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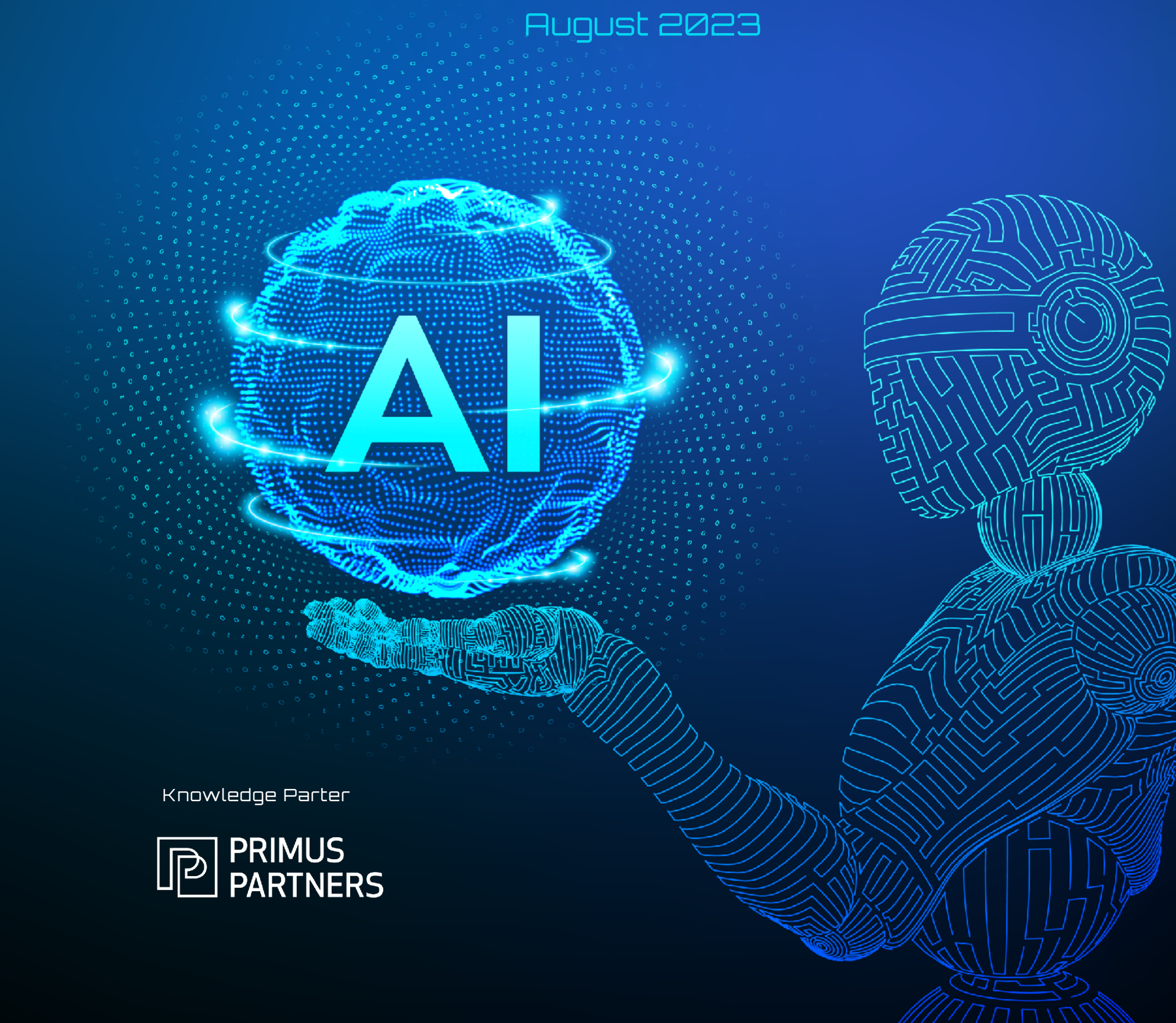
Artificial Intelligence

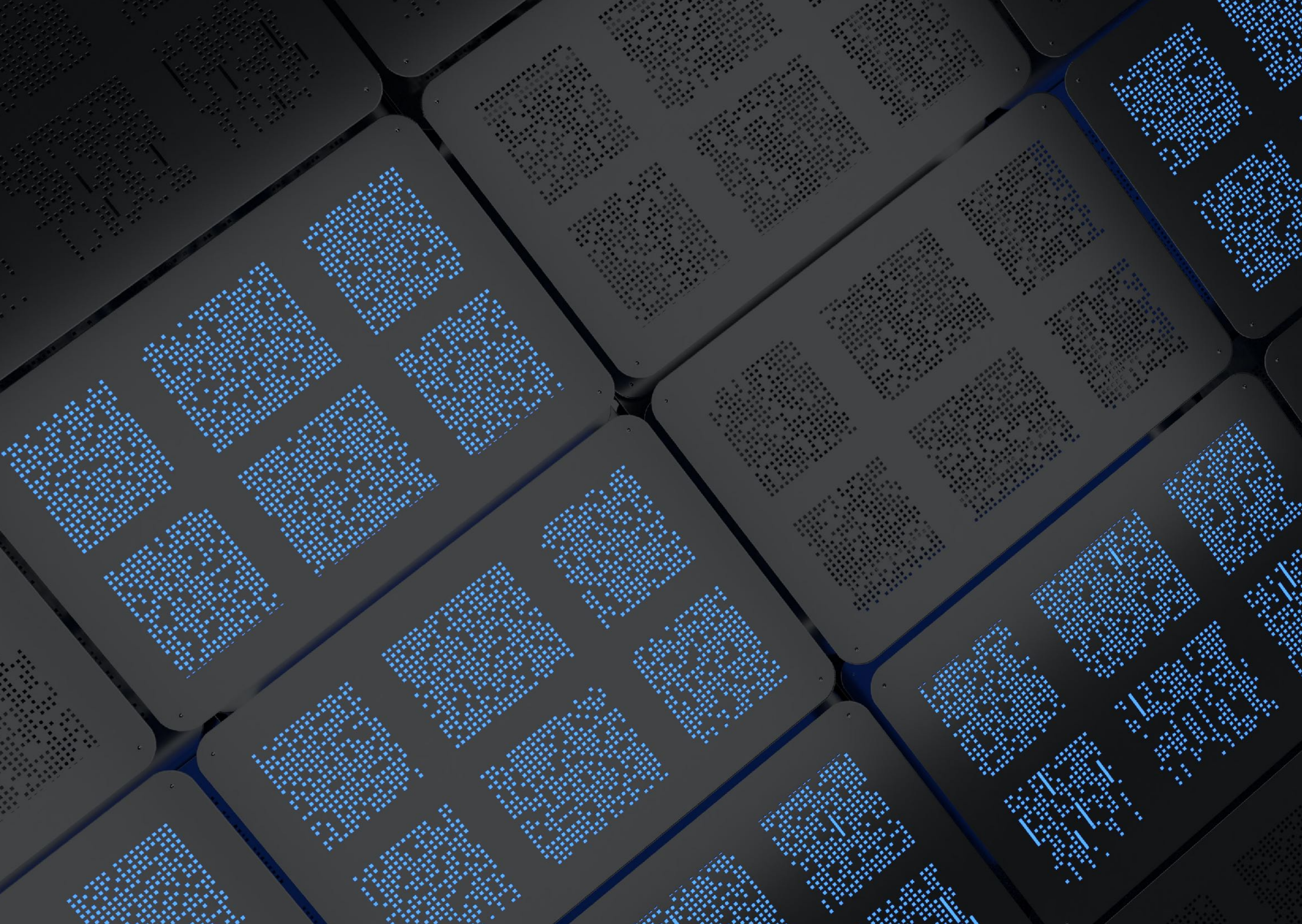
The next Y2K opportunity for India

August 2023



Knowledge Parter

PRIMUS PARTNERS



Foreword

Mr. Deepak Sood

Secretary General,
ASSOCHAM

Artificial Intelligence (AI) is definitely one of the technological phenomena that stands out as a hallmark of innovation. It has the potential to be a transformative force, reshaping industries, revolutionizing how we interact with technology, and fundamentally altering the fabric of society. AI, and especially generative AI, has immense potential for benefiting the country, and this publication looks at exploring the myriad benefits and the unparalleled importance of AI and to serve as a guide on our collective journey into this intelligent future.

Artificial Intelligence, once relegated to the realm of science fiction, has swiftly become a pivotal reality that permeates every aspect of our lives. From personal assistants and recommendation systems to autonomous vehicles and advanced medical diagnostics, AI's presence is both ubiquitous and profound. Its impact reaches far beyond individual conveniences, penetrating into complex fields like healthcare, finance, manufacturing, and environmental sustainability, where it bestows a remarkable promise of efficacy and efficiency.

Moreover, AI holds the potential to bridge societal gaps, fostering inclusivity and propelling us towards a more equitable future. By enabling personalized education, AI helps learners of all ages unlock their full potential, irrespective of their circumstances. Through language translation and sentiment analysis, AI amplifies voices across the globe, fostering cross-cultural under-standing and fostering collaboration on a global scale.

ASSOCHAM has prepared this report along with Primus Partners documenting the potential benefits of AI across sectors, exploring the challenges and to share recommendations for the country to generate maximum benefits out of this technology. While the Y2K opportunity in the late 1990s catapulted Indian IT industry into a different trajectory and led to the subsequent growth of the Indian IT / services industry, AI has the potential to be the next Y2K moment for our industry. The report can be extremely useful to all stakeholders involved in driving the AI journey including Government, industry and academia to help take the country forward in this journey.

Foreword

Mr. Devroop Dhar

Co-Founder and MD
Primus Partners

The rise of AI has unlocked a new era of human achievement, presenting us with an unparalleled opportunity to redefine our existence. Through its ability to replicate human intelligence and learning capabilities, AI has transcended the boundaries of traditional computing, reshaping industries and solving challenges that once seemed insurmountable. From healthcare to finance, from transportation to education, AI's potential to optimize processes, accelerate innovation, and enhance decision-making is nothing short of awe-inspiring.

While the benefits of AI are undoubtedly vast and promising, we must also address the importance of ethical considerations and responsible implementation. As AI's influence expands, it is crucial to develop robust frameworks to ensure transparency, fairness, and accountability in its deployment. The responsible stewardship of AI will determine whether we can harness its potential to create a more inclusive, equitable, and sustainable future for all of humanity.

This report has been prepared encompassing various facets of AI, including its benefits, use cases across different industries, challenges and need for regulation and recommendations. The report has been prepared based on industry data analysis, expert opinion and views and our analysis. The report also lays out a framework for organizations to map their present position in their journey for AI adoption and would be useful for organizations of all sizes.

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Artificial Intelligence: An idea whose time has come

Imagine a world where a virtual assistant answers your phone, takes notes and fixes your appointments. Your food is ordered as per dietary preference at a fixed time and car ignition is turned on based on calendar events even before you reach your keys. What will this world look like? Will the world really go human-less and machine centric in the decades to come? What is this technology and how will it change the nature of the man-machine interaction.

21st century is being pegged to be the century of disruptive changes. From global conflicts to global cooperation, from sustainable development to the gravest climate catastrophes and from the rising menace of unemployment to the rapid pace of developing sophisticated technology, the world has been moving between extremes. The rise of Artificial Intelligence (AI) and technologies such as cognitive thinking and machine learning is another case in point.

But what is Artificial Intelligence? How can machines with gears and no neurons be labelled as thinkers? Where do the nuances lie? At what threshold will the machine replace humans?

What is AI?

In simple terms, AI is the ability of a machine to think and take decisions based on systemic algorithms and data inputs. After being supplied with possible circumstances, and desired outcomes, the algorithm enables the machine to work on a plethora of permutations and combinations of possible outcomes and optimise the moves for the highest chances of success. In doing so, AI will generate possibilities and outcomes that the human mind is incapable of at that processing speed.

Some of the tasks that can be taken up by AI in specific industries are listed below:

Healthcare

- Analyse and Act on structured and unstructured medical data for consultation and research
- Assist healthcare workers in relevant medical procedures
- Suggest treatment and diagnosis plans for better patient recovery
- Predictive analysis of spread of infectious diseases based on topological, demographic and social factors
- Use of tools by medical institutions for better infra-structure management

Education

- Use of AI based solutions for educational training provide customised feedback based on student performance
- Augmented and Virtual reality for smart content creation to retain student curiosity
- Better content creation based on contemporary societal trends and demand of the education sector
- Analyse student performance data and enable target bridging of skill gaps
- Better vigilance during examination
- Real time and specific progress reports for parental clarity
- Universal access for students irrespective of geographical location

Agriculture

Determine soil and crop health based on nature of land clubbed with current weather conditions

Predictive analysis of local weather conditions and suggest crops

Greater insights for animal husbandry and dairy farming

Drones are being deployed for targeted pesticide spraying as well as for aerial drip water irrigation to ensure water conservation

Suggest best suited farming practices such as right mix of fertilisers, crop protection and harvesting techniques based on local conditions

Ensuring better yield price by analysing market conditions and competition analysis

Can be used for management of stock and surplus by institutions such as FCI to minimise post yield losses

Governance

- Better utilisation of public funds by use of financial monitoring and disbursements programs
- Data analysis of the effectiveness of social schemes and devise newer ways of efficient utilisation of resources
- Manpower monitoring at a decentralised level
- Use to monitor data by depart-mental authorities to support in policy making such as traffic management, railway management, flood and drought prediction, monitoring of state infrastructure

Travel and Hospitality

- Attend to basic customer service queries
- Curate/suggest travel itineraries based on user preferences
- Use of humanoids as guides/hosts/ escorts at hotels, airports and other points of customer reception
- Back-office data analysis of earning based on sources of revenue, based season to roll out offers, customer feedback and customer response to targeted advertising
- Suggest and run target advertising campaigns on special occasions
- Customer feedback management and customer sentiment analysis through data available on public platforms and social media
- Summarising and suggesting improvements using feedback data
- Predictive analysis to track the price trend and send customer alerts to book the best deal

Case Study:
ChatGPT

A very recent case in point is that of Chat GPT. Chat GPT caught the world by surprise with its ability to think on a human's behalf and generate results on an infinite number of topics. Not only was the tool analytical but also philosophical. In a matter of a few days, the global media was abuzz with people sharing their unique experiences with their new thinking assistants.

Application

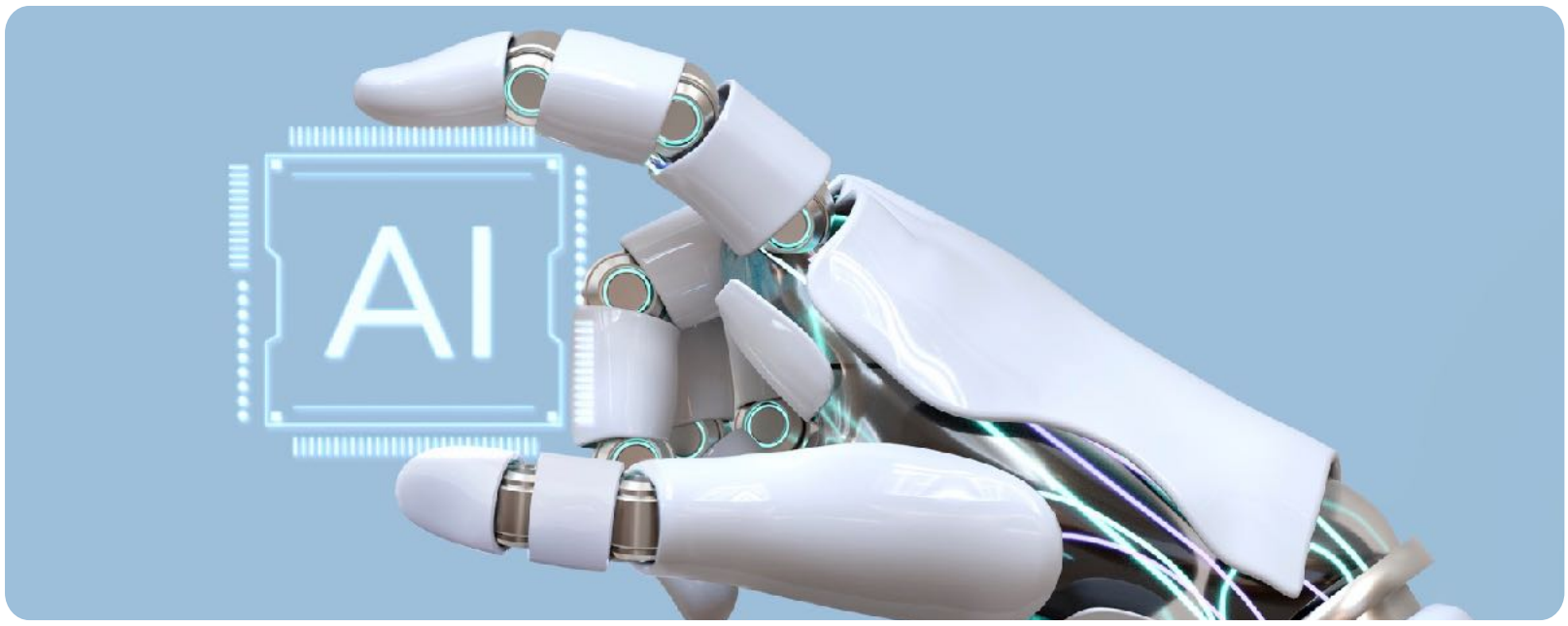
The experiences with Chat GPT showed new dimensions of machine learning. Unique experiences included simple interactions such as composing poems to complicated ones such as a philosophical discussion on resolving global conflicts. Fed by most updated open-source data coupled with unimagin-able processing speed, the tool soon made humans sceptical of their civilisational intellectual hegemony as being the only thinking species.

Case Study:
Temi and Sophia

Another successful real life application of machine learning is the success achieved in the deployment of humanoids and semi-humanoids in various services. Automation of hitherto manual services of reception and escorting have now been delegated to robots and humanoids. Temi and Sophia being the two cases in point.

Application

While Sophia is a humanoid which has the appearance of a human and the programming of a robot, Temi is a fully programmed robot trained to perform assistive activities. Today, these devices are being deployed successfully in medical institutions for assistive surgeries, as teaching assistant in learning centres, as watchers in day care centers and for meet and greet services in busy airports like Delhi and Bengaluru.



How does a machine do it?

There are ample real-life cases available glorifying the use of AI to compliment human effort. Adoption of AI processes has reduced human effort while speeding up processes at the same time.

But a natural question that arises is – How does a machine do it? It was neurons that led a human brain to churn for ideas and catalyse thinking, what gives machines the ability to think beyond what has been fed into them. The answer lies in the development of a technology called Machine Learning (ML). ML is the process of creating artificial neural networks in machines enabling them to process multitudes of data.

It is the process by which data and algorithms are intertwined enabling a machine to go through the possibilities of different outcomes repeatedly and rework the efficiency in every move.

Case Study:

Self-learning in AI - Alpha Zero

The most successful example of self-learning in AI is that of Alpha Zero, an AI based chess playing program that has returned unbeaten till date. While there have been artificial chess playing tools in the past, what makes Alpha Zero stand apart is its ability to play against itself and improve the possibility of winning with every move. The tool was fed with the rules of the game and the desired outcome of winning which led it to discover moves unknown to the human mind.

Generative AI:
The Talk of The Town

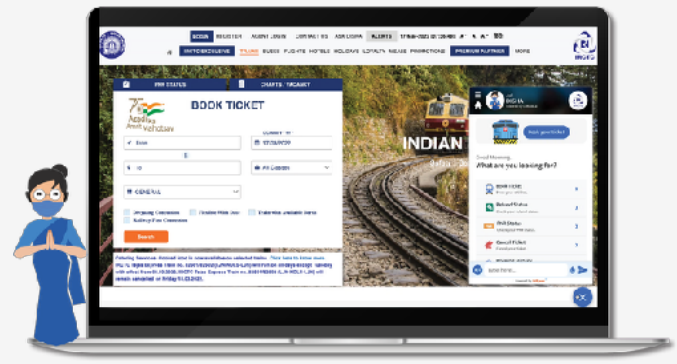
The ability of a machine to think and generate outcomes based on learnings from past experiences of humans and the ability to improve likely outcomes is called generative AI. A move which stamps the thinking/processing ability of bots. This ability can further be categorised in three different ways based on the inputs given. Supervised learning, Unsupervised learning, and Reinforcement learning.

1. **Supervised learning** is when labelled inputs are fed in as per the desired output and the AI works on the possibility of an outcome based on novel inputs. A practical example of the use of supervised learning is the use of intelligence-based tools to generate images.

2. **Unsupervised learning** is where the data fed to the machine is raw in its structure and labelling of the data happens as a part of the thinking process. A practical example of this is the use of algorithms in OTT platforms where based on user preferences the suggestive results change.

4. A third and a more complicated form of training is the **Reinforcement learning** where AI occupies a more active role rather than a passive one of just identifying data. The data processing happens at a more real time level with simultaneous processing of responses to input actions.

IRCTC developed and implemented AI powered Chatbot called **ASK DISHA** for customer facilitation in its internet ticketing site. The AI powered chatbot & virtual assistants using the technologies of Machine Learning (ML) and Natural Language Processing (NLP) in addition to AI has helped IRCTC to respond to customer queries regarding their travel and helped improve customer satisfaction by 70%.



EXPERT VIEW

Mr. Rohit Purohit
CEO
ViitorCloud

Harnessing AI Disruption while upholding Governance through AI Integration Framework

In an era where AI is not just a technology but a catalyst for transformation, how can leaders harness its power responsibly?

AI is undeniably reshaping our world, transcending every boundary and sector. For modern leaders, the allure lies not just in adopting AI but mastering its strategic and ethical integration. This monumental task is more than just tech integration; it's a leadership challenge of unparalleled dimensions.

AI isn't merely technology; it's a transformation catalyst. The question for Indian leaders: **How do we ride this wave, fostering innovation while maintaining ethical checks?**

It is observed that "Every month, there are stunning new AI models and applications." Yet, another side is that the "Success will hinge on AI integration, not mere access." Therein lies the crux — **leaders must balance scale with oversight.**

AI Landscape

From revolutionizing healthcare to steering autonomous vehicles, AI's imprint is ubiquitous. This transformation has industries scrambling to decode the AI formula.

AI is not just a technology; it is a primary driver of societal shifts. India, despite its formidable IT might, has a largely untapped AI potential. Indian organizations and leaders, both in public and private sectors, can leverage this technology to drive innovation and value creation at an unprecedented scale. AI's incorporation demands visionary leadership. It's more than operations; it's a strategic pivot, making AI a boardroom staple.

India, with its rich culture, demographics, and economic complexities, offers a unique setting for the AI paradigm. The confluence of a matured digital ecosystem, an expansive IT sector, and an immense pool of skilled talent provides India an edge in the AI narrative. With strategic directives like the NITI Aayog's AI blueprint, India is poised for AI leadership. **The challenge: marrying technology with ethics, scaling with oversight.**

AI, being consequential in real-world applications, mandates ethical oversight. As AI finds applications in sensitive areas like finance, healthcare, and national security, a robust governance framework is vital.

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The AI Integration Framework

AI's transformative power lies in its seamless integration into business processes, governance structures, and strategic outlook. As the industry witnessing different frameworks on case-to-case bases, here is an approach that encompasses strategic, tactical and governance outlook to aid AI's successful integration across organizational goals, functions and societal norms.

AI Integration		
Strategic Vision	**Tactical Execution**	**Governance**
Define the Purpose of AI Integration	Infrastructure Readiness	Form working groups
Include relevant stakeholder in the vision	Build skills across organizational roles	Mandate regular audits of AI's outcomes
Aim for Future Proofing	Integrate with close collaboration among the stakeholders	Continuous Feedbacks

1. Strategic Vision

Pinpointing AI's purpose, considering all stakeholders, and staying ahead of AI trends.

Purpose-driven AI: At the heart of AI's integration should be a clear, overarching purpose. Whether it's enhancing customer experience, improving efficiencies of primary health care centres, optimizing supply chains, or deriving insights from data, the "why" of AI should be well-defined. This clarity acts as a compass, guiding the scaling efforts.

Stakeholder Inclusion: AI's reach is expansive, affecting multiple stakeholders, including citizens, employees, customers, partners, students and even competitors. As part of the strategic vision, leaders must ensure that AI initiatives have an inclusive outlook, taking into account the perspectives of all impacted stakeholders.

Future Proofing: The landscape of AI is ever evolving. As part of the strategic vision, leaders should engage in future forecasting, understanding emerging trends, and preparing the organization for upcoming AI paradigms.

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2. Tactical Execution

Ensuring infrastructural robustness, workforce upskilling, and fostering collaborations.

Infrastructure Readiness: Mainstreaming AI requires a robust technological foundation. This involves investments in hardware, cloud platforms, and networking capabilities. An efficient AI system also requires clean, organized, and accessible data, necessitating robust and secure data management systems.

Skill Development: As AI becomes central, there's an impending need to upskill the workforce. From specialized AI training for tech teams to awareness programs for the non-tech staff, ensuring that the organization's human capital is AI-ready is vital.

Collaborative Ecosystems: The complex nature of AI solutions often requires a synergy of varied expertise. Building collaborative ecosystems, involving tech providers, academia, industry experts, and even competitors, can propel AI initiatives, ensuring they are holistic and cutting-edge.

3. Governance

Instituting ethics groups or committees, conducting regular AI audits, and ensuring feedback-driven AI refinements.

Ethics Committees: An essential facet of AI governance is the establishment of ethics committees. Comprising domain experts, ethicists, and external advisors, these committees can scrutinize AI projects with help of modern tools, ensuring they align with ethical standards.

Regular Audits: To ensure transparency and adherence to standards, regular AI audits should be conducted. These audits, possibly bi-annual or annual, evaluate AI systems' performance, ethics, and alignment with organizational goals. Existing set of audit tools can be leveraged.

Feedback Mechanisms: AI systems are iterative. They learn, adapt, and evolve. Establishing feedback mechanisms, where AI system outcomes are regularly evaluated, and feedback is looped back for system refinement, is essential. Depending on the cases, a human intervention led feedbacks bring more trust and reliance.

This framework can provide a structured path for leaders, ensuring AI is not just adopted but embedded, not just functional but ethical, and not just transformative but aligned with organizational attributes.

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The Way Forward

Leaders need not only understand its power but also guide their organizations in harnessing it responsibly and effectively. Here are some actionable steps within the framework for navigating this ever-evolving landscape:

1. Embrace Cultural Shift:

- Establish teams dedicated to aiding employees in adapting to AI-driven changes.
- Foster a culture of innovation, where employees at all levels understand the value of AI and are encouraged to think of its applications in their respective roles.

2. Resource Allocation and Investment:

- Set aside a portion of the annual budget specifically for AI R&D, training, and implementation.
- Ensure the organization's infrastructure, from cloud storage to processing capabilities, can handle advanced AI applications.

3. Foster Collaborative Ecosystems

- Engage in or create consortiums that allow for knowledge sharing, best practices, and collaborative projects.
- Collaborate with universities and research institutions for fresh perspectives and access to emerging AI research.

4. Setting AI Strategy:

- Set up a dedicated AI board comprising internal stakeholders and external experts to craft a forward-looking AI strategy.
- Pinpoint sectors or processes within your organization that can most benefit from AI integration.

5. Skills Acquisition:

- Organize monthly AI seminars, workshops, or webinars to stay updated with the latest trends.
- Partner with leading AI research institutions for specialized training sessions.

6. Transparent Algorithms

- Where possible, opt for transparent AI models that allow stakeholders to understand the decision-making process.
- Designate AI accountability teams responsible for any decision-making or implications arising from AI applications.

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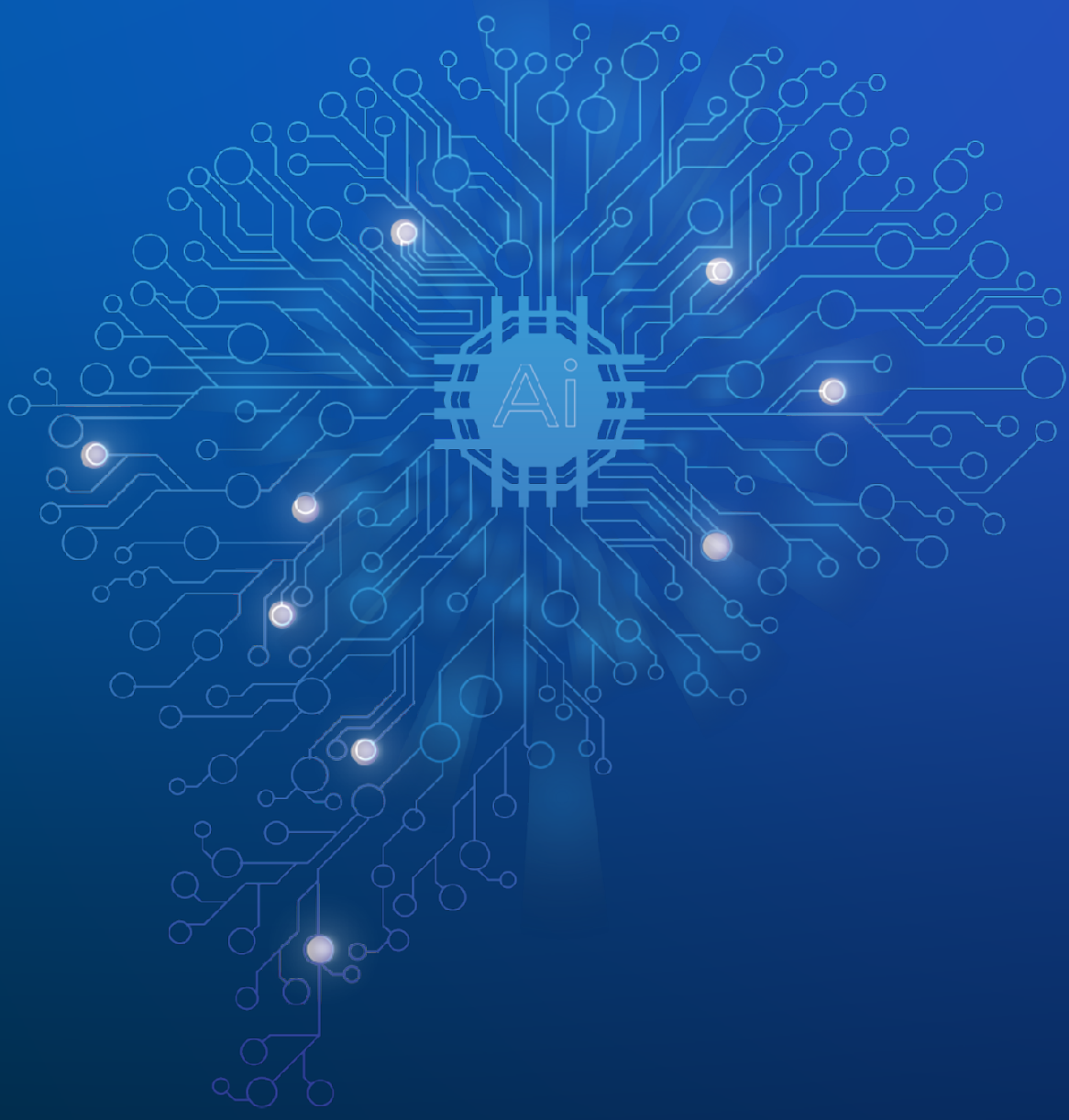
7. AI Governance and Oversight:

- Create an AI ethics charter, ensuring every AI implementation aligns with these principles.
- Regularly review AI models to check for and rectify any inherent biases.

8. Iterate, Adapt and Scale:

- Establish mechanisms for continuous feedback on AI implementations, refining models and approaches accordingly.
- Before broad-scale implementation, run pilot projects to test the feasibility and effectiveness of AI models.

Embracing AI demands not just technological changes but a cultural and strategic shift. By leading with vision, ethical responsibility, and adaptability, the leaders can not only harness the potential of AI but also pave the way for sustainable, responsible, and innovative growth. It's a journey of harmonizing machines with our mission, ensuring that every stride we take with AI is thoughtful, impactful, and resonates across sectors.



02

How can AI contribute to the India growth story

India's rise on the IT canvas of the world owes it to the Y2K bug which brought the global IT industry to its edge in 1999. Timely intervention of the IT leaders together with the strength of Indian workforce changed the destiny of an entire nation.

In the ensuing year, IT exports made for 75% of the total revenue from exports in India. What ensured success over two decades ago was the ability of industry leaders to grab the opportunity at the right time and ensure timely intervention. IT sector then came to be the sunrise sector of Indian economy growing year-on-year and bringing in billions as IT service exports grew.

Rise of Artificial Intelligence will also mark another such moment for the Indian economy. Ability of techpreneurs to make early investments will turn the hitherto tech giants into incubators for more efficient use of AI in what is still a blue ocean space for the industry.

By most liberal estimates, AI and allied services are estimated to add over 960 billion USD to the Indian economy by 2035 and approx. 400-500 billion USD by 2025 to the nation's GDP. [1] Greater adoption of AI at all levels of society will also have added advantages of improved productivity, reduction in costs and availability of greater opportunities in research and innovation. Use of AI for knowledge management and advisory services will also facilitate greater exchange of information and best practices across borders.

[1] Team Lease Digital Report

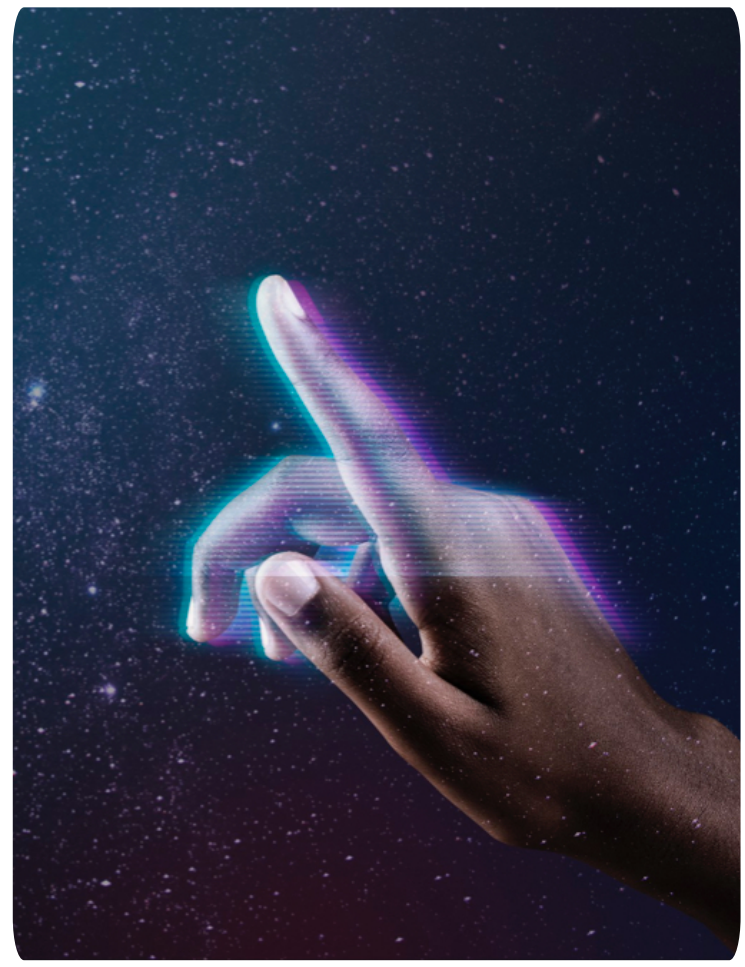
The industry is upbeat about the growing role of AI in boardrooms. Investment in the technology has grown by over 35% annually. A study also revealed that generative AI (GAI) was a part of almost 17% of boardroom discussions in the first quarter of 2023. [2] With the support of strong digital and IT infrastructure and policies to incentivise research and innovation, AI software services are expected to grow at 18% annually benefits of which will be divided across the socio-economic strata.

Anudeep Nagalia

Founder & CEO
KriyaFit

With the world moving to online shopping, all major eCommerce players have been competing to get a higher share of the customer's wallet. The next phase of growth in ecommerce will be driven by personalization, understanding even their unstated needs and how well platforms are able to connect with customers. Especially in health and fitness, there is a huge opportunity for someone to partner closely with customer, starting from monitoring their daily vitals, hydration, sleep patterns, fitness routines and leverage AI to offer based Deep Personalization in their health and wellness journey.

[2] What CEOs talked about, IoT Analytica Report



Governments in India have been supportive of the AI drive

NITI Aayog in 2018 released a discussion paper recommending the adoption of a National Strategy for Artificial Intelligence (NSAI) at the central level to chart out rules and regulations for use of AI tools.

Considering the pace of adoption and potential of growth, NITI Aayog recommends the usage of a two pronged stagey of establishing Centres of Excellence to promote research and International Centres of Transformational AI to further develop application-based research. To address questions on ethics, values and accountability of the technology, the paper recommends setting up of consortium of ethics to ensure adherence to standard AI practices.

In 2021, the paper was further developed to draft an approach document for "Responsible AI". In its broadest form, the paper recommends the adoption of ethical code for AI practice on seven pillars:

Pillar 1
Principle of Safety and Reliability

Pillar 2
Principle of Equality

Pillar 3
Principle of Inclusivity and Nondiscrimination

Pillar 4
Principle of Privacy and Security

Pillar 5
Principle of Transparency

Pillar 6
Principle of Accountability

Pillar 7
Principle of Protection and Reinforcement of Positive Human Values

Apart from NITI Aayog / Government of India initiatives, several State Governments have stepped up to support AI in India. A select list of initiatives is given below:

West Bengal AI-ML Technology Promotion Guidelines, 2020:

The Govt. of West Bengal released a guideline to be able to leverage AI-ML technology for real time governance.

T-AIM or Telangana - AI Mission:

Telangana has a statewide AI policy to promote the use of AI and attract investments. The target is to develop Hyderabad as the AI capital hub of India.

Tamil Nadu Safe and Ethical AI Policy 2020:

The TN state policy on AI is aimed at providing a roadmap to policymakers on the adoption of AI based solutions. The policy also mentions in its objectives the need to upskill people considering the changing nature of the work and build a mature and self-sustaining AI community

Karnataka - AI for Good Ideation

The state government of Karnataka partnered with NASSCOM to organise the first ideathon to highlight the widespread use of AI beyond business

Maharashtra - AI for Agriculture

Considering the unpredictable weather pattern and dependence of its populace on agriculture, the Govt. of Maharashtra has also expressed interest in partnering with NITI Aayog to develop a policy deploying the use of AI and allied technologies to mitigate the risks arising out of changing weather patterns for agriculture

EXPERT VIEW

Mr. Vaibhav S Joshi
Co-Founder, CBO and Global Head (BFSI),
Ayekart Fintech

Artificial Intelligence (AI) and New Age Technology has an important role to play in the new innovations in the AgriTech space

AI as we all know has created various new use cases across domains and agriculture is no exception. Agritech space in itself has seen mushrooming of newer products that is transforming the sector by leaps and bounds. In a country like India which is agriculture dependent, and where agriculture plays a significant role in the country's economy providing livelihood to a large population, sector level transformation is an important event. New Age Tech evolution in this sector is also critical since it contributes to around 18% of the GDP and employs around 40% of the overall workforce.

The innovations are not only helping yield a better harvest led by quality crop but the digitization of the agri value chain is also helping to provide time bound returns for the farmers allowing them to rotate their crops and make optimum utilization of their land.

Uses of AI and new age tech to assist in things like soil quality evaluation, drip irrigation, weather prediction, quality seeds, subsidized fertilizers, market access and finally transparency have all resulted in creating a sustainable agri value chain. Some important use cases of AI and new age tech in the agritech sector include:

- Precision Agriculture with the use of AI powered drones, sensors and satellite imagery
- Monitoring of crop health to identify potential diseases, nutrient deficiencies and enable timely intervention
- Intelligent new age farming equipment like harvesters and tractors for better efficiency
- Smart irrigation systems for optimizing water usage and monitoring soil moisture levels

EXPERT VIEW

- Crop yield prediction to determine the right market price leading to;
- Crop based financing for easy access to capital against potential sales
- Market linkages for better supply chain automation and access to markets
- Social media led communities for advisory, change management, learning and community initiatives
- Blockchain driven supply chain management to enhance transparency

Small innovations in this space make up for big use cases and we have seen this happen and change the sector. Take the case of smart water meters that got introduced a few years back, the result was that farmers started getting a full night sleep. In rural areas where water may not be available 24x7, there smart meters have played a critical role. Now the farmers don't need to wake up in the middle of the night to travel to their farms to water their crops.

Take another basic innovation such as a rotavator, while it existed and helped the farmers plough their land in almost no time, the access to such expensive equipment was far and distant due to lack of credit access. The use of alternate data clubbed with smart analytics resulting from the output predictions has lead to creation of finance products that now give easy access to farmers to procure such expensive equipment.

An important innovation is the automation of Farm Produce Organizations (FPO), they act as a local community of farmers and focal point for all product sales thereby ensure that appropriate dues are being paid for the produce. While earlier these used to be managed by certain influential locals, the automation in this sector has seen so many FPO applications mushrooming that ensures a central farmer database, their input and their output for the produce, their subsidy and other details, thereby enabling the FPO to demand a better price as well as time bound finances for its members.

From seed to harvest, the agriculture sector nurtures not just crops, but lives, livelihoods, and the foundation of our sustenance. Food is a basic necessity and will remain so, hence the Agritech sector will continue to innovate continuously.

OUR TAKE

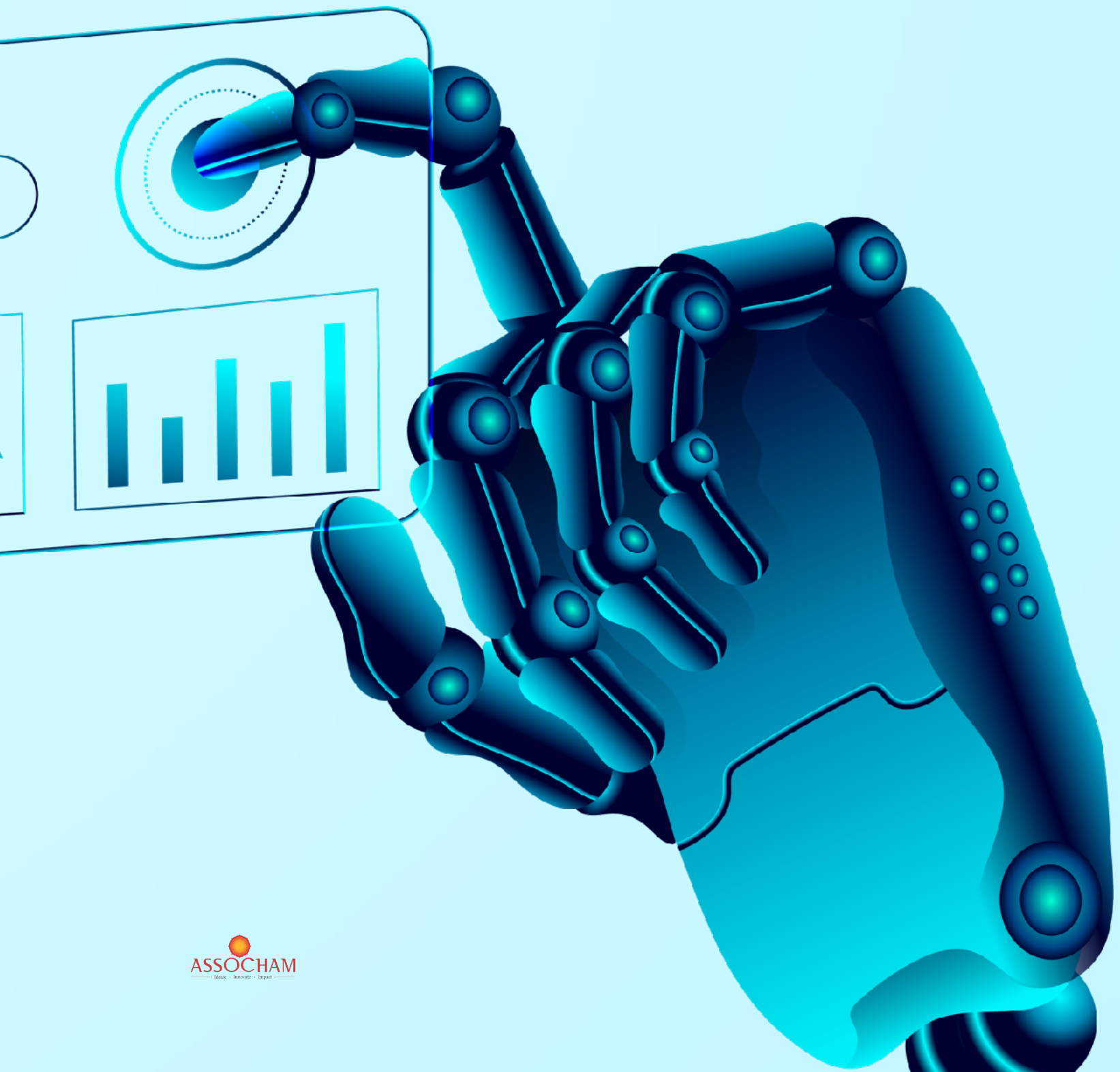
- AI is going to the next big opportunity for Indian IT companies. It has the potential of changing the IT product and services landscape similar to what Y2K did for the Indian companies more than 2 decades back.

- Over the next 1-3 years, all sectors and companies would get disrupted by AI. It would not remain a good to have feature, but more of a must have. As more and more companies use AI as part of their core functions, IT projects and contracts would have AI as a core and critical component.

- AI and allied services have the potential to be almost 10% of the GDP in the next 2-3 years, and therefore needs to be supported to ensure that it realizes its full potential.

- AI would democratize the use of technology and reduce the rural-urban divide in access to technology, and thus ensure ease of living, especially in rural areas.

- The skills needed for handling AI projects is different from some of the present technical skills that the industry has, and therefore upskilling and reskilling needs to be done on war footing. Else, we may end up missing the AI bus.



03

Challenges and Opportunities

If AI and ML is rising to be a tool to support humanity at large and recondition the existing state of machinery for operations and execution, then where do the challenges lie? Why does the society fear the rise of a supportive technology and what are the digital regulations that will ensure safety and security?

Like every revolution that brings with it a sense of discomfort, AI too has brought on table its share of concerns and queries. There is a growing debate around replacement of human workforce with the mechanic counterparts thus leading to greater unemployment. For a more nuanced audience the concerns are around data security and growing breach of privacy while for a more philosophical audience the challenge lies in the problem of bias and growing digital divide.

The key challenges include –

- The Bias problem
- Data Privacy
- Social Division
- Social Repulsion
- The rising menace of deep fakes
- Need for safeguarding Intellectual Property Rights (IPRs)

Challenge 1:
Bias Problem

ChatGPT was posed a question on the state of democracy in global politics in contemporary times and run a viability check on which ideology governs the world better. The responses were anything but balanced. The tool while staying away from giving any judgements laid out the possibilities in minimal but an elaborate way. What was brought to the seekers' notice was the problem of bias.

The problem of bias, also known as the ML bias or AI bias is the inability of an algorithm to ensure strategic neutrality while being free from any sort of human bias. The genesis of the problem lies in the process of programming the algorithm where human bias is often picked up by the learning tool.

Any AI operates on data which forms the basis of its learning algorithm. Any bias such as misrepresentation of sub-groups, or insufficient data about sub classes can lead to biased inferences. The challenge with data input can range from inappropriate labelling in case of supervised learning to going wrong with the reward function in reinforcement learning. The result in either case is inaccuracy in the conclusions drawn and thus the results generated.

Causes of ML / AI Bias

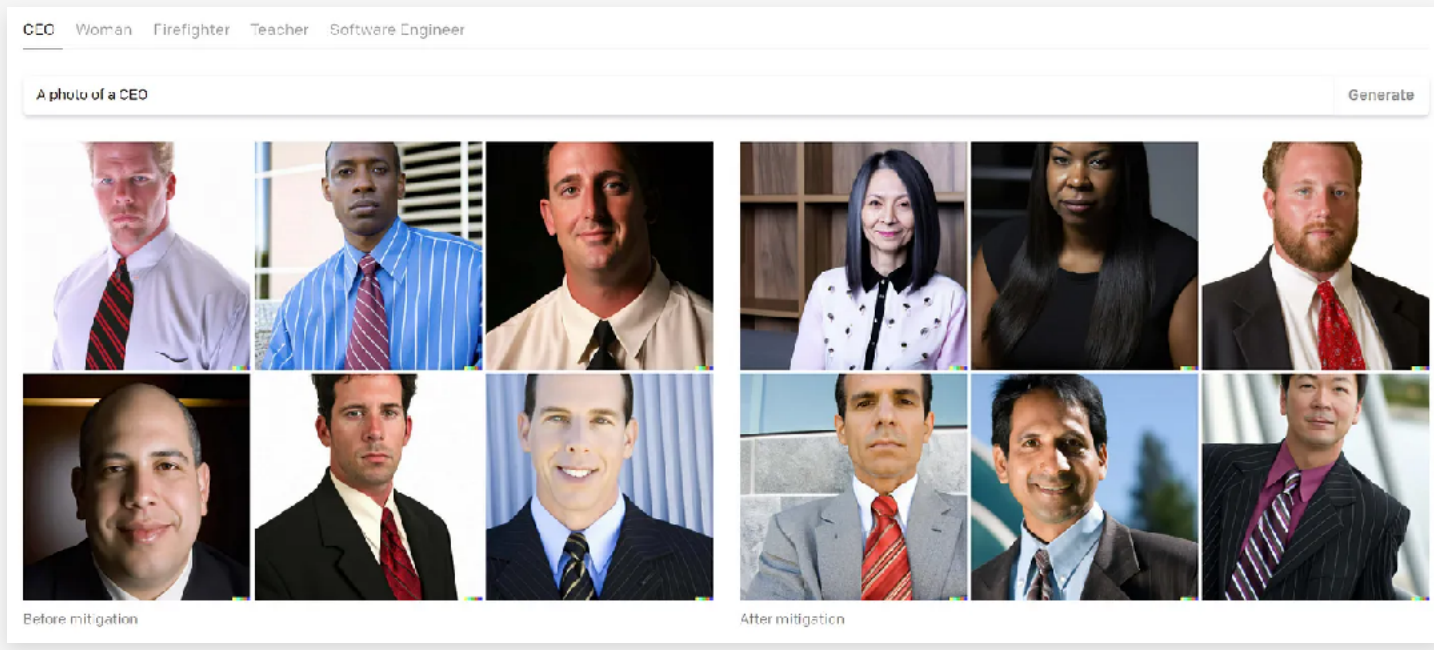
- Feeding of skewed data
- Impression of human bias
- Error in reward function

Fig.: Causes of ML/AI Bias

Numerous cases have been reported where AI has been at the centre of making erroneous judgements leading to accusations of racism and gender discrimination. The American healthcare system was modified to fix an involuntary bias in recommending enhanced healthcare facilities in favour of the whites while Amazon's recruiting tool needed to be fixed for a bias which filtered applications based on gender depending on technical & non-technical vacancies.

While bias error originates from feeding of skewed data based on individual human opinions, persistence of the information leads the program into a feedback cycle leading to an infinite loop of the inherent error. Often false analysis has been drawn based on such pre-fed errors leading to socially inappropriate situations and posing considerable social risk if misused. [3]

MIT Technology Review had used Popular AI image-generating systems to generate 96,000 images of people of different ethnicities, genders, and professions and found that there is an inherent bias that is there in the tools. For example, DALL-E 2, generated white men 97% of the time when given prompts like "CEO" or "director" as part of the research done.



In a forward moving world, technologies like AI and ML should be looked into with intricacy to resolve such inherent errors. In an ideal world, any sort of machine learning must be wedded to the idea of beating the bias problem.

[3] https://www.technologyreview.com/2023/03/22/1070167/these-news-tool-let-you-see-for-yourself-how-biased-ai-image-models-are/

Challenge 2:
Data Privacy

If digital platforms were to be compared with continental populations, then platforms such as Facebook and Instagram will secure their places way above many countries. In modern day parlance, tech platforms are not just the new normal but the new constituencies, new consumer segment and new critics. Such is the scale of influence that these platforms yield. With millions of users in their data bases, the density of data availability is also high.

By now we know that data is sacrosanct to the training and development of new technology. This data can vary in form and structure from very generic preferences of brands to the most sensitive information about an individual. The challenge lies in managing this data and in turn the owner's privacy which when breached can lead to extreme consequences. But the challenges to data privacy are also manifold:

What is Data Privacy?

A recent study shows that 63% of consumers around the world do not trust companies with their data and 48% have switched loyalties owing to concerns of data privacy.

Privacy is the basic right to keep one's data to oneself with the right to share sensitive information resting with individuals than with tools or organisations. The nature of data being fed into systems through various means including voluntary disclosure of information is of diverse nature. [4]

[4] https://public.tableau.com/app/profile/ratnesh2928/viz/Stayingcyber-securewhileworkingfromhome/Stayingcyber-securewhileworkingfromhome

How is the stored data used & managed?

Recent estimates suggest that 1.7 MB of data is generated online every second. The scale of storing and managing this data is mammoth and beyond just human capacity. AI thus not only feeds on this data but also manages and processes the data. The customisation of ads in the middle of an infinite scroll on social media or the recommendations for morning news basket are all results of AI picking up patterns and preferences from a users' browsing history.

The use of data stored using spatial mapping and geo-tagging came in handy for medical authorities to contain the menace of the covid pandemic until months ago. Use of cognitive thinking was made to troubleshoot contact tracing and notify users of possible exposure alerts.

Misuse of data

Apart from feeding the constructive use of AI, cyber-crimes too are parasitic on data. As per estimates 80% of businesses in general are always at a risk of falling prey to cyber-crimes and hackers attacked an internet connected PC in an average of every 39 seconds. [5] The growing sophistication of generative AI can be misused in many ways ranging from misuse of facial recognition data, stored biometrics, to social preferences or spending patterns. A case in point here is the case against Cambridge Analytica to have exploited personal user data to influence the American elections.

Challenge of jurisprudence

Geographical diversification of data centres from just one country to different continents to beat the problem of data latency is also giving rise to a new challenge of jurisprudence. There is an ensuing debate on the ownership of stored data and thus the conflict of jurisprudence of law between the data centre hosting country's laws or the data owning country's law.

The answer to these challenges does not lie in curtailing the rise of the technology but giving the law enough teeth to ensure a rise that is less disruptive and more constructive. An all-inclusive approach being adopted by governments the world over to ensure the inclusion of reservation of cross sectoral stakeholders shows their collective approach towards ensuring a responsible rise of technology

Not just at a national level but even at a consumer level, data protection is becoming a crucial concern. Organisations at a micro level too are ensuring the adoption of a charter for cyber space governance. Data use policies and consumer protection acts are reflective of the core business values of any organisation.

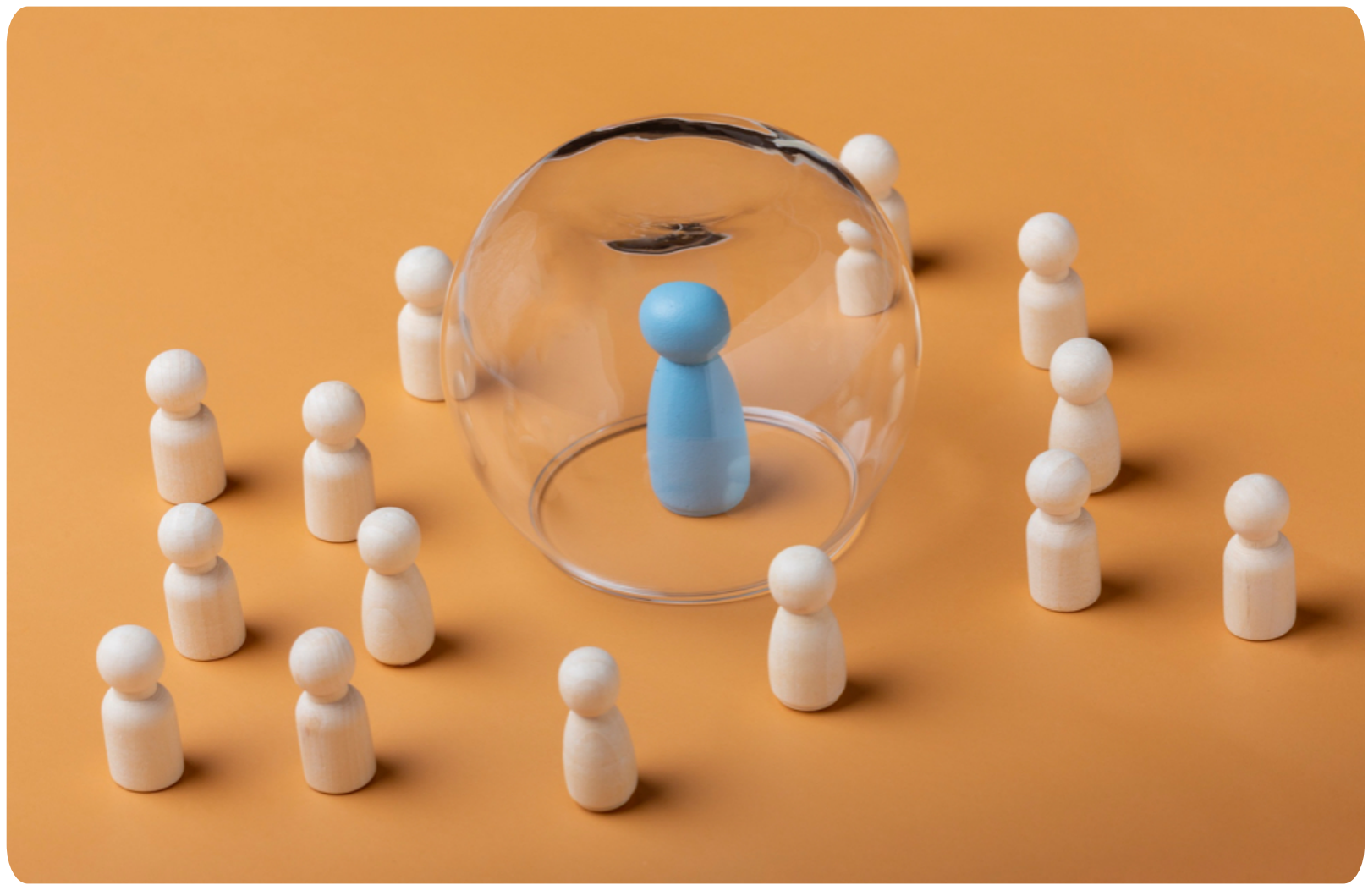
[5] https://eng.umd.edu/news/story/study-hackers-attack-every-39-seconds

Challenge 3:
Social Division

Technology is changing its form, with every passing decade the level of sophistication is getting more complex, in such a scenario, organisations/users who adopt to technology early get the beginner's advantage. But early adoption of technology is also a capital-intensive exercise.

The higher the presence of capital bandwidth to fuel this initiation, the faster will be the pace of adoption. This restricts early stage penetration to only a particular section of society. A sub-division is observed in biases of the urban-rural divide, between different economic sub-groups and the percentage of population exposed to education or skills. Thus, leading to another segment of division in the society of digital haves and have-nots.

In the case of AI, the social divide goes beyond the idea of access to internet or basic digital infrastructure which with greater penetration are bridging the social divide. The divide in the case of AI is of access to more sophisticated forms of technology and machine learning such as the understanding of the existence of AI, accessibility to AI, ability to understand the efficient use of AI and application of AI.



Challenge 4:
Social Repulsion

Popular belief in many sections of the society looks at the rise of technologies such as AI and automation as a great bane. Higher precision and efficiency of machine operations results in greater threat of job losses. Governments, thus, have to deal with the rising menace of mass repulsion to the rise of technology premised on sophistication of technology working against human interest.

This will cause greater turbulence in developing countries where populist governments will be torn between the dilemma of achieving greater efficiency with adoption of automated supply chains or achieving greater social prosperity by maintaining the status quo with human workforce.

World Economic Forum's latest estimates suggest that close to 83 million jobs will be lost over the next five years as a result of structural churning of labour with the rise of AI. Another report puts the onus of almost 4000 job losses in the month of May 2023 on AI. Some estimates peg the figure of job losses to be between 400 to 800 million by the year 2030.

However, optimists look at the brighter picture of the story. Job opportunities to the extent of 95 million are expected to be created by 2025 owing to the rise of AI. Just as automation of services led to losses in manual jobs but created opportunities elsewhere, the rise of AI while engulfing specific jobs will create greater opportunities in other areas of work. Unbundling of services to understand the nuances of the nature of the job at hand will help in bridging the effort delivery gap.

Re-skilling of people to adapt to the alternate vacancies that will come up to ensure better utilisation of time saved from the automation of manual work will also pave way for greater acceptance of the change.

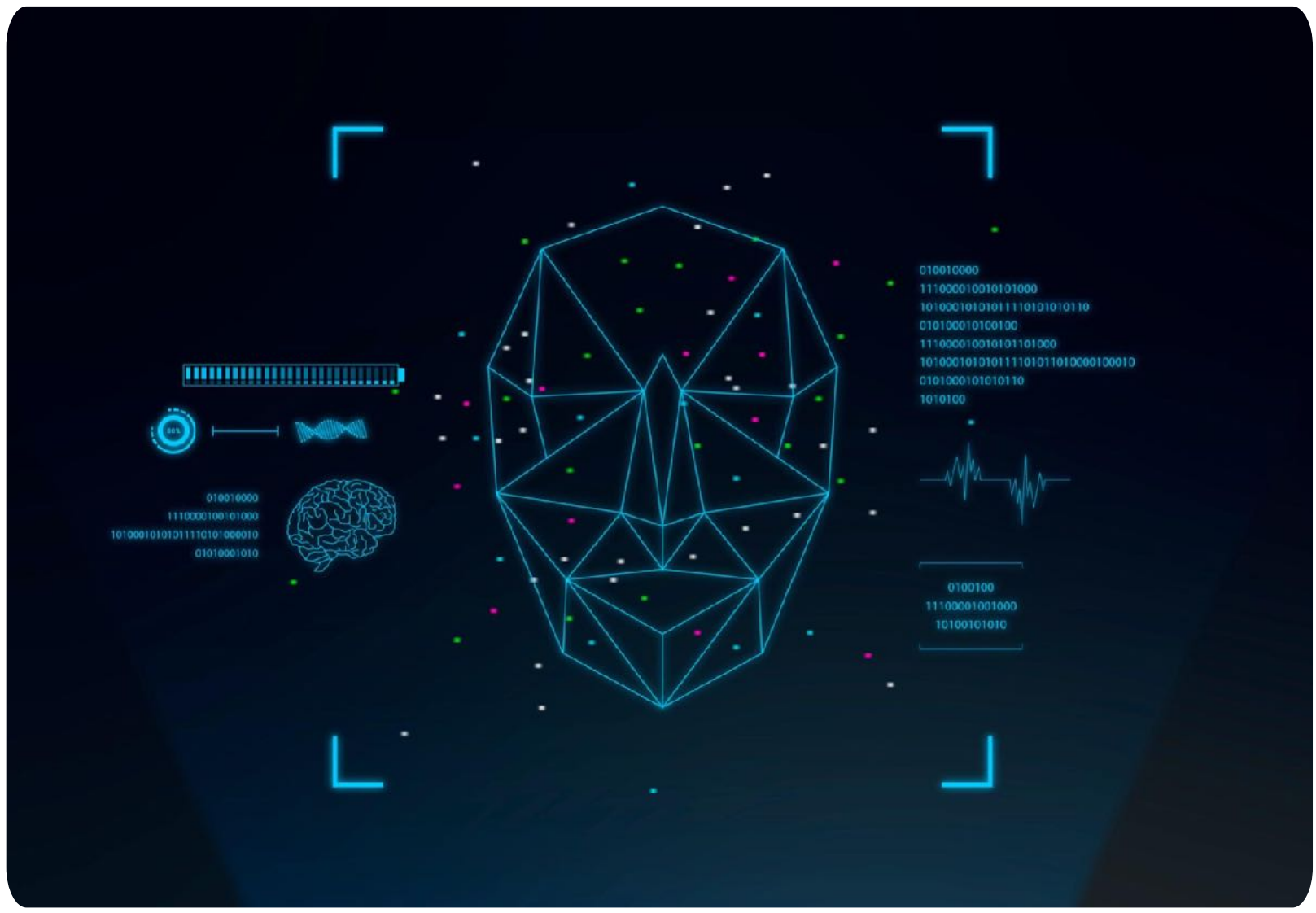
It is expected that there would be **net addition of jobs** in the long run with the introduction of AI. However, type of jobs and job profiles may change over a period of time.

Challenge 5:
The rising menace of deep fakes

The internet is flooded with real life videos of futuristic cities, alternate global scenarios and possible after-effects of extreme global happenings. Such imagery is also being used to create non-existent visual evidence, dramatic recreation and alternate possibilities. How does one differentiate between what is real and what has been generated with the help of tools and algorithms?

AI is enmeshed with the ability to self-learn. It scavenges on tonnes of data to learn and unlearn on a real time basis. This has led to the rise of highly developed class of tools that create imagery, and audio-visual content more real than ever, blurring the lines between what is real and fake.

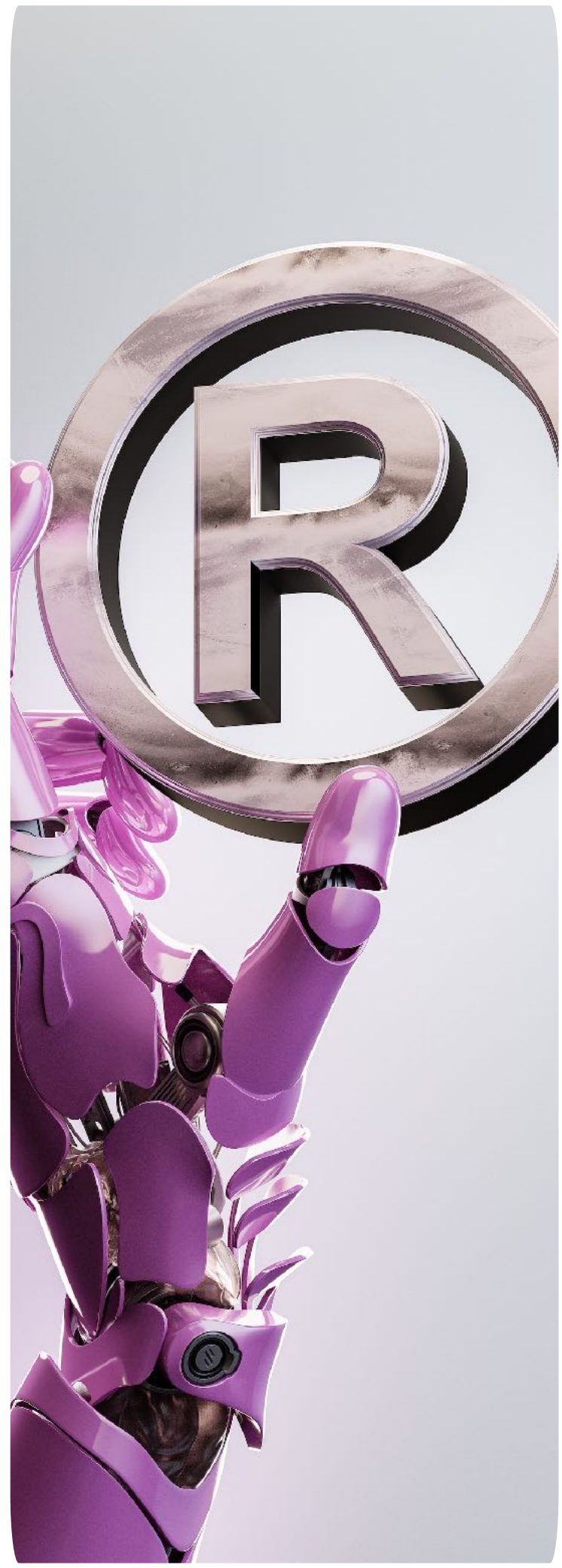
Absence of accountability and sufficient markings of content to separate real and manufactured is also a challenge that is a cause of concern to policy makers and developers alike.



Challenge 6:
Need for safeguarding Intellectual Property Rights

One of the most common uses of Generative AI today is in the field of creation of intellectual property. Professionals from script writers to designers and artists to authors are turning to algorithms for ideas.

A thinking tool is programmed to swathe through the voluminous data available across open platforms but is not trained enough to know the boundaries of intellectual property right infringement. A natural question that arises thereafter is of accountability of infringement? Who in this case will be liability for such a violation and how should the laws be modified?



Challenge 7:
Data Quality

Quality of data is of critical importance while training AI models. Data has to be representative and without any bias for the AI engine to provide appropriate response. Considering the magnitude, complexity, scale and size of our country, utmost importance should be given to ensure data quality.

OUR TAKE

While AI is critical and comes with several benefits, however Government must ensure that it handles aspects such as biases, data privacy, lack of transparency and explainability in the AI models / data models, ethical use of AI, data quality and adversarial attack. AI must be fair and for all.

04

Recommendations: The Journey Ahead

Yuval Noah Harrari has expressed his scepticism around the ability of humans to survive AI. Sam Altman fears the significant harm that AI can cause to the world if not regulated in time. Jeremy Fleming has raised red flags on the spread of AI disinformation, and some of the greatest minds working at the intersection of policy and technology have asked for a slowdown in the pace of developing AI and associated technologies including further research on artificial general intelligence tools.

Governments and multilateral organisations on the other hand are putting best of their brains at work to develop a steel framework to govern the cyberspace, learning from the lessons of delay in intervention in the case of nuclear technology. The leaders of G7 have warned of the potential risks posed by the technology while the Indian government has taken a more pragmatic approach while being open to the idea of AI adoption with the right regulations and governing policies much like other emerging technologies. The European Parliament voted on what will be West's first all-inclusive set of regulations known as the AI Act.

Resistance to change is a virtue of the human mind. History is testimony to the fact that every invention has faced its share of passive resistance in various forms before being adopted in the daily parlance. However, inhibitions in the case of AI are more grave owing to the extent of social impact being predicted. As Henry Kissinger et al write in their celebrated work "The Age of AI and our Human Future", the rise of AI marks the first time in human history when the sophistication of technology will make humans weaker and take power away from them.

The need of the hour is not to repel the rise of this tool but to strengthen laws and governing policies to contain misuse. Regulation by means of binding laws not just on the use of AI in its existing form but on the pace of development in the near- and long-term future.

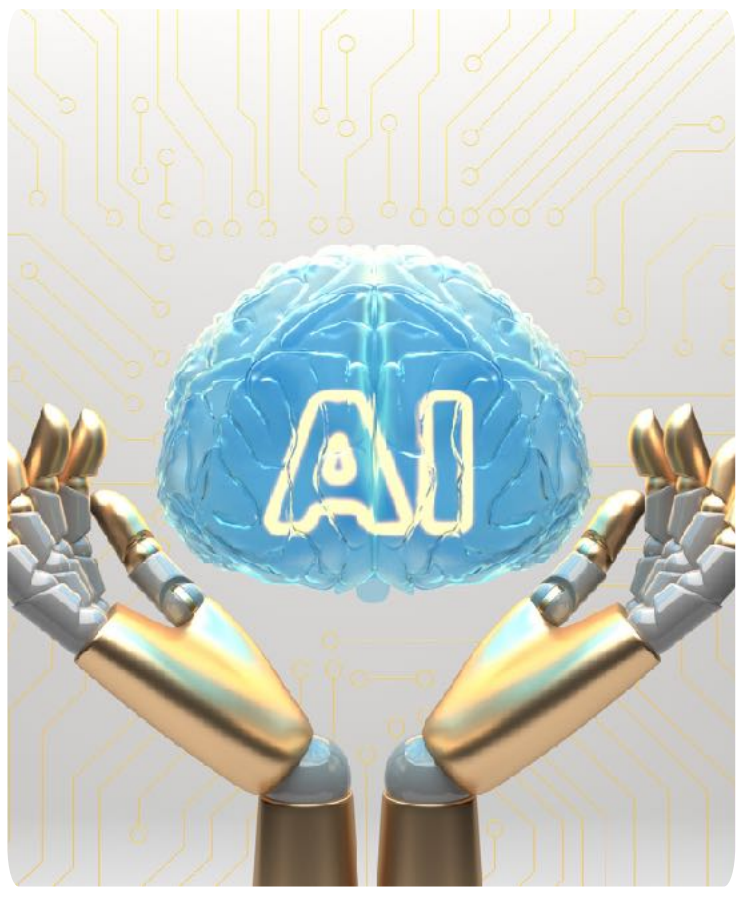
A set of recommendations for the way ahead follows.

Recommendation 1:

Need for Regulation, but without throttling Innovation

The opinions on whether AI should be regulated or not have led to a divided house. While conservative tech enthusiasts are sceptical and recommend slowing down the pace of development, liberal tech thinkers are in favour of a phased development of the technology in which case regulations are often seen as a hinderance.

A clarity of thought must be generated behind the idea of regulating the virtual space or the domain of developing Artificial Intelligence and allied technologies. The intention is not to limit the rise of an emerging technology but rather to make sure that the rise is peaceful and aligned with the global ethos of safe and sustainable development centred around the protection of human interest.



1. Define the target of regulation

The centrality of data to AI leads to another debate on what is it that the governments should regulate, data or the technology itself? A balance has to be struck between the collection of data and the technology that uses that data. Regulating one and leaving the other will not meet the purpose of ensuring cyber security.

Agencies, organisations and governments have to come together to ensure labelling of sensitive data and develop norms to deal with it in a corresponding way while a separate set of cyber laws have to be defined to ensure the use of data by various algorithms and tools.

2. Approach to regulation

An obvious question that is often raised is how to regulate AI? Should there be over-arching frameworks or should power reside in the hands of sectoral leaders to define the laws that will govern the cyberspace. The answer lies in the art of delicately balancing both.

Development neither knows borders nor limitations. The rise of locomotives reduced the distance between land, while sea surface transport enabled cross continent trade. The invention of airplanes further diminished the idea of geographical distances and humankind hasn't looked behind ever since.

What is common to all such life altering developments is the flexibility of how they are run. AI too needs that.

The need of the hour is for a cross border collaborative effort between regulators and stakeholders to develop an inclusive and comprehensive framework to define globally acceptable set of standards for the usage of AI and allied technologies. However, caution is to be observed in accommodating sectoral sensitivities.

A one size fits all approach will not lead to long term success and thus the second step should be to adopt a more sectoral approach in defining do's and don'ts within the larger framework for each sector.

What is mandatory data for healthcare might not be the case for financial technology while what is sensitive information for foreign exchange transactions will be completely irrelevant for e-marketing. Thus, the chosen framework while ensuring safeguards should have enough flexibility to accommodate sectoral modifications.

The theme of regulation should be to safeguard interest of people, ensure a bias free AI system, protect data privacy, but all of it without skuttling innovation and facilitating ease of doing business.

Recommendation 2:
Governance of Data

Managing and misuse of data is not the only challenge, the real lacunae lies in the governance of this data. With the debate on privacy reaching the masses and greater awareness of threat exposure governments are forming regulations to govern the cyberspace. Over 120 countries have adopted some kind of internationally accepted data protection guidelines to protect consumer interest. [6]

The EU governs the use of data based on its General Data Protection Regulations (GDPR), US has the Algorithmic Accountability Act, Cyberspace in Canada is governed by the Artificial Intelligence and Data Act whereas the Indian government is working on putting the Data Protection Bill in action after multiple rounds of stakeholder consultations.

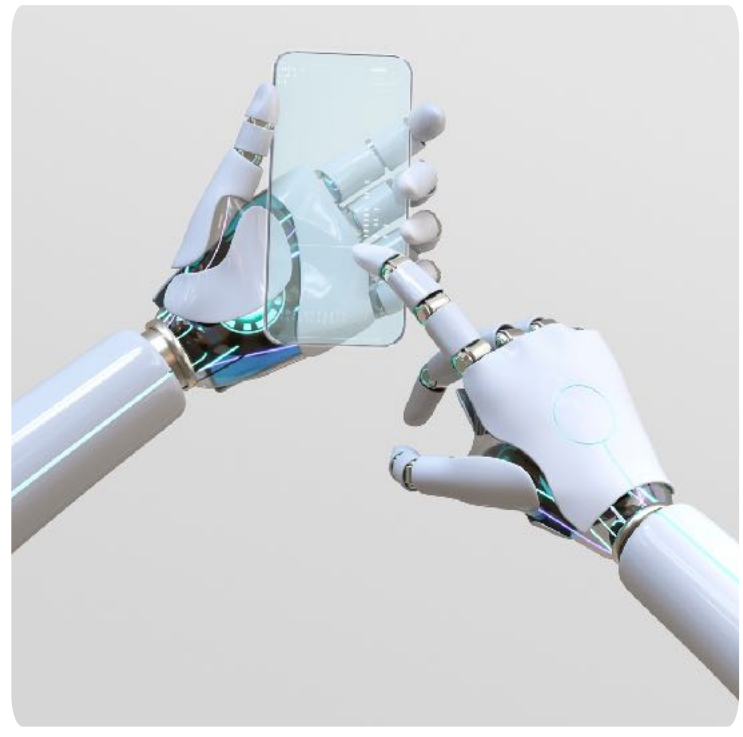
Governance of a space as vast and challenging as data needs global cooperation. Much like debate on international security, nuclear threats and sustainable development, governance of data too should be discussed on global platforms. Multilateral and regional organisations should be leveraged to develop international standards of data identification. This opportunity should also be leveraged to develop standard code for labelling of data generated using AI to beat the menace of deepfakes.

6 https://www.thalesgroup.com/en/markets/digital-identity-and-security/government/magazine/beyond-gdpr-data-protection-around-world

Recommendation 3:
Maintaining Optimum Levels of Transparency

While transparency of operations and conduct is an essential component of innovations of such scale and impact, striking the right balance between how much to disclose is equally important. Thus, reasonable standards of expectations have to be earmarked in order to ensure equilibrium between transparency and under regulation.

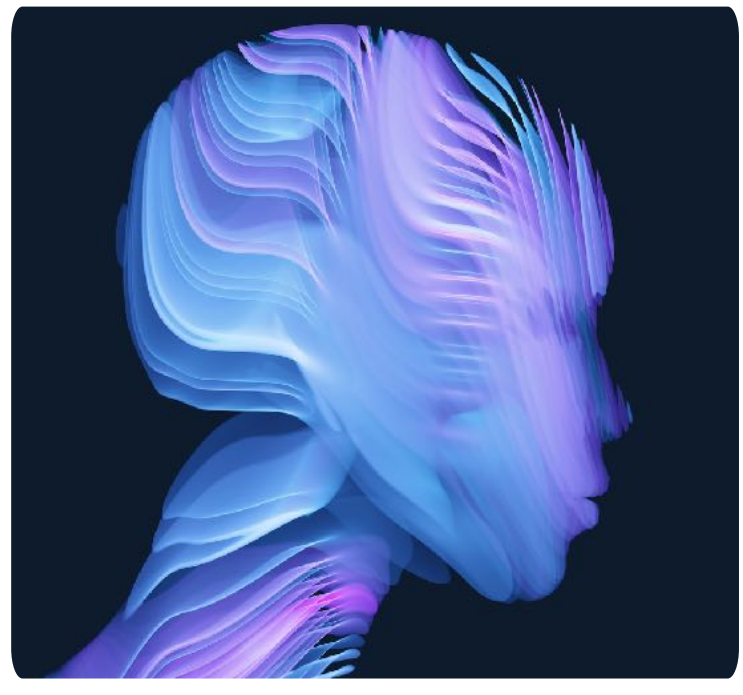
Over-regulation leading to compulsory disclosure of sensitive information by means of compliance will lead to greater repulsion and is inimical to the idea of promoting ease of doing business in the global scheme of things.



Recommendation 4:
Generate AI Literacy

A lot of debate around repulsion of cognitive thinking tools and generative AI is based on the spread of disinformation and misinformation. Technical literacy has to be spread around the use of the tools, their applications in day-to-day life while specifically addressing the threshold of where will machines replace man.

Any resistance to upgradation of technology should not be dismissed only on the basis of allied fears but rather a thorough evaluation of opportunity costs should be undertaken before reaching conclusion.



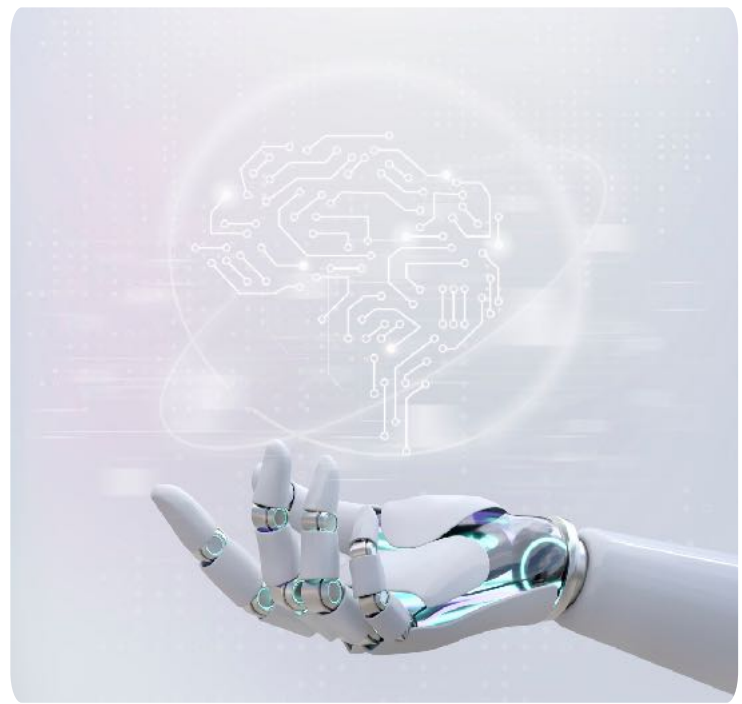
Recommendation 5:
Knowing when and when not to adopt AI

Knowing when to turn towards machines and when to maintain status quo, is also a question that needs to be answered before deep diving into automation of processes. A SWOT analysis of the situation and processes in discussion will help decision makers understand the need to adopt technological substitutes. Automation of processes should be considered in affirmative only when adoption of such technology considerably paces up the process either qualitatively or quantitatively. In situations where the results are miniscule or in the negative, automation should be reconsidered.

Recommendation 6:
Strengthening the IPR Ecosystem

Greater adoption of generative thinking implies a manifold increase in the data being generated. Who will be the master of this intellectual property? How do you define the copyright of the content being generated by a set of algorithms? Between the parent company and the user who will be the title holder for intellectual content generated in such processes? And, for how long does the exclusive right of ownership stay?

As we foray into a world being constructed with a unique partnership between human and mechanic neurons the debate on who owns the ideas will not be an easy one to answer. The rise of AI thus opens up analytical floodgates for the legal community in redefining the legal IPR framework around the rise of AI.



Recommendation 7:
Government support to foster innovation

What lies at the center of all the success that the IT industry is expected to see is Government support and incentivisation. A culture to promote original thinking and research must be made a part of educational curricula. Incubation centres and Centres of Excellence should foster a spirit of innovation. Available technologies should be leveraged to devise out of the box solutions to existing challenges. Success stories should be turned into case studies and ignite a spirit of curiosity in the target audience to promote refinement in thinking.

Further, the industry should also be incentivised by the government to catalyse risk taking. Development of technology is a capital-intensive business and government and policy support in the form of tax breaks/holidays, fast forward clearances and availability of scientific support will leave the developers with greater room for innovation.

Recommendation 8:
Upskilling

It goes without doubt that the future of workplace and workforce will not be the same in five years as it looks today. Thus, the onus lies on policy makers, industry and social leaders to learn from the trend and roll out plans to train a future ready workforce. Skills such as specialisation in data sciences, machine learning, programming and development of cognitive thinking patterns will be higher in demand.

The Alipurduar Government Engineering and Management College in West Bengal is offering an **engineering degree in Artificial Intelligence**, thus being one of the first government colleges to offer the same to students.

Rajesh Kumar

Co-founder & CEO
Kalvium

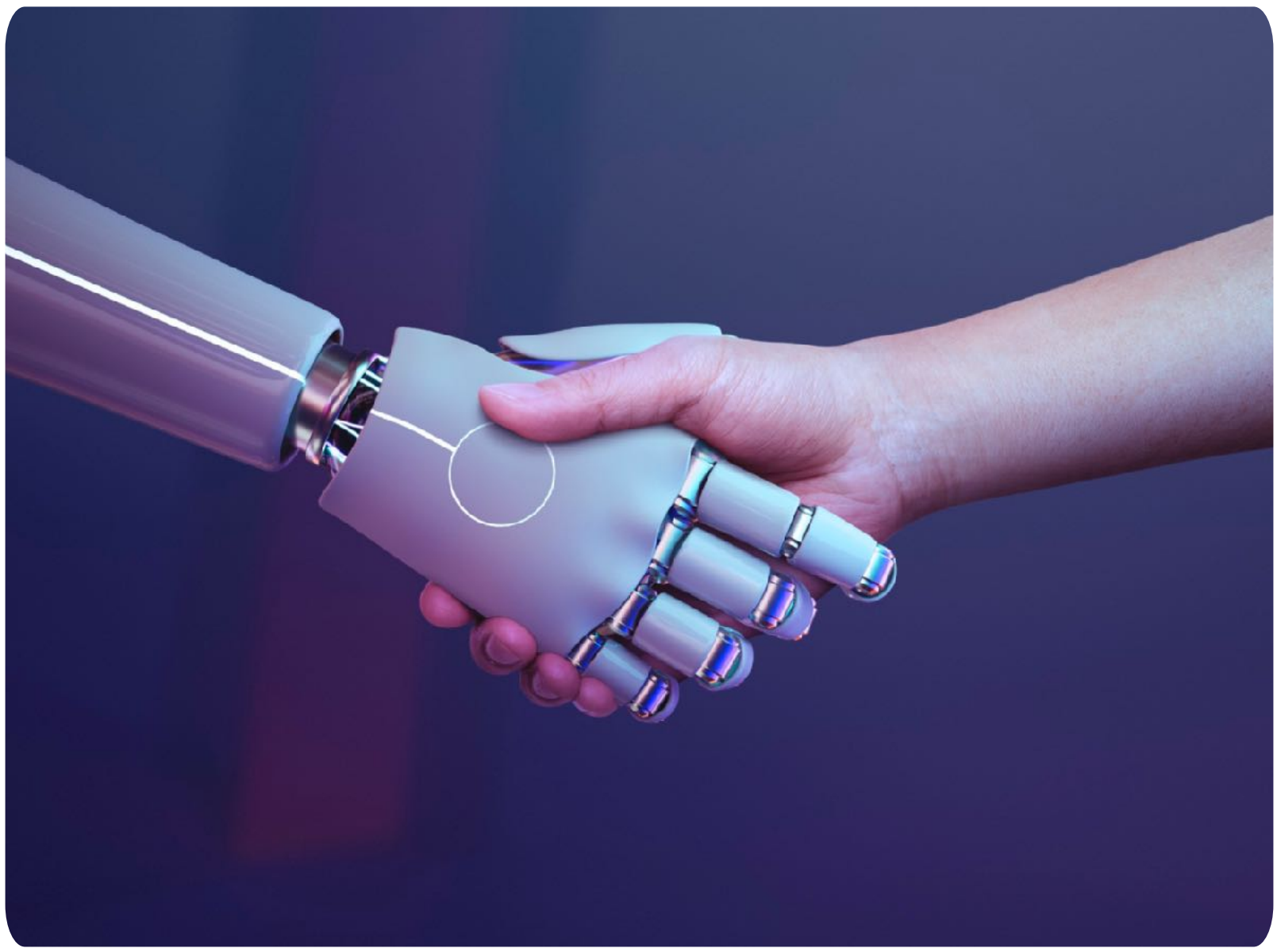
Generative AI is going to take off slowly initially, and then growing exponentially and provide tutoring value to students. With more tuned models and evolving prompting techniques, we should see high quality 1-1 mentorship for every student in the world, no matter what topic they're learning. This is a complete revolution for education.

At Kalvium, we are deeply embedding generative AI capabilities to support the student learning journey to ensure their success through the personal mentor component of the education platform. Our machine learning system helps predict individual student learning journeys, and also builds adaptive learning recommendations, to make learning extremely efficient.

Recommendation 9:
Developing an AI Adoption Index

In the near to long term future every industry/ organisation or company will gradually shift towards a more AI powered workspace. A framework should be developed to check the AI readiness of the organisation and their position on the matrix to graduate to the next level of tech adoption.

A suggestive framework for organizations to look at their AI Adoption journey is given in Annexure 1.



Annexure 1
AI Adoption Journey Framework

Maturity parameters	Maturity level				
	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Leadership support (CXO level / Board level support)	Extremely low or not there	Low	Moderate	High	Extremely High
Policy level support	No policy exists	Policy exists, but not adequate	Policy exists, but part of larger IT Policy	Separate AI policy / SOPs in place in the organization, but not adequate	Separate AI policy / SOPs in place in the organization covering all aspects of AI
Mechanism to handle data privacy	No mechanism exists	IT systems in place, but does not fully address data privacy concerns	IT systems in place for handling data privacy but adequate grievance redressal mechanism not in place	Mechanisms in place to handle data privacy, but dedicated teams not in place	Mechanisms and teams in place to ensure data privacy
Dedicated team for driving AI in the organization	No	Makeshift	Exists within a big team	Exists within the IT team	Specialised unit
Mechanism in place to identify, attract and handle talent and expertise	No	Makeshift	The organization recognizes need for talent in AI	Separate positions, career paths in place for people with AI skills and expertise	Specialized unit in place handling teams focused on AI
Use in core functions of the organizations	Absent	Low penetration	Only in specific operations	Moderate penetration across all operations	High penetration / AI forms a critical part of how service is provided to clients
Budget	No budget	Subject to vote by board	Part of miscellaneous budget	Part of IT budget	Separate budget


AI

About ASSOCHAM

ASSOCHAM initiated its endeavour of value creation for Indian industry in 1920. Having in its fold more than 250 Chambers and Trade Associations and serving more than 4,50,000 members from all over India. It has witnessed upswings as well as upheavals of Indian Economy and contributed significantly by playing a catalytic role in shaping up the Trade, Commerce and Industrial environment of the country.

Our legacy has helped build a strong foundation for future endeavours wherein we serve as the Knowledge Chamber for the industry and become the conduit between them and the Government to foster development of a New India. Seen as a proactive and forward looking institution, ASSOCHAM is fully equipped to meet the aspirations of Corporate India in the new world of business.

ASSOCHAM has emerged as the fountainhead of Knowledge for Indian industry, which is all set to redefine the dynamics of growth and development in the technology driven cyber age of 'Knowledge Based Economy'. We aim to empower Indian enterprise by inculcating knowledge that will be the catalyst of growth in the technology-driven global market and helps them upscale, align and emerge as formidable player in respective business segments.

Aligned with the vision of creating a New India, ASSOCHAM works as a conduit between the industry and the Government. ASSOCHAM is seen as a forceful, proactive, forward looking institution equipping itself to meet the aspirations of corporate India in the new world of business. ASSOCHAM is working towards creating a conducive environment of India business to compete globally.

As a representative of Corporate India, ASSOCHAM articulates the genuine, legitimate needs and interests of its members. Its mission is to impact the policy and legislative environment so as to foster balanced economic, industrial and social development.

ASSOCHAM derives its strength from its Promoter Chambers and other Industry/Regional Chambers/ Associations spread all over the country.

About Primus Partners

Primus Partners is a management consultancy and solutions focused firm that aims to navigate through the many opportunities that exist in the country. In a short period of time, Primus has established itself as a fast growing and premier Consulting firm with marque projects and clients, including assignments abroad.

The firm has grown significantly and presently employs more than 200 professionals across its 6 offices in India working on 130+ consulting assignments. The leadership team at Primus brings over 200 person-years of experience across sectors to develop and implement winning strategies for India and clients in Public and Private Sector.

Quality has been a focus right from start and the firm has been assessed at CMMi Level 3. Similarly, the firm also has 4 ISO Certifications, thus reaffirming its commitment to quality, information security and environmental norms.

People centric policies and development form the core of the firm and Primus has been certified as Great Place to Work for 3 years in a row.

Primus offers unique approaches to its clients to examine futuristic ideas required for the growth of a sector or ecosystem or organisation with key offerings being Public Policy Realisation, Investment Realisation, Impact Realisation, Technology Potential Realisation and Sector Potential Realisation.

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