

Topics - MINDS MAPS included (Daily current affairs 1st March 2025



- **Understanding Avalanches**
- **India's Aditya-L1 Solar Mission**
- **The Importance of Wetlands: A Focus on Meghalaya's Conservation Efforts**
- **The AI Race: Bengaluru's Software Developers at a Crossroads**
- **Mains**



By saurabh Pandey



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22 missing after avalanche hits BRO project site

Of 55 civilians at the site in Uttarakhand, 10 have been rescued, says Army; 23 believed to be safe

Continuous snowfall hinders efforts to rescue workers trapped under a 'mountain of ice'

IMD has issued an advisory on possibility of further avalanches in mountainous districts

Ishita Mishra
NEW DELHI

In a life-or-death race against time, teams from the Indian Army and the Indo-Tibetan Border Police are working to save 22 workers who are feared to be trapped beneath the ice after a devastating glacier avalanche hit a Border Roads Organisation (BRO) project site at Mana village in Uttarakhand's Chamoli district at around 5 a.m. on Friday.

According to the Uttarakhand government, there were 57 civilian workers present at the affected site where BRO construction work has been ongoing for the past two years.

Chamoli district's Disaster Response Officer Nandkishore Joshi said that the

workers had been sleeping inside a couple of containers when the avalanche hit their sheds. The victims include the construction workers as well as earth mover drivers and other machine operators.

"There has been continuous snowfall in the area for the past 48 hours," he said, adding that while many of the workers managed to run out of the sheds, many others are trapped under the mountain of ice that has covered the site.

Army Brigade Commander Mandeep Dhillon said that a dedicated rescue team – comprising seven officers, 17 Junior Commissioned Officers (JCO), and 150 other personnel of the IBEX Brigade, which is trained for rescue operations in the Himalayas – has been deployed in Mana village since 8 a.m. They



Heroic task: Army personnel engaged in rescue work following an avalanche that struck a camp near Mana village in Chamoli district of Uttarakhand, on Friday. PTI

are equipped with a specialised medical team and engineering equipment.

"Ten people have been rescued so far, who are under treatment by Army doctors. The operation re-

mains ongoing, with all resources focused on saving lives," Brigadier Dhillon said. He added that 22 other workers were reported to be safe. Later, the State government said that they

had managed to trace the whereabouts of one more worker and clarified that two other workers had been on leave.

Injured workers have been admitted to the army

hospital in Mana, according to a statement from the State Disaster Response Force. The doctors have stitched up a couple of the rescued workers who suffered grievous injuries on their heads and other parts of the body.

Adverse weather

The rescue operations were forced to stop multiple times during the day due to the extreme weather conditions, with continuous snow and rainfall in the upper reaches of the Himalayas, including at Mana. The India Meteorological Department has issued an advisory on the snowfall and the possibility of further avalanches in mountainous districts, along with the precautionary measures to be taken.

The State government

also issued two helpline numbers that can be contacted by the kin of the trapped workers seeking information about the rescue, as the communication channels at the site remained non-functional due to the bad weather.

"Sad news was received about many workers being buried under an avalanche during the construction work being carried out at the BRO near Mana village in Chamoli district. Relief and rescue operations are being carried out by ITB, BRO and other rescue teams," Uttarakhand Chief Minister Pushkar Singh Dhami said.

Describing it as a tragic incident, Defence Minister Rajnath Singh said that he has spoken to the Chief Minister and taken stock of the situation.



Topic → Understanding Avalanches

Avalanches are catastrophic events that occur when a mass of snow, ice, and debris suddenly descends down a mountainside. They can be triggered by various factors and are categorized into different types, such as:

Slab Avalanches: Occur when a cohesive layer of snow breaks loose.

Powder Avalanches: Comprise loose, dry snow that flows rapidly.

Wet Avalanches: Form when melting snow creates a heavy, slushy mass.

Causes and Contributing Factors

Several elements contribute to avalanche formation, including:

Weather Conditions: Heavy snowfall, rain, and rising temperatures can destabilize snowpack.

Terrain: Steep slopes are more prone to avalanches.

Human Activity: Skiing, snowboarding, and other outdoor activities can trigger slides.



Avalanche Safety Measures

As the risk of avalanches escalates, understanding safety measures is paramount for anyone venturing into the backcountry.

Importance of Preparation

Research: Always check avalanche forecasts and reports before heading out.

Training: Enroll in avalanche safety courses to learn how to assess risks.

Equip Yourself: Carry essential gear such as beacons, probes, and shovels.

Tools and Resources for Safety

Several tools can enhance your safety, including:

Mobile Apps: The Utah Avalanche Center has launched a mobile app that provides real-time alerts and forecasts.

Avalanche Beacons: These devices help locate individuals buried under snow.

ISRO's Aditya-L1 mission captures first-ever image of a solar flare 'kernel'

The Hindu Bureau
BENGALURU

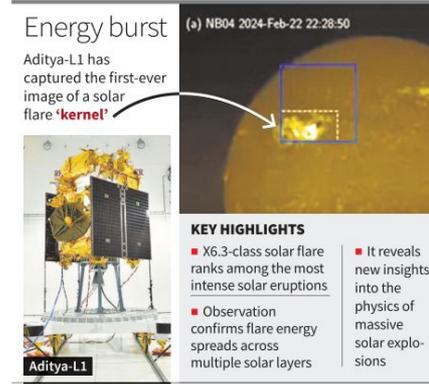
India's first dedicated space-based solar mission, Aditya-L1, has made a ground-breaking observation as one of its scientific payloads has captured the first-ever image of a solar flare 'kernel'.

The Solar Ultraviolet Imaging Telescope (SUIT) payload has captured the image in the lower solar atmosphere – the photosphere and chromosphere.

ISRO said that this observation and associated scientific results mark a major step towards understanding the Sun's explosive activity and its impact on Earth.

According to ISRO, "On February 22, the SUIT payload onboard Aditya-L1 observed an X6.3-class solar flare, which is one of the most intense categories of solar eruptions. The unique feature of this observation was that SUIT detected brightening in the Near Ultra Violet wavelength range (200-400 nm) – a range never observed before in such detail".

These observations confirm that the energy released from the flare spread through different layers of the Sun's at-



Observations confirm that energy from the flare spread through different layers of Sun's atmosphere

mosphere. This provides new insights into the complex physics responsible for these massive solar explosions, the space agency added.

One of the most exciting revelations in this observation is that the localised brightening captured in the lower solar atmosphere corresponds directly with an increase in the temperature of plasma in

the solar corona at the top of the solar atmosphere.

According to ISRO "This confirms the linkage between flare energy deposition and associated temperature evolution. This finding also validates long-standing theories while offering new data that will help to reshape our understanding of physics of solar flare".

The Aditya-L1 mission was launched on September 2, 2023. On January 6, 2024, the spacecraft was successfully placed in a large halo orbit around first Earth-Sun Lagrange Point, known as Lagrange Point L1.

Topic → India's Aditya-L1 Solar Mission

Overview of Aditya-L1 Mission

First Solar Mission: India's Aditya-L1 is the first dedicated space-based solar mission.

Launch Date: Launched on September 2, 2023.

Orbit Achievement: Successfully placed in orbit around the Earth-Sun Lagrange Point L1 on January 6, 2024.

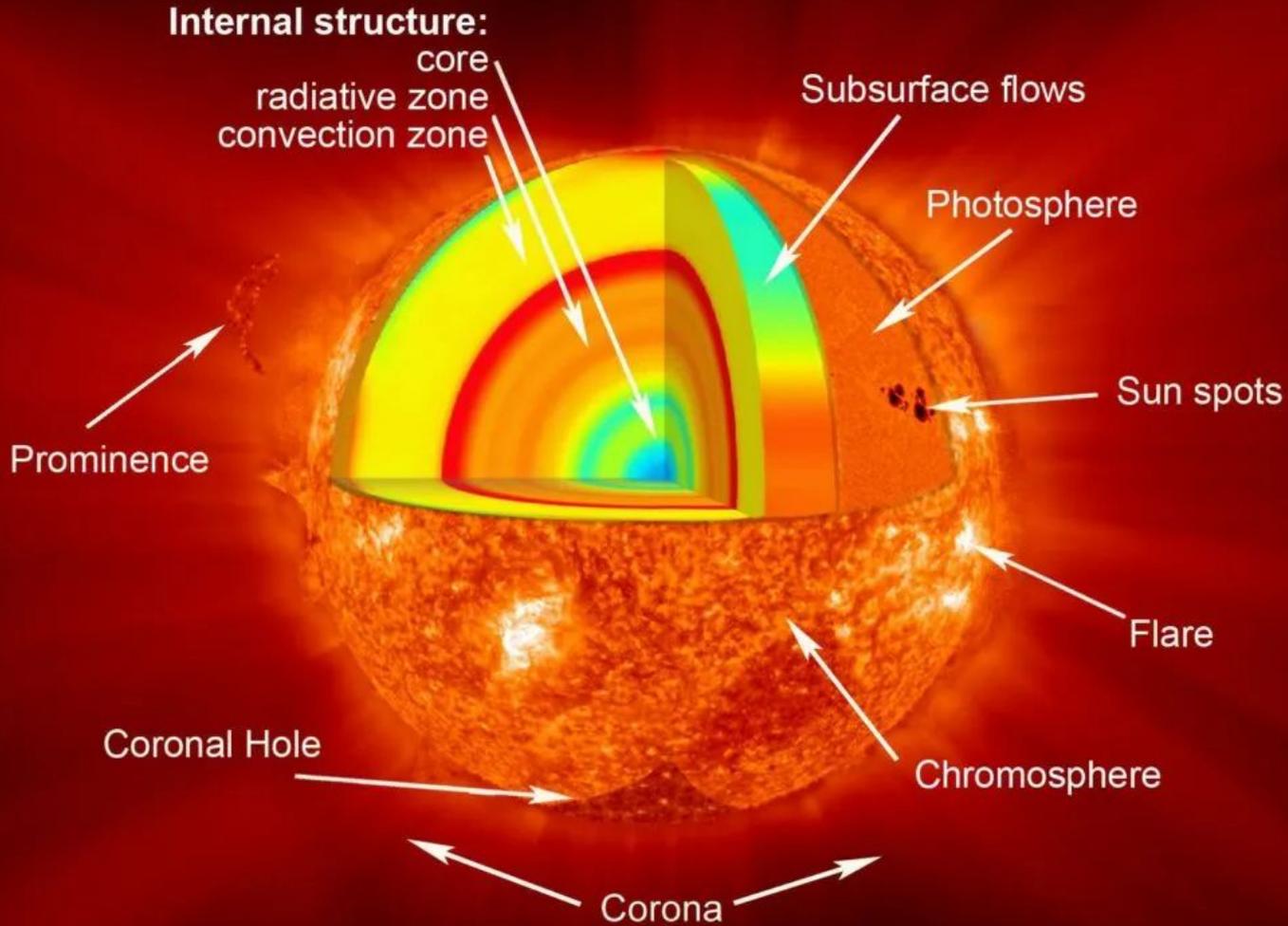
Breakthrough Observations

First Image of Solar Flare: Captured by the Solar Ultraviolet Imaging Telescope (SUIT).

The Solar Ultraviolet Imaging Telescope (SUIT) captured the first-ever image of a solar flare **'kernel'**.

Observation Details: Image taken in the lower solar atmosphere, specifically the photosphere and chromosphere.





Significant Solar Event ⚡

Event Date: February 22.

Flare Class: X6.3-class solar flare, one of the most intense solar eruptions.

Scientific Insights 🔍

- Energy Release: Observations provide insights into energy release and effects across different layers of the Sun's atmosphere.
- unique feature of this observation was that SUI7 detected brightening in the Near Ultra Violet wavelength range (200-400 nm) — a range never observed before in such detail”.
- Temperature Correlation: Brightening observed correlates with an increase in plasma temperature in the solar corona, confirming theories about flare energy deposition.

- One of the most exciting revelations in this observation is that the localised brightening captured in the lower solar atmosphere corresponds directly with an increase in the temperature of plasma in the solar corona at the top of the solar atmosphere.



The necessity of mainstreaming wetland conservation



The *suo motu* public interest litigation by the Meghalaya High Court very recently, to monitor the conservation of wetlands in the State brings the focus back on this important ecosystem. Since 1971, February 2 is observed every year as 'World Wetland Day' to mark the adoption of the Ramsar Convention, an international treaty for the conservation of wetlands, which was signed in the Iranian city of Ramsar. The theme this year was "Protecting Wetlands for Our Common Future". It is a theme that has appropriately positioned wetlands in the sustainable development perspective, as espoused in the Brundtland report, 'Our Common Future', and published by the UN World Commission on Environment and Development in 1987.

Many pressures

Wetlands, one of the most biologically productive ecosystems, provide multiple benefits. Globally, wetlands cover an area of 12.1 million km², or around 6% of the earth surface, providing 40.6% of global ecosystem services. However, they are under severe stress, both qualitatively and quantitatively, due to various development activities including population growth, urbanisation, industrialisation, and increasing demand for land to cater to various human needs and climate change.

Since 1900, as much as 50% of the area under wetlands has been diverted to accommodate various other uses, as one of the studies indicated. Wetland surface area, both coastal and inland, declined by about 35% between 1970 and 2015. Globally, the rate of loss estimated with the Wetland Extend Trends (WET) index is (-)0.78% a year, which is more than three times higher than the loss rate of natural vegetation as estimated by the Food and Agriculture Organization of the United Nations. Around 81% of inland wetland species population and 36% of coastal and marine species have declined since 1970. The extinction risk of wetland species, both plants and animals, is increasing, globally.

The conservation and the management of wetlands have emerged as a major challenge as they are linked to other development issues and can serve in devising nature-based solutions for water management and the mitigation of climate change impacts, besides providing blue-green infrastructures in urban areas. Recognising the importance of wetlands in the larger development context, the Ramsar Convention COP14 that was held in Wuhan, China and Geneva, Switzerland from November 5-13, 2022,



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The conservation and the management of wetlands have emerged as a challenge as these are linked to other development issues

laid stress on preparation of the fifth Ramsar Strategic Plan and recognised that the conservation and management of wetlands cannot be a stand-alone initiative. It needs to be contextualised and appropriately linked to other international environment development initiatives.

Accordingly, the COP14 argued that implementation of the Ramsar Strategic Plan would be an important contribution towards the achievement of the Sustainable Development Goals, meeting the Global Biodiversity targets, the United Nations Framework Convention of Climate Change. It would also align with the UN Decade on Ecosystem Restoration, and any relevant work of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the Intergovernmental Panel on Climate Change (IPCC) and other global programmes relating to wetlands. The global changes resulting from the COVID-19 pandemic and greater knowledge about the impacts of biodiversity loss and climate change since COP13, or the 13th Meeting of the Conference of the Parties to the Ramsar Convention on Wetlands (2018), reinforce the urgency to arrest the loss of wetlands.

The situation in India

India is a signatory to the Ramsar Convention. As of 2023, the Ministry of Environment, Forest and Climate Change has designated 75 Ramsar sites (wetlands of international importance) in the country. These are distributed from the coasts to Himalayan territory, and are diverse in nature. Even some of the river stretches such as that of the Upper Ganga river are designated as Ramsar sites.

However, identification of Ramsar site does not necessarily contribute to its conservation. Moreover, the area under Ramsar sites together cover 1.33 million hectares or around 8% of 15.98 million ha wetlands, presently known and mapped as reported in the National Wetland Decadal Change Atlas, 2017-18 prepared by Space Applications Centre (SAC), Government of India. Based on the location, wetlands are classified as inland and man-made. By 2017-18, India had 66.6% of wetlands as natural wetland (43.9% as inland wetland and 22.7% as coastal wetland).

The area under wetlands is not a static figure. The general trends indicate a reduction in natural wetlands and an increase in man-made wetlands across the country. The SAC study showed that natural wetlands along the coast are declining even in a short span of 2006-07 to 2017-18.

According to an estimate by the Wetlands International South-Asia (WISA), nearly 30% of the natural wetlands in India have been lost in the last four decades due to urbanisation, infrastructure building, agricultural expansion and pollution. The loss is more in urban areas, especially around major urban centres. It is reported that from 1970 to 2014, Mumbai lost 71% of its wetlands.

Another study has shown that wetlands in east Kolkata have shrunk by 36% in 30 years from 1991 to 2021. A recent WWF study has indicated that Chennai has lost 85% of its wetlands. There have been several studies indicating the loss of ecosystem services due to the degradation of wetlands around the world. One such study, of Cali city in Colombia, has brought out that the estimated loss of total ecosystem services due to loss of urban wetlands is \$76,827 a hectare in a year. In the peri-urban area the loss is estimated at \$30,354 a ha a year.

The bigger dimension

At present, most wetland management initiatives in India address the ecological and environmental aspects of the wetland ecosystem. The studies are also limited to some of the major wetlands. At the global level, apart from wetland biodiversity, there is stress on wetland distribution and a characterisation of wetland and human impacts to evaluate and prioritise wetlands for conservation.

Given the varied ecosystem services and values that they offer to society, wetlands form an integral part of ecological, economic and social security. It is important to recognise this larger dimension and investigate the physical, social and economic factors, including alterations, in land use within the catchment area, the drivers which have led to modifications in wetland surroundings, and the ex-situ pressure contributing to wetland degradation and the governance structure.

Wetlands act as a source as well as sink of carbon. Therefore, their role in climate change mitigation has to be carefully evaluated and monitored, something which is hardly attempted now. More effective and comprehensive management strategies are required in response to escalating stress from various climatic and anthropogenic factors. The present approach is insufficient to address all these issues. Wetland management warrants an innovative ecosystem-based approach and it should be mainstreamed within the development plan, as advocated during the Ramsar COP14.

Topic → The Importance of Wetlands: A Focus on Meghalaya's Conservation Efforts

Introduction to Wetlands and Their Significance

Wetlands, encompassing marshes, swamps, and bogs, are among the most biologically productive ecosystems on the planet. They serve as crucial habitats for a diverse range of flora and fauna, playing an indispensable role in ecological equilibrium. Here's why they matter:

Biodiversity Hotspots: Home to countless species, wetlands are essential for maintaining biodiversity.

Natural Water Filters: They purify water by absorbing pollutants, thus enhancing water quality.

Flood Control: Wetlands act as buffers against floods, absorbing excess rainwater and reducing runoff.

What Are Wetlands?

Wetlands can be classified into various types based on their characteristics:

Marshes: Dominated by herbaceous plants, marshes are often found along riverbanks and coastlines.

Swamps: Characterized by woody plants, swamps can be freshwater or saltwater and are often home to various wildlife.

Bogs: These are acidic wetlands that accumulate peat, providing unique habitats for specialized flora and fauna.

Their rich biodiversity makes wetlands one of the most productive ecosystems globally.



The Role of Wetlands in Ecosystem Services

Globally, wetlands cover approximately 12.1 million km², constituting about 6% of the Earth's surface. They are responsible for providing around 40.6% of global ecosystem services, such as:

Water Purification: Filtering harmful substances from water sources.

Carbon Storage: Acting as significant carbon sinks, wetlands help combat climate change.

Habitat Provision: Supporting diverse species, wetlands are crucial for wildlife survival.

However, despite their immense value, wetlands are under severe threat due to urbanization, pollution, and climate change.

World Wetland Day: A Global Perspective

February 2 marks World Wetland Day, an occasion to promote awareness about the importance of wetlands. This day commemorates the adoption of the Ramsar Convention, an international treaty advocating for the conservation of wetlands.

History and Significance: Since 1971, this day has served as a reminder of the vital role wetlands play in ecosystems worldwide.

2023 Theme: The theme "Protecting Wetlands for Our Common Future" aligns with sustainable development goals, emphasizing collective action for safeguarding these ecosystems.

Pressures on Wetlands: A Global Concern

Despite their significance, wetlands face unprecedented pressures. Since 1900, approximately 50% of wetland areas have been lost, primarily due to:

Urbanization: Expanding cities often encroach on wetland areas.

Pollution: Industrial waste and agricultural runoff significantly degrade wetland health.

The Wetland Extent Trends (WET) index indicates alarming loss rates, with wetland surface areas declining by about 35% between 1970 and 2015

The Situation in India

India is home to 75 Ramsar sites, recognized for their international importance. However, the conservation of these sites remains a challenge due to:

Limited Area: Ramsar sites only cover about 8% of the total wetlands in India.

Urban Pressures: Cities like Mumbai have lost up to 71% of their wetlands since 1970, highlighting the urgent need for effective conservation strategies.

The Bigger Picture: Wetlands and Sustainable Development

Wetlands are not just ecological treasures; they are integral to social and economic security. They provide essential services that support livelihoods and enhance resilience to climate change.

Economic Benefits: Wetlands contribute to fisheries, agriculture, and tourism.

Climate Resilience: Acting as natural buffers, they help communities adapt to climate impacts.

To address escalating pressures on wetlands, comprehensive management strategies are essential. Integrating wetland conservation into broader development plans will ensure their sustainability.

Conclusion

The Meghalaya High Court's recent initiative is a timely reminder of the importance of wetlands in our ecosystem. 🌱 As we observe World Wetland Day, let us commit to protecting these vital habitats for a sustainable future.

The steps that will shape India's AI ambition



In the heart of Bengaluru, software developers find themselves racing against time to outbid Chinese rivals for major Artificial Intelligence (AI)-driven projects with international clients. Despite being part of a skilled workforce, deals often slip away due to capabilities Indian firms struggle to match. This is not just a single developer's dilemma. It is a glimpse into India's crossroads.

Faced with a three-way race to catch up with Silicon Valley while being chased by China and South East Asia, India is being subject to rigorous competition. But, if it wants to prevail at the forefront of the AI race, India must recognise that the challenge lies not in whether businesses prefer a local or foreign AI platform but in whether market regulations will inadvertently stifle India's momentum.

The issues in India

Export competitiveness hinges on the nationwide deployment of productivity-enhancing technologies. Indian services and consultancies must incorporate AI technologies to maintain their lead position in the global market. But concerns remain over the massive loss of routine jobs, discriminatory algorithmic decision-making, and the negative risks of human impersonation. In particular, "deepfakes" undermine trust by spreading misinformation, and destabilise political processes eroding credibility rapidly.

AI adoption issues such as misinformation and intermediary liability are at the forefront of the AI discussion in India, as digital platforms have become primary conduits for information dissemination. The general opinion among startups in India is that intermediaries – usually foreign tech giants – often set the rules of engagement, making it challenging for local startups to compete.

Tension has increased since, with recent Indian app developers filing a complaint against Google before the Competition Commission of India. But, putting regulatory and administrative pressure on those companies will not necessarily resolve the core problem of monopolistic



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If it wants to lead in the AI race, India must recognise that the challenge lies in whether market regulations will stifle its momentum

business practices. Regulating AI will interfere with technological adaptation, which will have undesirable consequences on India's relative competitiveness.

India has already localised a significant portion of the AI value chain, and additional AI-related compliance costs may hamper India's ability to outpace commercial rivals such as China and the United States, which have decided to leave AI unregulated.

Navigating the global AI race

India's position as the world's IT powerhouse gives it a unique advantage in the AI era. Attempts to govern and regulate AI occur as industrialised nations compete globally for industrial leadership. The European Union (EU) opted for strict regulation to address risks and societal impacts. In contrast, the U.S. maintains a more hands-off stance, prioritising innovation. India finds itself in a delicate balancing act between these two paths. But the sooner misconceptions about quickly outdated market rules addressing a limited set of hypothetical risks are set aside, the better India can focus on outpacing commercial rivals such as China and the U.S.

There are very good reasons why the EU has chosen to legislate through binding laws, mainly due to its unique structural deficiencies. The EU lacks a supranational constitution that safeguards human rights and protects citizens against AI-based surveillance or policing by its member-states. Therefore, unlike India, the EU must enact binding rules to pre-empt AI laws by national governments that will otherwise fragment its single market.

Additionally, the costs of regulatory failure are too high if India's exporting capabilities are at stake, particularly given Chinese dominance in hardware and cloud technologies. India has previously taken inspiration from EU or U.S. laws. However, it must follow its own paths and pursue its national interests based on its services-driven industrial profile.

Introducing regulatory attempts that can

impede AI development in India may allow businesses to repatriate from India and relocate IT development and software research and development to other countries with more AI-friendly rules. In other words, Indian IT services and consultancies held back by AI regulations run the risk of losing their hold of the global market.

Instead, the Indian government can use its diplomatic influence to ensure that open-source models remain open, accessible, and commercially viable, paired with international strategic partnerships for energy security, computing resources, and international standardisation.

A case for regulatory clarity

Building on the expected strong adoption of AI, public officials have a responsibility to listen to political and social concerns. While India is not explicitly pursuing ex-ante product regulation on AI akin to that in Europe (or previously planned in California), various agencies have launched conflicting policies, resulting in a minor power struggle that resulted in a fragmented policy landscape.

Lessons learnt from the EU and the U.S. point to the need to strengthen and future-proof existing laws rather than produce new ones. Current transitional guidelines have shown a feasible pathway to avoiding overlapping liability or regulatory blindspots by re-interpreting existing legislation. India has a comprehensive framework for antitrust, corporate liability, free speech, and public order that covers AI development and use cases. India may not need AI-specific rules legislation such as the IT Act.

India must choose its own path according to its national interests. The challenge lies not in whether businesses prefer a local or foreign AI platform but in encouraging rapid adoption and supporting open-source and other alternatives accessible for fine-tuning and transferring learning in its IT industry.

The views expressed are personal

Introduction: The Competitive Landscape of AI

- In the vibrant tech ecosystem of Bengaluru, the race for Artificial Intelligence (AI) development has reached a fever pitch. 🎉 Software developers in this bustling city are not just vying for local projects; they find themselves in a global contest against formidable rivals from China.
- With lucrative AI-driven contracts on the line, the stakes are significantly high. Despite boasting a skilled workforce, many Indian firms struggle to clinch these valuable deals. This scenario underscores a pivotal moment for India, as it navigates the crossroads of innovation and competition.
-

The Indian Dilemma: Outbidding Rivals

Skilled Workforce vs. Capabilities: While Indian developers exhibit remarkable talent, they often lack the advanced capabilities and technologies that their Chinese competitors offer. This disparity is not just about who can write code faster; it's about delivering innovative and robust solutions that meet the sophisticated demands of international clients.

Outbidding by Chinese Firms: A plethora of factors contribute to this trend, including superior infrastructure, substantial government support, and aggressive investments in research and development by Chinese companies. These elements give Chinese firms a significant competitive advantage, often leading to Indian companies losing out on lucrative contracts.

The Three-Way Race: India, China, and Silicon Valley

As India strives to catch up to the innovation levels of Silicon Valley, it faces relentless competition from China and Southeast Asia. The importance of market regulations cannot be understated in this fierce race:

Regulatory Impact: India's business environment is influenced by various regulations that can either hinder or promote innovation. The challenge is not merely about preference for local versus foreign AI platforms, but how these regulations shape the competitive landscape for Indian firms.

Strategic Insights: To effectively compete, Indian companies must not only innovate but also navigate these regulatory terrains adeptly, ensuring that compliance does not stifle creativity and growth.

Challenges Facing Indian Developers

Job Losses and Algorithmic Decision-Making: The rapid adoption of AI raises concerns about job security in routine roles. Developers must grapple with the ethical implications of algorithmic decision-making, which can inadvertently lead to biased outcomes.

The Threat of Deepfakes: The proliferation of deepfake technology poses a substantial risk, as these AI-generated videos can be exploited to spread misinformation and disrupt socio-political stability. Developers need to be vigilant and proactive in addressing these challenges.



The Role of Intermediaries in AI Adoption

Complaints Against Tech Giants: Indian startups frequently feel overshadowed by the dominance of foreign tech giants, which often dictate market dynamics. Recent complaints by Indian app developers against Google highlight the existing tensions in the marketplace.

Regulatory Pressure: While regulatory pressure may seem like a solution, merely targeting these giants may not address the deeper issues of monopolistic practices and could lead to stifled competition for local players.

Navigating the Global AI Race

India's Unique Position: India's stature as a leading IT hub endows it with unique advantages in the AI landscape. However, as the global competition heats up, the nation must navigate a delicate balance between fostering innovation and implementing necessary regulations.

Balancing Regulation and Innovation: To maintain its competitive edge, India must shed outdated regulatory misconceptions and focus on creating an environment that promotes rapid AI adoption without compromising ethical standards

The EU vs. US: Lessons for India

- Learning from Regulatory Practices: India can glean valuable lessons from the EU's stringent regulations aimed at protecting citizens from AI misuse.
- However, it must also tailor its approach to align with its service-driven economy, ensuring that regulations foster growth rather than hinder it.

Conclusion: Charting a Path Forward

As India stands at this critical juncture, the imperative is clear: it must promote swift AI adoption while championing open-source alternatives. The future of the IT industry in India hinges on its ability to adeptly navigate these multifaceted challenges and secure its position in the global marketplace

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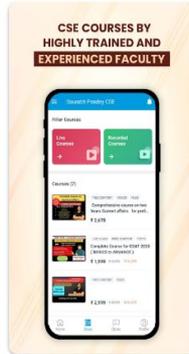
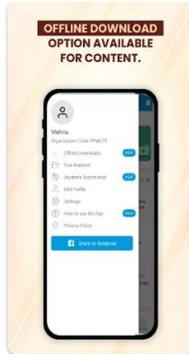
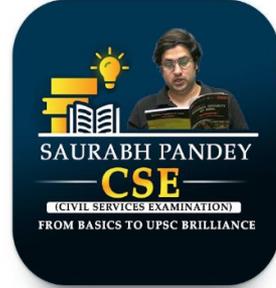
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