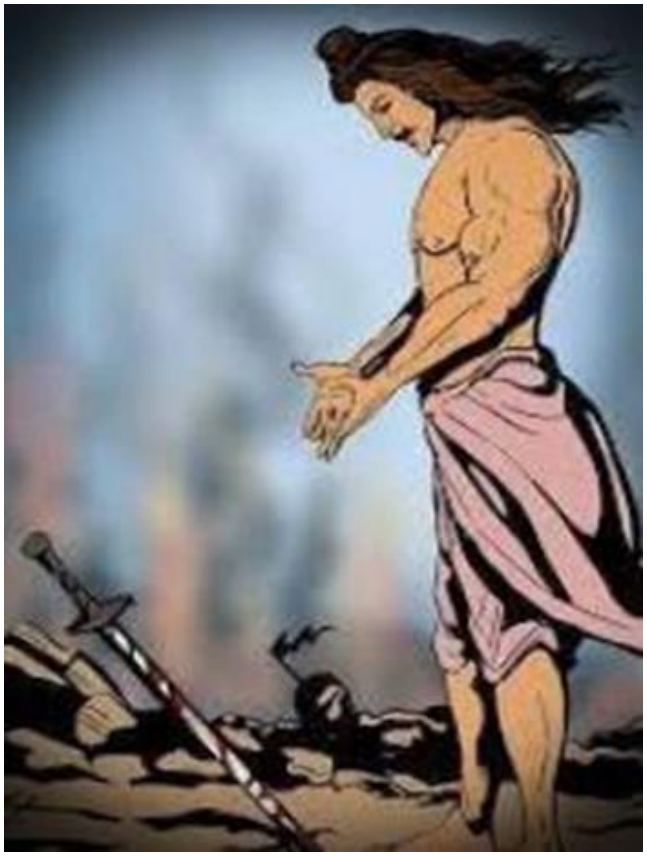


Figure: Ashoka embracing Buddhism after the Kalinga War

Ashoka converted to Buddhism primarily due to the remorse he felt after the brutal Kalinga War, which he witnessed firsthand. The immense suffering and violence inflicted during the war deeply affected him, leading him to renounce armed conquests and seek a path of peace and non-violence. This experience prompted him to embrace Buddhism and its teachings of dharma, compassion, and social responsibility.

Ashoka's conversion was not just a personal spiritual transformation but also a commitment to social reform and ethical governance. He began to promote the concept of dharma, which he interpreted as a set of moral principles focused on compassion, non-violence, honesty, and social responsibility.

Conclusion

The Kalinga War concluded with a Mauryan victory, but more significantly, it led to Emperor Ashoka's profound remorse and conversion to Buddhism, marking a turning point in his reign and ancient Indian history. The war's devastating impact, including immense loss of life and suffering, prompted Ashoka to renounce violence and embrace a policy of Dharma (righteous conduct). This shift resulted in an era of peace and prosperity, with Ashoka dedicating his remaining years to social welfare and the propagation of Buddhist teachings.

Jasprit Bumrah

Author: V. Dileep
PIN: 25155-C-011

Early Life

Bumrah was born on 6 December 1993 into a Sikh Punjabi Ramgarhia family in Ahmedabad, Gujarat. His father, Jasbir Singh, ran a chemical business, while his mother, Daljeet Bumrah, worked as a school teacher. His father died due to hepatitis B when Bumrah was 5 years old. His mother raised him and his sister Juhika in a middle-class environment in Ahmedabad. Bumrah attended Nirman High School in Vastrapur, Ahmedabad, where his mother worked as the vice principal. He also played cricket for Nirman's team.

Figure: Jasprit Bumrah -- Early Career

Youth and Domestic Career

In 2010, Bumrah appeared at the Gujarat Cricket Association's Under-19 district selection trials. The selectors did not include him in the main squad of 15 due to his unconventional bowling action but named him as a reserve. After the district team won the first three matches, all three reserve players were given a chance in the fourth three-day match. Bumrah took seven wickets in that match.

Bumrah made his Twenty20 (T20) debut for Gujarat against Maharashtra in the 2012-13 Syed Mushtaq Ali Trophy, and helped his side clinch the title with his Man of the Match performance in the final, with figures of 3/14 to beat Punjab. On 18 March 2013, during the match against Mumbai, former India coach John Wright was impressed by Bumrah's performance and invited him to sign up for Mumbai Indians (MI).

Bumrah played first-class cricket for Gujarat and made his debut against Vidarbha in October 2013 during the 2013-14 season, where he took seven wickets for 89 runs. Gujarat won the Vijay Hazare Trophy, with Bumrah taking a five-wicket haul in the final against Delhi.

Figure: Bumrah in action during domestic cricket

International Career

Bumrah made his ODI debut in January 2016 against Australia in the last match of the ODI series, where he took his first international wicket --- that of Steve Smith --- and finished with figures of 2/40. In the first match of the T20I series that followed, Bumrah made his debut,

taking his maiden T20I wicket --- that of David Warner --- and finished with figures of 3/23. India won the T20I series and Bumrah was the highest wicket-taker on either side with six wickets.

Bumrah was named in India's 15-man squad for the 2016 ICC World Twenty20. He took a wicket in every single match of the tournament except against Bangladesh. In India's tour of Zimbabwe in 2016, Bumrah took 4 wickets for 28 runs in his second ODI game. He was the highest wicket-taker of the series with 9 wickets.

During the 2017 Sri Lanka tour, Bumrah recorded the most wickets (15) taken by any fast bowler in a bilateral ODI series of five or fewer matches. In February 2018, he became the highest-ranked bowler in the ICC Men's ODI player rankings, along with Afghan leg-spinner Rashid Khan.

Franchise Career

Bumrah has played for the Mumbai Indians since 2013 in the IPL and helped the team win the title five times in 2013, 2015, 2017, 2019, and 2020. He has taken 170 wickets in 138 matches in the IPL, with an average of 22.78 and an economy rate of 7.32, making him the joint highest wicket-taker for the team with Lasith Malinga.

IPL Titles

- Winner 2013
- Winner 2015
- Winner 2017
- Winner 2019
- Winner 2020

Awards

- Polly Umrigar Award for best male cricketer (2018-19, 2021-22, 2023-24)
- Dilip Sardesai Award for highest wickets in Test cricket (2018-19)
- Wisden Cricketers' Almanack -- Wisden Cricketer of the Year (2022 edition)
- Times of India TOISA Cricketer of the Year (2021)

Honors

- 2024 Men's T20 World Cup
- Asia Cup 2016 -- Bangladesh
- Asia Cup 2018 -- United Arab Emirates
- Asia Cup 2023 -- Pakistan
- Asia Cup 2025 -- United Arab Emirates
- ICC Men's Test Cricketer of the Year: 2024
- Sir Garfield Sobers Trophy (ICC Men's Cricketer of the Year): 2024
- ICC Men's Player of the Month: June 2024 & December 2024
- Wisden Leading Cricketer in the World: 2024

Mahesh Babu Foundation

Author: B. Harshith
PIN: 25155-CM-007

Foundation Overview

The Mahesh Babu Foundation, founded by the actor Mahesh Babu in Hyderabad, focuses on helping underprivileged children, especially by funding congenital heart surgeries --- collaborating closely with Andhra Hospitals and Rainbow Hospitals.

Figure: Mahesh Babu Foundation logo

Key Milestones & Impact

Over 2,000 heart surgeries have been funded through partnerships with Andhra and Rainbow Hospitals. On World Health Day, the foundation paid for 30 children to undergo heart surgeries, conducted successfully with the support of medical teams. Most recently, the fund surpassed a remarkable milestone of 4,500 life-saving paediatric heart surgeries sponsored by the foundation.

Figure: Heart surgery milestone celebration

Specialized Programs

In March 2022, Mahesh Babu launched the Pure Little Hearts Foundation (PLHF) at Rainbow Children's Heart Institute to support economically disadvantaged children with congenital heart conditions. The foundation initially committed to supporting surgery for around 125 children. The foundation has even extended its reach internationally --- for instance, it helped a 5-year-old Iraqi boy with Down syndrome receive critical heart surgery through Andhra Hospitals.

Figure: Pure Little Hearts Foundation program

The Mahesh Babu Foundation is a beacon of hope for underprivileged children requiring cardiac care. With over 4,500 paediatric heart surgeries funded, a dedicated Pure Little Hearts Foundation, and a wide-reaching impact in healthcare and education, the initiative truly makes a difference.

Smart Village -- Smart Ward Programme

Mahesh Babu's village adoption initiative is one of the most widely respected aspects of his philanthropic work, blending inspiration from his movie Srimanthudu with real-world community development.

The Origin

In 2015, after the release of Srimanthudu --- a film about a wealthy man adopting and developing a village --- Mahesh Babu announced he would adopt two real villages: Burripalem in Guntur district, Andhra Pradesh (his father Krishna's native place) and Siddhapuram in Mahbubnagar district, Telangana. He declared his commitment under the "Smart Village -- Smart Ward Programme" launched by the Andhra Pradesh and Telangana governments.

Goals of the Adoption

The main idea was holistic rural development, not just charity. Focus areas included:

- Infrastructure: Roads, street lighting, drainage, drinking water systems.
- Education: Building schools, digital classrooms, computer labs, libraries.
- Healthcare: Medical camps, vaccination drives, health awareness programs.
- Sanitation & Hygiene: Toilets for households, waste management systems.
- Economic Development: Skill training for youth, women empowerment programs.

Wife visits adopted village on behalf of Mahesh Babu

DC CORRESPONDENT
HYDERABAD, APRIL 29

Namrata, wife of superstar Mahesh Babu on Friday promised to make Siddhapur, the village in Mahbubnagar district the couple have adopted, into a 'smart village'.

She visited Siddhapur following complaints from locals that the superstar hasn't even bothered to visit it or make arrangements for providing even basic amenities as promised after adopting it last September.

Mahesh Babu never visited the village but only made an announcement, the villagers had complained.

After the huge success of his movie *Srimanthudu* that was based on adoption concept, the actor adopted two villages Siddhapur in TS and and Burripalem in Guntur of AP.

Namrata went round Siddhapur and attended a local medical camp organised for children below 14 years and other programmes.

She said that they were trying to develop the village in all aspects on the lines of Burripalem.

"There will be health camps every three months for all. I will accompany Mahesh Babu here in the next two or three weeks. I have received complaints regarding drinking water shortage, lack of veterinary doctors and other issues from the sarpanch. I will speak to the collector and see that all grievances are redressed, she said.

Namrata also spoke to locals who complained of bad roads, drinking water shortage, dilapidated gram panchayat office, a local temple among others.

She promised to resolve the issues at the earliest.

Mahesh Babu's wife Namrata studies a representation by a villager in Siddhapur on Friday.

Figure: Smart Village development activities

Key Works in Burripalem

- Renovated and modernized Zilla Parishad High School.
- Constructed toilets under Swachh Bharat Abhiyan.
- Set up drinking water purification plants.
- Improved internal roads and drainage.
- Conducted regular health camps in collaboration with his foundation.
- Funded COVID-19 vaccination drives during the pandemic.

Key Works in Siddhapuram

- Built Anganwadi centers for early childhood care.
- Developed digital classrooms to bridge the urban-rural education gap.
- Introduced solar street lights to improve safety and reduce electricity costs.
- Upgraded village healthcare facilities.
- Organized youth skill training programs.

Community Impact

- Dropout rates in schools have reduced due to better facilities and access to learning resources.
- Public health has improved through vaccination, sanitation, and access to clean drinking water.
- Employment opportunities have increased with skill training.
- The villages became model examples in the region for smart village development.

Philosophy behind It

Mahesh Babu has said in interviews that adopting a village is not a one-time event --- it requires continuous involvement, accountability, and local participation. His approach mixes government support, personal funding, and community responsibility so the improvements are sustainable.

Medicine

Author: T. Muni Santhosh
PIN: 25155-CM-054

Figure: Overview of Medicine and Healthcare

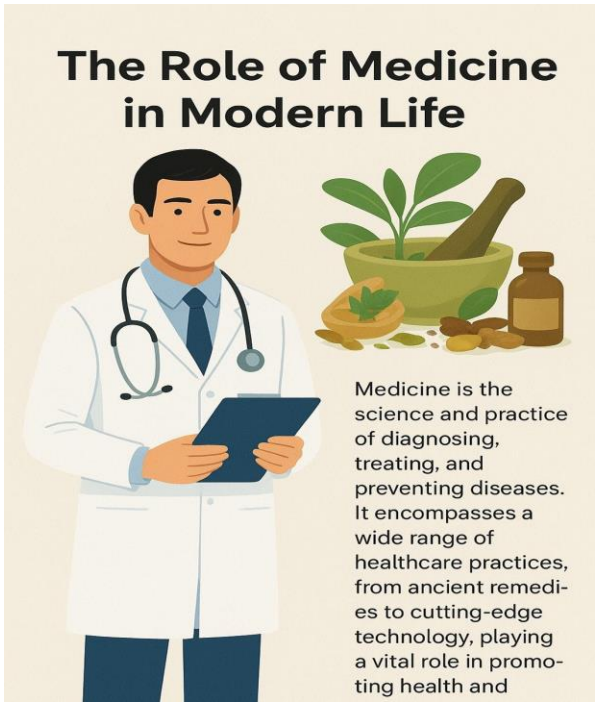


Figure : History of Medicine

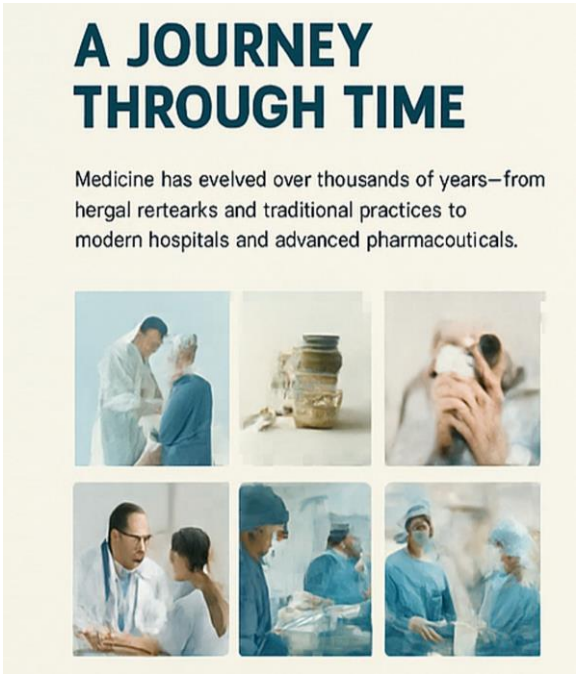


Figure: Medical Branches and Specializations

Figure: Modern Medical Advancements

MS Dhoni

Author: K. Munikumar
PIN: 25155-C-007

Early Life

Dhoni was born on 7 July 1981 in Ranchi, Bihar (now in Jharkhand) in a Hindu Rajput family to Pan Singh and Devaki Devi. His parents hailed from Lwali village in Uttar Pradesh (now Uttarakhand) and he was the youngest of three children. His family spells the surname as "Dhauni". The spelling "Dhoni" emerged due to a spelling mistake in his school certificates and, despite repeated attempts by his family, has never been rectified.

Dhoni did his schooling from DAV Jawahar Vidya Mandir, where he started playing football as a goalkeeper, but later moved to play cricket on the suggestion of his coach Keshav Banerjee. From 2001 to 2003, Dhoni worked as a Travelling Ticket Examiner (TTE) at Kharagpur under South Eastern Railway zone of Indian Railways.

Figure: MS Dhoni -- Early Life

Youth & Career

He played as a wicket-keeper for Commando cricket club from 1995 to 1998 and Central Coal Fields Limited (CCL) team in 1998. At CCL, he batted higher up the order and helped the team qualify to the higher division. Based on his performance at club cricket, he was picked for the 1997/98 season of Vinoo Mankad Trophy under-16 championship.

In the 1998-99, Dhoni played for Bihar U-19 team in the Cooch Behar Trophy and scored 176 runs in 5 matches. In the 1999-2000 Cooch Behar Trophy, the Bihar U-19 cricket team made it to the finals, where Dhoni made 84 in a losing cause. Dhoni's contribution in the tournament included 488 runs in nine matches with five fifties, 17 catches and seven stumpings.

Dhoni made his Ranji Trophy debut for Bihar against Assam in the 1999-2000 season, as an eighteen-year-old scoring 68 runs in the second innings. Dhoni scored his maiden first-class century while playing for Bihar against Bengal in the 2000-01 Ranji Trophy season. In the 2003/04 season, Dhoni scored a century (128*) against Assam in the first match of the Ranji ODI tournament and was part of the East Zone squad that won the Deodhar Trophy.

Figure: MS Dhoni during domestic cricket career

Records and Achievements

Tests

- Most runs by an Indian wicket-keeper (4876)
- Most number of sixes by an Indian captain
- Most dismissals by an Indian and fifth most by any wicket-keeper

ODIs

- Most wins by an Indian captain and second most overall (110)
- Second most runs as captain (6641)
- Third most number of matches as captain
- First player to pass 10,000 runs with an average of over 50
- Most not-outs (84)
- Highest score by a wicket-keeper (183*)
- Highest eighth wicket partnership for India (100* with Bhuvneshwar Kumar)
- Most dismissals in an innings (6) and career (432) by an Indian wicket-keeper
- Most stumping's by any wicket-keeper

T20s

- Second most matches as captain
- Most T20I innings (76) and runs (1,153) before scoring a fifty
- Most stumping's as wicket-keeper
- Most catches as wicket keeper in a T20I innings

Combined

- Most international matches as captain
- Most stumping's and only wicket-keeper to make 150 stumping's
- Third most dismissals as a wicket-keeper
- Sixth most sixes in career

Figure: MS Dhoni lifting the World Cup trophy

Honours

Team Honours

- India T20 World Cup: 2007
- Asia Cup: 2010, 2016, 2018
- Cricket World Cup: 2011
- ICC Champions Trophy: 2013
- Chennai Super Kings -- Indian Premier League: 2010, 2011, 2018, 2021, 2023
- Champions League: 2010, 2014

Individual Honours

- MTV Youth Icon of the Year: 2006
- ICC Men's ODI Team of the Year: 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014
- ICC Men's Test Team of the Year: 2009, 2010, 2013
- Major Dhyanchand Khel Ratna Award: 2008
- ICC ODI Cricketer of the Year: 2008, 2009
- Padma Shri: 2009
- Honorary Lieutenant Colonel, Parachute Regiment of the Indian Territorial Army: 2011
- CNN-News18 Indian of the Year: 2011
- Castrol Indian Cricketer of the Year: 2011
- ICC People's Choice Award: 2013
- Padma Bhushan: 2018
- ICC Men's ODI Team of the Decade: 2011-2020 (captain and wicket-keeper)

- ICC Men's T20I Team of the Decade: 2011-2020 (captain and wicket-keeper)
- ICC Spirit of Cricket Award of the Decade: 2011-2020
- ICC Cricket Hall of Fame: 2025

Figure: MS Dhoni receiving the Padma Bhushan award

Conclusion

Dhoni is widely regarded as one of the greatest cricketers and captains in the history of the sport. His calm demeanour under pressure, exceptional wicket-keeping skills, and ability to finish matches under difficult conditions set him apart. Dhoni receiving the Padma Bhushan award from then President of India Ram Nath Kovind in April 2018 is a testament to his immense contribution to Indian cricket. He remains an inspiration to millions of cricket fans across the world.

Operation SINDOOR: The Rise of Aatmanirbhar Innovation in National Security

Author: A. Pavan Sai
PIN: 25155-CM-006

Introduction

Operation SINDOOR emerged as a calibrated military response to an evolving pattern of asymmetric warfare, one that increasingly targets unarmed civilians along with military personnel. The terrorist attack on tourists in Pahalgam in April 2025 served as a grim reminder of this shift. India's response was deliberate, precise, and strategic. Without crossing the Line of Control or international boundary, Indian forces struck terrorist infrastructure and eliminated multiple threats.

However, beyond tactical brilliance, what stood out was the seamless integration of indigenous hi-tech systems into national defence. Whether in drone warfare, layered air defence, or electronic warfare, Operation SINDOOR marks a milestone in India's journey towards technological self-reliance in military operations.

Air Defence Capabilities: Tech as the First Line of Protection

On the night of 07-08 May 2025, Pakistan attempted to engage a number of military targets in Northern and Western India including Awantipura, Srinagar, Jammu, Pathankot, Amritsar, Kapurthala, Jalandhar, Ludhiana, Adampur, Bhatinda, Chandigarh, Nal, Phalodi, Uttarlai, and Bhuj, using drones and missiles. These were neutralised by the Integrated Counter UAS (Unmanned Aerial Systems) Grid and Air Defence systems.

Air Defence systems detect, track, and neutralise threats using a network of radars, control centres, artillery, and both aircraft- and ground-based missiles. On the morning of May 8, the Indian Armed Forces targeted Air Defence Radars and systems at a number of locations in Pakistan. An Air Defence system at Lahore was neutralised.

Performance of Systems

As part of Operation SINDOOR, the following systems were deployed:

- Battle-proven AD (Air Defence) systems like the Pechora, OSA-AK and LLAD guns (Low-level air defence guns).
- Indigenous systems such as the Akash, which demonstrated stellar performance.

AKASH is a Short Range Surface to Air Missile system to protect vulnerable areas and vulnerable points from air attacks. The AKASH Weapon System can simultaneously engage Multiple Targets in Group Mode or Autonomous Mode. It has built-in Electronic Counter-Counter Measures (ECCM) features and the entire weapon system has been configured on mobile platforms.

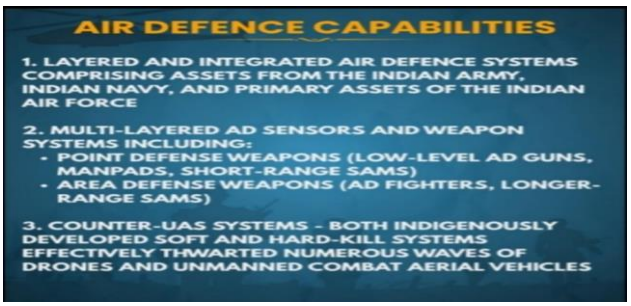


Figure: AKASH Missile System deployed during Operation SINDOOR

India's Air Defence Systems, combining assets from the Army, Navy, and primarily the Air Force, performed with exceptional synergy. These systems created an impenetrable wall, foiling

multiple attempts by Pakistan to retaliate. The Integrated Air Command and Control System (IACCS) of the Indian Air Force brought all these elements together, providing the net-centric operational capability vital for modern warfare.

Offensive Actions with Pinpoint Accuracy

India's offensive strikes targeted key Pakistani airbases --- Noor Khan and Rahimyar Khan --- with surgical precision. Loitering munitions were used to devastating effect, each finding and destroying high-value targets, including enemy radar and missile systems.

Loitering munitions, also known as "suicide drones" or "kamikaze drones", are weapons systems that can hover or circle a target area, searching for a suitable target before attacking. All strikes were executed without loss of Indian assets, underscoring the effectiveness of our surveillance, planning, and delivery systems. The Indian Air Force bypassed and jammed Pakistan's Chinese-supplied air defence systems, completing the mission in just 23 minutes, demonstrating India's technological edge.

Evidence of Neutralized Threats

Operation SINDOOR produced concrete evidence of hostile technologies neutralized by Indian systems:

- Pieces of PL-15 missiles (of Chinese origin)
- Turkish-origin UAVs, named "Yiha" or "YEEHAW"
- Long-range rockets, quadcopters and commercial drones

These were recovered and identified, showing that despite Pakistan's attempts to exploit advanced foreign-supplied weaponry, India's indigenous air defence and electronic warfare networks remained superior.

Performance of Systems: Air Defence Measures of the Indian Army

On May 12, Lt Gen Rajiv Ghai, Director General Military Operations, in the Operation SINDOOR press briefing highlighted the excellent performance of a mix of legacy and modern systems.

Preparedness and Coordination

A unique blend of Counter Unmanned Aerial Systems, Electronic Warfare assets, and Air Defence Weapons from both Army and Air Force created multiple defensive layers from the International Boundary inward:

- Counter Unmanned Aerial Systems
- Shoulder-Fired Weapons
- Legacy Air Defence Weapons
- Modern Air Defence Weapon Systems

This multi-tier defence prevented Pakistan Air Force attacks on Indian airfields and logistic installations during the night of May 9-10. These systems, built over the last decade with continuous government investment, proved to be force multipliers during the operation.

ISRO's Contribution

At an event on May 11, ISRO Chairman V Narayanan mentioned that at least 10 satellites are continuously working round-the-clock for strategic purposes to ensure the safety and security of the citizens of the country. Without satellite and drone technology, monitoring the 7,000 km seashore areas and the entire Northern part of the country continuously would not be achievable.

The Business of Drone Power: A Rising Indigenous Industry

The Drone Federation India (DFI), a premier industry body representing over 550 drone companies and 5,500 drone pilots, envisions making India a global drone hub by 2030. It promotes the design, development,

manufacturing, adoption and export of Indian drone and counter-drone technology worldwide. Key companies in the drone ecosystem include:

- Alpha Design Technologies (Bengaluru): Partnered with Israel's Elbit Systems to build SkyStriker.
- Tata Advanced Systems: Offers a full range of integrated solutions across Defence & Security.
- Paras Defence & Space Technologies: Distinguished by Indigenously Designed Developed and Manufactured (IDDM) capabilities.
- IG Drones: Specializes in defence drone manufacturing and R&D, partnered with the Indian Army and multiple State Governments.

The Indian drone market is projected to reach $11 billion by 2030, accounting for 12.2% of the global drone market.

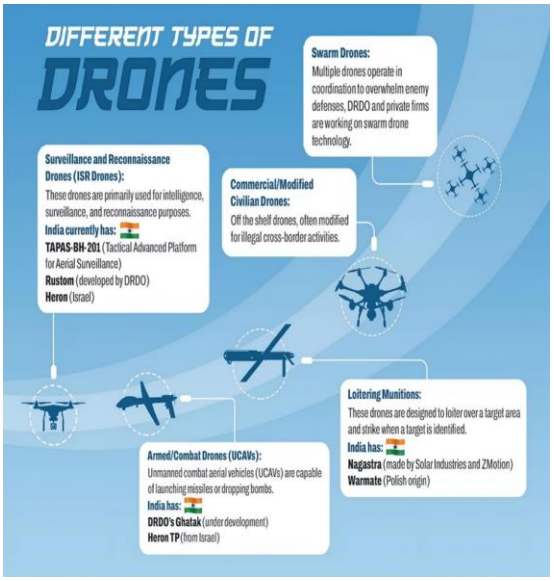


Figure: India's indigenous drone technology ecosystem

Drones at the Centre of Modern Warfare

The integration of drone warfare into India's military doctrine owes its success to years of domestic R&D and policy reform. Since 2021, the ban on imported drones and the launch of the PLI (Production Linked Incentive) scheme have catalysed rapid innovation. The scheme was notified on 30th September, 2021, with a total incentive of Rs 120 crores spread over three Financial Years (FY 2021-22 to FY 2023-24).

Defence exports crossed the record figure of Rs 24,000 crore in Financial Year 2024-25. The aim is to increase the figure to Rs 50,000 crore by 2029, and make India a developed nation and the world's largest defence exporter by 2047.

Make in India Powering Defence Growth

India has emerged as a major defence manufacturing hub, driven by the "Make in India" initiative. In FY 2023-24, indigenous defence production reached a record Rs 1.27 lakh crore, while exports soared to Rs 23,622 crore in FY 2024-25 --- a 34-fold increase from 2013-14. Advanced military platforms developed include the Dhanush Artillery Gun System, ATAGS, Main Battle Tank Arjun, Light Combat Aircraft Tejas, Advanced Light Helicopter, Akash Missile System, and various naval assets like destroyers, indigenous aircraft carriers, submarines, and frigates.

Conclusion

Operation SINDOOR is not just a story of tactical success. It is a validation of India's defence indigenization policies. From air defence systems to drones, from counter-UAS capabilities to net-centric warfare platforms, indigenous technology has delivered when it mattered most. The fusion of private-sector innovation, public-sector execution, and military vision has enabled India to not only defend its people and territory but also assert its role as a hi-tech military power in the 21st century.

In future conflicts, the battlefield will increasingly be shaped by technology. And India, as shown in Operation SINDOOR, is ready - armed with its own innovations, backed by a determined state, and powered by the ingenuity of its people.

References: Operation SINDOOR Press Briefing (May 12, 2025)

Our Earth

Author: P. Yoga Simha
PIN: 25155-M-036

Earth, the only known planet to support life, is the third planet from the Sun, orbiting it in approximately 365 days. It has a diameter of about 7,926 miles and is 4.54 billion years old, consisting of a rocky surface, liquid water covering 71% of its area, and a protective atmosphere. Earth's unique conditions, including its temperature, oxygen, and liquid water, make it a habitable "Goldilocks planet".

Definition of a Planet

A planet is a large, nearly round object orbiting a star, with its own gravity that has cleared its orbital path. The three key criteria are:

- Orbits a star: A planet must be in orbit around a star.
- Nearly round shape: Its mass must be large enough for its own gravity to pull it into a nearly round shape.
- Cleared its orbital path: A planet must have "cleared the neighbourhood" around its orbit, meaning it has become the dominant gravitational body in its orbital region.

The Eight Planets of Our Solar System

These planets are categorized into two groups:

Inner (Terrestrial) Planets

These are the four planets closest to the Sun and have solid surfaces.

- Mercury: Closest to the Sun, the smallest, and has no atmosphere.
- Venus: The hottest planet, with a dense, carbon dioxide-rich atmosphere and clouds of sulphuric acid.
- Earth: Our home planet, which takes 365.24 days to orbit the Sun.
- Mars: Known as the Red Planet due to iron oxide in its soil, and has the highest mountain in the solar system, Olympus Mons.

Outer (Giant) Planets

These are the four planets farthest from the Sun, and they are much larger with no solid surfaces.

- Jupiter: The largest planet in the solar system, with the most moons.
- Saturn: Famous for its prominent rings; the second-largest planet.
- Uranus: An ice giant that was discovered in 1781.
- Neptune: The farthest planet from the Sun, an ice giant discovered in 1846.

Key Facts

- Planets reflect light from the Sun, which is why they appear to shine.
- Planets, unlike stars, do not twinkle because they are much closer to Earth.
- The solar system formed about 4.6 billion years ago from a spinning cloud of gas and dust called a solar nebula.

Key Facts About Earth

- Position and Orbit: Earth is the third planet from the Sun and the fifth largest. It completes one orbit every 365.25 days.
- Age: The planet is estimated to be about 4.5 billion years old.
- Surface: Approximately 71% of Earth's surface is covered by water.
- Atmosphere: Provides the oxygen necessary for life and protects from the Sun's harmful rays.
- Life: Earth is the only known planet to host life, with diverse ecosystems and millions of species.

- Shape: Earth is an oblate spheroid, slightly flattened at the poles and bulging at the equator.
- Rotation: The planet rotates on its axis in about 24 hours, causing day and night.
- Unique Features: Earth has one natural satellite, the Moon, which influences tides and helps stabilize its axis.

Why Earth is Habitable

- Ideal Distance: Earth's distance from the Sun provides a temperature suitable for liquid water to exist.
- Liquid Water: The presence of large amounts of liquid water on the surface is a crucial and unique feature.
- Protective Atmosphere: The atmosphere protects living organisms from harmful solar radiation and regulates temperature.
- Nutrient Cycling: Earth's geological processes contribute to the constant change and renewal of its surface and atmosphere.

Dwarf Planets and the IAU Classification

In 2005, a team of astronomers announced that they had found a tenth planet --- a KBO similar in size to Pluto. The International Astronomical Union (IAU) took on the challenge of classifying the newly found KBO, which was later named Eris. In 2006, the IAU passed a resolution that defined the term planet and established a new category called dwarf planet. Eris, Ceres, Pluto, Haumea, and Makemake are the dwarf planets recognized by the IAU. There may be another 100 dwarf planets in the solar system, and hundreds more in and just outside the Kuiper Belt.

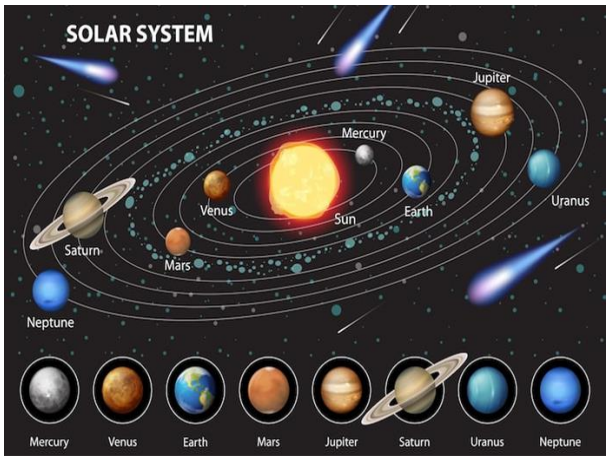


Figure: Our solar system planets and dwarf planets

Exploring Our Solar System with the Webb Telescope

Webb's extraordinarily sensitive spectroscopic instruments and state-of-the-art imaging capabilities enable analysis and mapping of solar system objects' atmospheres and surfaces. Scientists are now using Webb to conduct detailed investigations of terrestrial Mars, gas giants Jupiter and Saturn, and ice giants Uranus and Neptune. Webb is also studying primordial bodies, such as comets and Kuiper Belt objects like Pluto.

Recent Webb Discoveries

- New jet stream in Jupiter's atmosphere: Webb revealed a narrow jet stream speeding over Jupiter's equator at 320 miles per hour.
- Uranus rings and atmosphere: Webb showed an infrared view of Uranus' rings, moons, storms, and the planet's bright polar cap.
- Carbon on Europa's surface: Jupiter's moon Europa has a salty subsurface ocean, and Webb found carbon on its surface that likely originated there.
- DART impact observation: Webb had a front-row seat to NASA's test for defending Earth against potential asteroid hazards.

Solar System Facts

Our solar system includes the Sun, eight planets, five officially named dwarf planets, hundreds of moons, and thousands of asteroids and comets. Our solar system is located in the Milky Way, a barred spiral galaxy. Our Sun is in the Orion Arm, between the Sagittarius and Perseus arms. Our solar system orbits the centre of the galaxy at about 515,000 mph (828,000 kph). It takes about 230 million years to complete one orbit around the galactic centre.

Phone Addiction: The Silent Epidemic of the Digital Age

Author: C. Aravind
PIN: 25155-CM-009

In today's world, smartphones have become more than just devices --- they are our constant companions. From staying connected to friends to working, learning, and entertaining ourselves, phones have transformed modern life. But behind the convenience lies a growing problem: phone addiction.

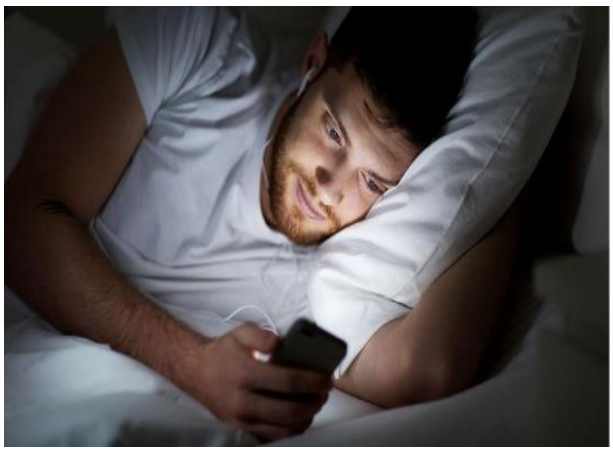


Figure: The rise of smartphone dependence

What is Phone Addiction?

Phone addiction, sometimes called nomophobia (fear of being without a mobile phone), and refers to the excessive and compulsive use of smartphones that interferes with daily life. It's not just about spending a lot of time on your phone; it's about losing control over that usage.

Signs of Phone Addiction

Some common warning signs include:

- Feeling anxious or irritable when the phone is out of reach.
- Constantly checking notifications, even without alerts.
- Using the phone late at night, leading to poor sleep.
- Neglecting work, studies, or relationships due to screen time.
- Feeling a strong urge to use the phone in inappropriate situations, like during meals or conversations.

Why is it Dangerous?

While smartphones offer many benefits, overuse can harm both mental and physical health:

- Mental health issues: Anxiety, depression, and reduced attention span.
- Physical health problems: Eye strain, headaches, neck and back pain.
- Sleep disruption: Blue light from screens affects the body's natural sleep cycle.
- Weakened relationships: Less face-to-face interaction and more social isolation.

Causes of Phone Addiction

- Instant Gratification: Social media likes, messages, and updates trigger dopamine release in the brain.
- Fear of Missing Out (FOMO): The urge to stay constantly updated with trends and news.
- Boredom Escape: Phones act as a quick distraction from reality.

Figure: Signs and symptoms of phone addiction

How to Break the Cycle

- Set Screen Time Limits: Use built-in tools to track and reduce usage.
- Turn Off Non-Essential Notifications: Reduce unnecessary distractions.
- Phone-Free Zones: Keep your phone away during meals, study time, or before sleeping.
- Replace the Habit: Engage in hobbies, exercise, or read books instead of scrolling.
- Digital Detox Days: Pick one day a week to stay off social media entirely.

Figure: Health impacts of excessive phone use

Conclusion

Phones are powerful tools, but like any tool, they can become harmful when overused. Awareness is the first step toward balance. By setting boundaries and practicing mindful usage, we can enjoy the benefits of technology without becoming its slaves. In the end, our phones should serve us --- not the other way around.

P.T. Usha: India's Golden Girl

Author: B.K. Lekhana
PIN: 25155-C-001

Figure : P.T. Usha -- The Queen of Indian Track and Field

Pilavullakandi Thekkeparambil Usha, famously known as P.T. Usha, is a retired Indian track and field athlete and sports administrator, widely recognized as the "Queen of Indian track and field". Born on June 27, 1964, in Payyoli, Kerala, her natural talent for running was discovered at a young age.

Early Life and Career

Figure: P.T. Usha in her early athletic career

Usha's athletic journey began in the 1980s when she was noticed by Coach O.M. Nambiar, who started training her. She quickly showed her potential by winning multiple medals at junior events, including six medals at the 1978 inter-state meet. Her talent was further nurtured at the Sports Division in Kannur.

P.T. Usha made her international debut at the 1980 Moscow Olympics. She won silver medals in the 100m and 200m at the 1982 Asian Games in New Delhi. At the 1984 Los Angeles Olympics, Usha finished fourth in the 400m hurdles, narrowly missing a bronze medal by 1/100th of a second, but setting an Asian record and becoming the first Indian woman to reach an Olympic final in track and field.

The 1986 Asian Games in Seoul saw Usha win four gold medals and one silver, establishing new Asian Games records in all her events. She also holds a record for winning five gold medals and one bronze at the 1985 Asian Athletics Championships in Jakarta.

Awards and Recognition

- Arjuna Award (1983)
- Padma Shri (1985)
- Best Asian Athlete Award (multiple times)
- World Trophy for Best Athlete (1985, 1986)

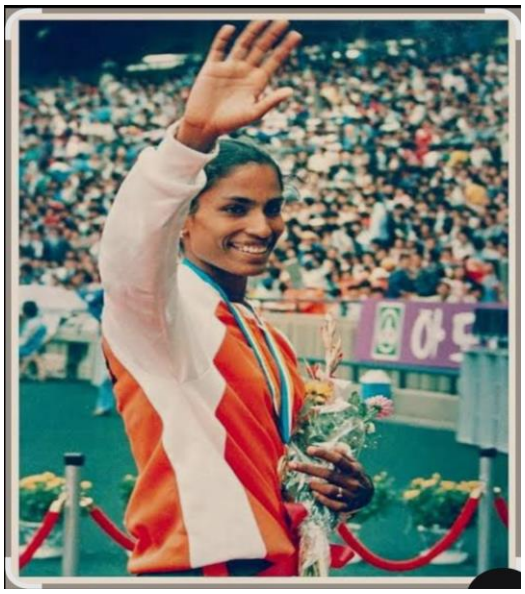


Figure: P.T. Usha receiving national awards

Post-Retirement and Legacy

Usha continued to compete and win medals until her retirement in 2000. She founded the Usha School of Athletics in Kinalur, Kerala, in 2002, to train and promote young athletes. In 2022, P.T. Usha became the first woman president of the Indian Olympic Association (IOA), and the first Olympian to hold the position. Her election is seen as a step towards greater inclusivity and gender equality in Indian sports.

Figure: P.T. Usha's legacy in Indian athletics

P.T. Usha's life story is one of determination, ground breaking achievements, and a continued commitment to shaping the future of Indian athletics. Her impact on sports in India, particularly for women, is immeasurable. She remains one of the most inspiring sportswomen the world has ever seen.

Stephen Hawking

Author: M. Maha Varshini
PIN: 25155-CM-032

Stephen Hawking was a British theoretical physicist and cosmologist who made significant contributions to our understanding of black holes and the universe, most notably through his work on the theory that black holes emit "Hawking radiation". Despite being diagnosed with amyotrophic lateral sclerosis (ALS) in his early twenties and being given only two years to live, he defied medical odds, producing ground breaking research, writing the bestselling book, "A Brief History of Time," and inspiring millions with his perseverance and intellect.

Scientific Contributions

- Black holes: Hawking's work revolutionized the understanding of black holes, including his prediction that they emit thermal radiation (now known as Hawking radiation).
- Singularity theorems: He made significant contributions to the study of space-time singularities, which are points where the laws of physics break down.
- Cosmology: He played a key role in the study of the origin and evolution of the universe, including the concept of the wave functions of the universe.
- Information paradox: His work on black holes led to the formulation of a fundamental conflict between quantum mechanics and general relativity that is still a major area of research.

Overcoming ALS

- Diagnosis and prognosis: At age 21, Hawking was diagnosed with ALS, a degenerative disease that would eventually leave him paralyzed and require a speech synthesizer for communication.
- Determination: Against the prediction that he would not survive more than two years and would be unable to complete his PhD, he went on to earn his doctorate and live for another 55 years.
- Communication: Due to his illness, Hawking lost the ability to speak so he communicated through a voice-generating computer system, which he operated by the muscle in his cheek.

Public Impact and Legacy

- A Brief History of Time: His book made complex scientific ideas accessible to a wide audience, becoming an international bestseller and making him a household name.
- Inspiration: His life and work are seen as a testament to the power of the human mind and the ability to achieve greatness despite severe physical challenges.
- Science communication: He was a passionate advocate for science communication, believing that everyone should have a basic understanding of science. He also co-authored children's books on science with his daughter, Lucy Hawking.

Sunil Chhetri

Author: A. Poojitha
PIN: 24155–EC-002

Sunil Chhetri is widely regarded as the greatest footballer in India's history, holding the national record for all-time top goal-scorer and being among the top goal-scorers in international football. Known for his exceptional leadership and goal-scoring abilities, he is often called "Captain Fantastic" and has been recognized with numerous awards, inspiring a new generation of Indian football fans.

Sunil Chhetri ranks as the third-highest active international goal scorer worldwide, surpassed only by Cristiano Ronaldo and Lionel Messi. He was born on August 3, 1984, in Secunderabad, India, and has become a football legend by scoring 95 goals in 153 appearances for the Indian national team since 2005.

Born into the world of football, his father's army career meant the family moved frequently across the country. Right after his birth, his father received a posting to Darjeeling, where Chhetri spent much of his childhood. The constant changes didn't affect his growing love for football.

Money was tight in his early days, but Chhetri's love for football pushed him to practice on makeshift grounds. He later rose to fame with Mohun Bagan in the early 2000s. His brilliant skills and leadership on the field earned him seven AIFF Player of the Year awards (2007, 2011, 2013, 2014, 2017, 2018, 2019). The Indian government recognized his contributions with the prestigious Padma Shri in 2019.

Awards

Chhetri is a recipient of the Arjuna Award, the Padma Shri, and the Khel Ratna Award.

Impact

His passion and dedication for the sport are considered unmatched, bringing Indian football to the forefront and inspiring a new generation of players and fans. Chhetri's influence reaches far beyond his personal records. His rise from local fields to becoming India's football hero has motivated young athletes

Nation-wide. Under his captaincy, India won major tournaments like the SAFF Championship and AFC Challenge Cup. His success has helped boost investment in grassroots football and created better facilities across India.

Swami Vivekananda

Author: D. Adithya
PIN: 25155-C-013

Swami Vivekananda, born Narendra Nath Datta in 1863, was a key figure in introducing Indian philosophies of Vedanta and Yoga to the Western world. He was a chief disciple of the 19th-century mystic Ramakrishna and played a vital role in the revival of Hinduism in India. He is renowned for his powerful oratory, particularly his 1893 speech at the Parliament of the World's Religions in Chicago, which began with the iconic phrase "Sisters and brothers of America..."

Early Life and Spiritual Awakening

Born into an affluent family in Calcutta, Narendra Datta displayed an early inclination towards spirituality and a keen intellect, excelling in various fields like music, gymnastics, and studies.

He encountered the teachings of Ramakrishna, a mystic who emphasized the divine presence in all beings, which deeply impacted him and led him to renounce worldly life. He became a sannyasin, taking the name Swami Vivekananda, and dedicated his life to spreading Ramakrishna's message and promoting social reform.

Mission to the West

Vivekananda's landmark speech at the Parliament of the World's Religions in Chicago in 1893 catapulted him to fame in the West. He presented Hinduism in a universal and inclusive light, emphasizing its philosophical depth and its potential to address the spiritual needs of people from all backgrounds.

He delivered numerous lectures and classes in the United States and Europe, introducing Vedanta and Yoga to a wide audience and fostering interfaith dialogue.

Revival of Hinduism in India

Vivekananda's message resonated deeply with Indians, inspiring a resurgence of Hindu pride and identity. He encouraged social reform, particularly focusing on the upliftment of women and the marginalized sections of society. He established the Ramakrishna Math (a monastic order) and the Ramakrishna Mission (a charitable organization) to further his work in India and abroad.

Key Teachings and Legacy

Vivekananda emphasized the divinity of the soul and the importance of self-realization through various paths of yoga. He advocated for social service and humanitarianism, believing that service to humanity was a form of worship. His teachings continue to inspire millions worldwide, promoting spiritual growth, social justice, and interfaith harmony.

The Nine Unknown Men of Emperor Ashoka: Guardians of Forbidden Knowledge

Author: AK Dhruva

PIN: 25155-CM-001

Emperor Ashoka (reigned c. 268–232 BCE), known for his transformation after the Kalinga War and his embrace of Buddhism. The legend of the Nine Unknown Men, a secret society founded by him to guard powerful — and potentially dangerous — knowledge, remains one of the most enduring mysteries blending history and myth.

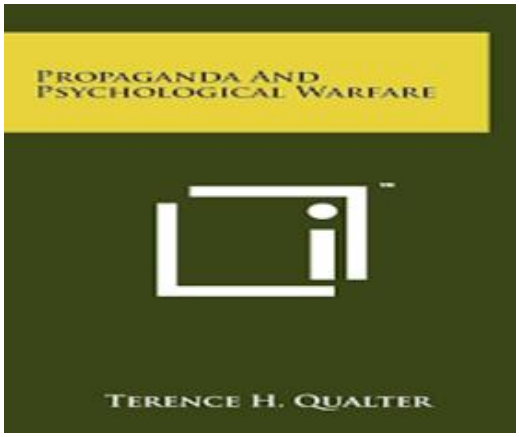
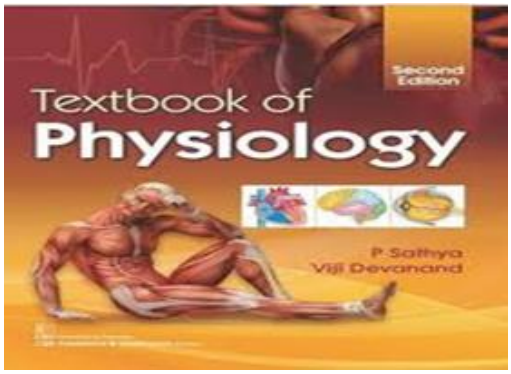
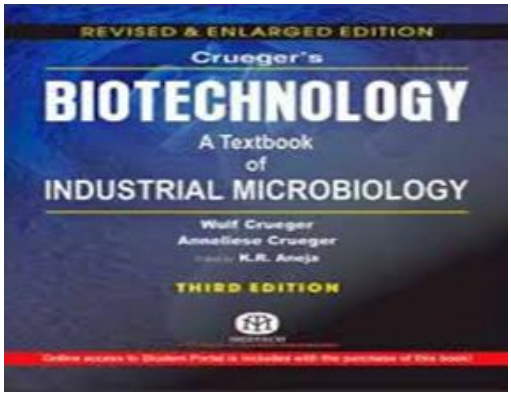
The Nine Books of Knowledge

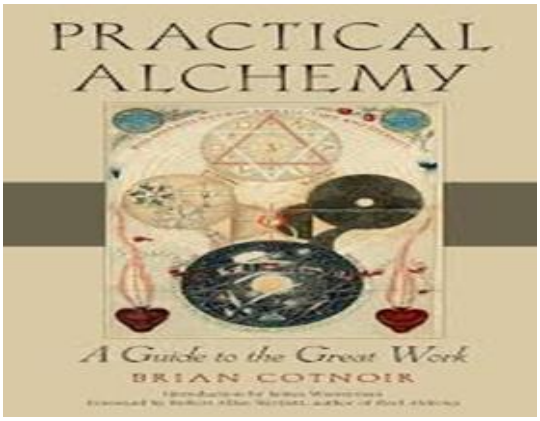
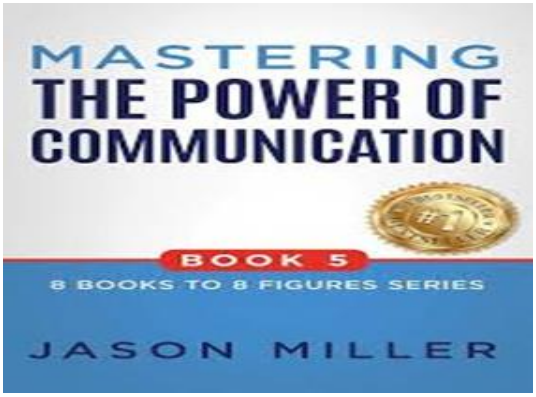
Summary

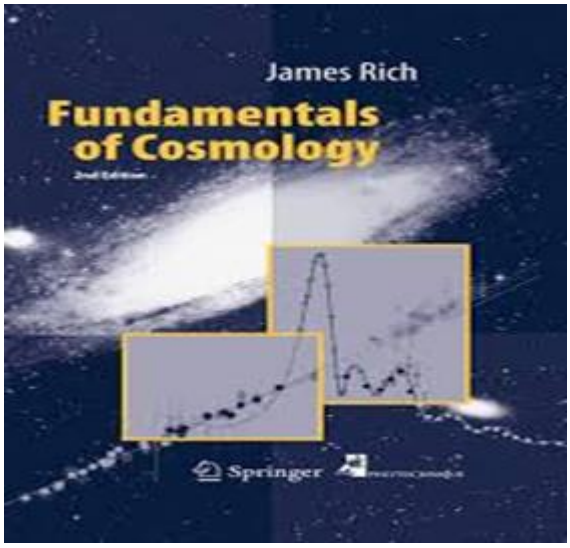
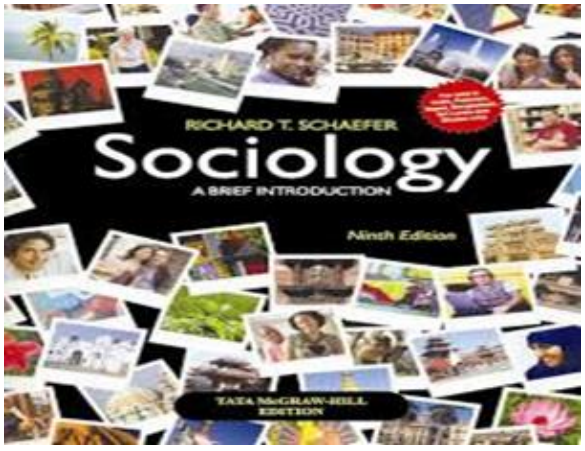
Though no historical records mention the Nine Unknown Men, their tale likely emerged from Ashoka's known dedication to Dharma and his apprehension that certain knowledge could be misused. The legend suggests a covert lineage of guardian’s discreetly guiding humanity's moral progress while safeguarding destructive secrets. Over time, this myth has been fictionalized by authors and conspiracy theorists, yet it continues to fascinate because it symbolizes a tension between knowledge and responsibility.

#	Subject	Brief Description
1	Propaganda & Psychological Warfare	Techniques of mass influence and manipulation.
2	Physiology	Mastery over life: healing and lethal touch.
3	Microbiology / Biotechnology	Biological manipulation and experiments.
4	Alchemy	Transmutation of matter — mystical science and metaphor.
5	Communication	Secret languages, telepathy, deep connectivity.
6	Gravitation	Control over gravity; ancient concepts of flying machines.
7	Cosmology	Universe's architecture: space, time, and the cosmic order.
8	Light	Optics, invisibility, and energy manipulation.
9	Sociology	Societal evolution and the dynamics of civilizations.

Detailed Summaries of the Nine Book

Book 1: Propaganda & Psychological Warfare This book is said to contain the secrets of influencing mass opinion and controlling large populations. It explores how ideas can be spread or suppressed to shape societies.	
Book 2: Physiology This text allegedly describes advanced medical knowledge, including techniques to instantly heal or cause harm. It may have contained early explorations of acupuncture, pressure points, and bodily control.	
Book 3: Microbiology / Biotechnology This book supposedly focused on biology and microorganisms, holding both cures for deadly diseases and the potential for biological weapons.	

Book 4: Alchemy Believed to hold the key to transmutation of metals and processes to create gold. It may also have contained deeper symbolic insights into transformation of the self.	
Book 5: Communication This book allegedly contained knowledge of advanced communication, possibly including telepathy, secret codes, and universal languages.	
Book 6: Gravitation Said to explore gravity and anti-gravity concepts, possibly tied to legends of flying machines (Vimanas) described in ancient Indian texts.	

Book 7: Cosmology Focused on the structure of the universe, time, and cosmic cycles. It may have explained advanced astronomy and theories of relativity-like concepts.	
Book 8: Light This book explored optics and the nature of light, including invisibility techniques and advanced energy manipulation.	
Book 9: Sociology The final book allegedly studied the rise and fall of civilizations, giving insights into how societies evolve, collapse, and can be sustained.	

The Power of Sports in Shaping Character and Community

Author: K Sunil

PIN: 25155-CM-018

Sports have always played a significant role in human society, going far beyond physical competition. From local playgrounds to global stadiums, sports unite people, build character, and inspire millions. In today's fast-paced world, sports continue to influence personal development, mental health, and social connection.

One of the most important contributions of sports is the development of discipline and teamwork. Athletes learn early that success does not come overnight. It requires consistent practice, dedication, and the ability to work with others toward a common goal. Team sports such as football, basketball, and hockey teach players how to communicate effectively, trust their teammates, and accept responsibility. These skills are not only valuable on the field but also essential in everyday life, education, and future careers.

Sports also play a vital role in promoting physical and mental well-being. Regular participation helps improve strength, endurance, and coordination while reducing the risk of lifestyle-related diseases. Equally important is the positive effect on mental health. Physical activity reduces stress, boosts self-confidence, and helps individuals manage anxiety and depression. For many people, sports serve as a healthy escape from daily pressures, offering a sense of balance and emotional release.

At a community level, sports bring people together regardless of age, background, or culture. Major sporting events create shared experiences that foster unity and pride. Whether it is a local school tournament or an international competition like the Olympics, sports encourage mutual respect and cultural exchange. Fans support their teams passionately, forming strong social bonds that often last a lifetime.

Sports also teach valuable life lessons about winning and losing. Victory brings joy and motivation, but defeat teaches resilience and humility. Athletes learn how to handle failure, accept criticism, and come back stronger. These lessons prepare individuals to face challenges with confidence and perseverance in all aspects of life.

In recent years, sports have also become a platform for social change. Athletes are increasingly using their influence to raise awareness about issues such as equality, mental health, and environmental responsibility. Their voices reach millions, proving that sports can be a powerful tool for positive impact beyond entertainment.

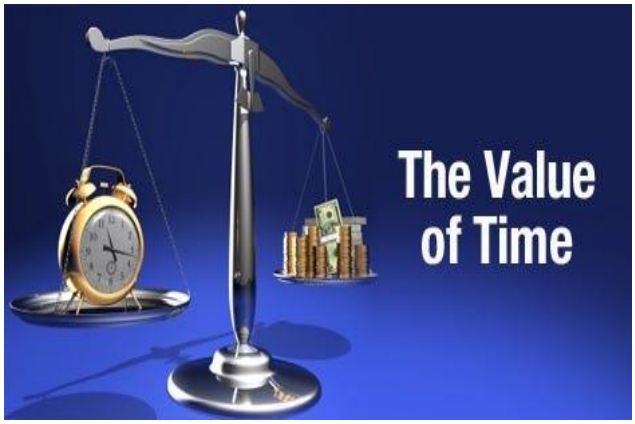
Conclusion

Sports are much more than games or competitions. They shape character, strengthen communities, and promote physical and mental health. By encouraging values such as teamwork, discipline, and respect, sports help individuals grow into well-rounded and responsible members of society. As the world continues to evolve, the importance of sports in our lives remains stronger than ever.

The Value of Time

Author: G. Selvam
PIN: 25155-C-015

Time is one of the most precious resources available to every human being. Unlike money, property, or material possessions, time cannot be stored, saved, or regained once lost. It flows continuously, whether we recognize its worth or not. Each day gives us twenty-four hours, but how we use those hours determines the quality of our lives and the legacy we leave behind. Understanding the value of time is the first step toward living a purposeful and meaningful life.



Time as a Limited Resource

The greatest truth about time is that it is limited. Every second that passes is gone forever. No amount of wealth, power, or influence can bring back yesterday or add extra hours to today. This makes time more valuable than any material possession. A millionaire and a common worker both live within the same twenty-four-hour day. The difference lies not in how much time they have, but in how wisely they use it.

When people waste time, they waste opportunities. The minutes spent idly scrolling, procrastinating, or delaying important tasks can never be recovered. Many realize this only later in life, when they look back with regret at lost chances. As the old saying goes, "Lost wealth can be regained, but lost time is gone forever."

Time and Success

Success in life, whether in studies, career, or personal growth, depends largely on time management. Those who respect time are able to plan, act, and achieve. Students who dedicate regular hours to learning gain knowledge that builds their future. Professionals who value punctuality earn trust and respect in their fields. Athletes who discipline themselves to train every day improve their skills and reach excellence.

History is filled with examples of people who achieved greatness because they valued their time. Scientists, inventors, writers, and leaders all managed their hours carefully. Thomas Edison, for example, worked tirelessly, making use of every moment to create inventions that changed the world. Similarly, Mahatma Gandhi and Martin Luther King Jr. devoted their lives to purposeful action, inspiring generations through disciplined use of their time.

Time and Relationships

The value of time is not limited to personal success. It is equally important in building and maintaining relationships. Spending time with family and friends strengthens bonds and creates memories that last a lifetime. A child values the time spent with parents more than the gifts they receive. Elders cherish the hours their loved ones dedicate to listening and caring.

Sadly, many people realize the importance of time in relationships only when it is too late. Busy with work and distractions, they neglect their loved ones, only to regret it when opportunities are gone. True love and friendship require time, attention, and presence. Therefore, giving quality time to people we care about is one of the best ways to show love and appreciation.

Time and Personal Growth

Every human being has talents and potential, but developing them requires time. Learning a skill, mastering a craft, or improving health and character cannot happen overnight. Consistent effort over time brings results. A student becomes a scholar, a beginner becomes an expert, and a small seed grows into a strong tree only through the steady investment of time.

Unfortunately, many people underestimate the power of small but regular efforts. Reading a few pages daily, practicing an instrument for half an hour, or exercising for twenty minutes may seem insignificant. But over months and years, these small actions add up to remarkable achievements. Time rewards those who use it patiently and consistently.

Time and Discipline

The key to valuing time lies in discipline. Without self-control, time slips away into laziness and distractions. Discipline means setting priorities, avoiding procrastination, and focusing on what truly matters. It also means respecting the time of others by being punctual and dependable.

In schools, punctuality is a sign of discipline and responsibility. In workplaces, deadlines show professionalism. In personal life, managing time wisely prevents stress and allows for balance between work, rest, and recreation. Discipline does not mean being busy every moment, but rather using time consciously and purposefully.

Time and Life's Uncertainty

Another reason time is valuable is its uncertainty. No one knows how much time they have in this world. Life is unpredictable, and every day is a gift. That is why it is essential to live meaningfully and not postpone important actions for "someday." Saying "I'll do it tomorrow" may lead to regret if tomorrow never comes.

When we understand the fragility of life, we learn to cherish each moment. We become more present, grateful, and mindful of how we spend our days. Whether it is pursuing dreams, serving others, or simply enjoying nature, the wise use of time makes life fulfilling.

Conclusion

The value of time cannot be measured in gold or silver, but in the richness it brings to our lives. Time is the silent teacher, the healer, and the builder of destiny. It teaches us patience, rewards hard work, strengthens relationships, and reminds us of life's preciousness.

To waste time is to waste life. To respect time is to respect oneself. Every moment we spend can either bring us closer to our goals or push us further away. The choice is always ours. Therefore, let us recognize the true worth of time, manage it wisely, and use it to create a life of purpose, success, and happiness.

Moon

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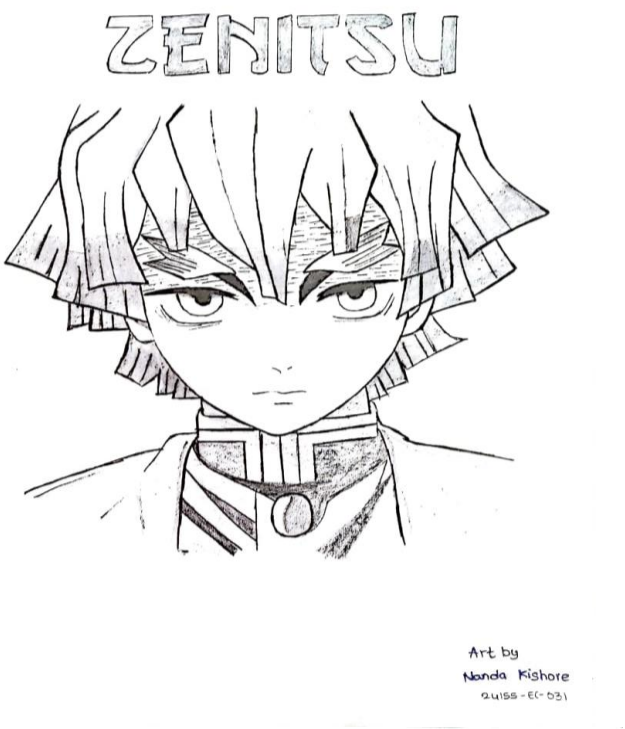
Silent watcher of the midnight skies,
You bathe the earth in silver sighs.
Dreams unfold beneath your glow,
Whispers travel where shadows go.
Each crater holds a tale untold,
Of love, of loss, of hearts grown cold.
Yet still you shine, serene, immune
My timeless muse, eternal Moon.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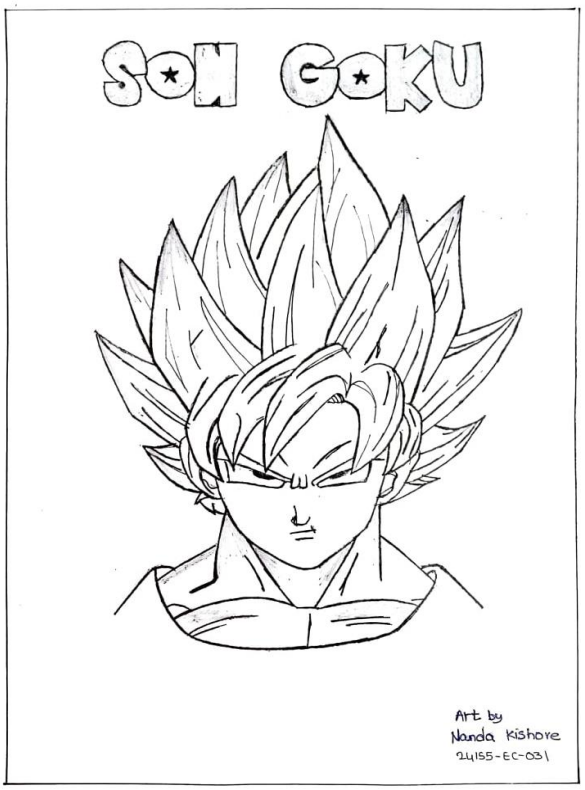
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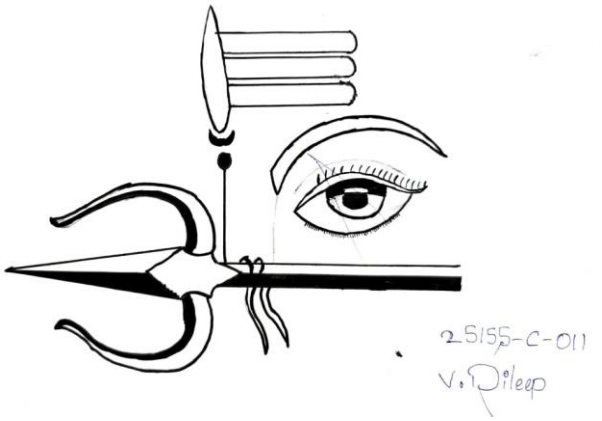
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