The āgna Museletter
July 2024

Shape AI today for tomorrow!

Dear Reader,

Artificial Intelligence or Augmented Ingenuity?

Imagine walking into a room where every device, every screen, seems to anticipate your needs before you even express them. This is the magic of artificial intelligence (AI) at work, seamlessly integrating into our daily lives.

AI is not just a technology; it's a transformative force reshaping industries, augmenting human capabilities, and pushing the boundaries of what's possible. As we navigate this era of innovation, AI stands as both a promise and a challenge, promising efficiency and insight while challenging our ethical frameworks and societal norms.

Read on to Access Insights on AI.

MUSELETTER HIGHLIGHTS:

Agna INSIGHTS

In the last two decades, the AI landscape has undergone profound transformation due to advancements in computing power, big data, and AI models. Innovations in semiconductor technology, GPU architectures, and specialised hardware have fueled the development of sophisticated AI applications. The proliferation of data from the IoT revolution and advanced visual systems has enhanced dataset quality, enabling more effective AI training through breakthroughs in deep learning architectures and algorithms like GANs and reinforcement learning. Meanwhile, advances in storage systems and edge computing have facilitated real-time processing, and improved network technologies such as 5G and fiber optics support seamless data transfer. The democratisation of AI via user-friendly tools has broadened access to AI development.

As envisioned in Kai-Fu Lee and Chen Qiufan's "AI 2041," this transformative power of AI is rapidly becoming a reality, poised to revolutionise sectors from healthcare to climate tech. AI's ability to analyse vast datasets, automate complex tasks, and enhance human decision-making opens unprecedented opportunities. This edition of Agna Insights explores how AI technology is advancing in critical areas such as healthcare, space tech, climate tech, emergency management, and defence, focusing on its capabilities, human-centric approaches, and the challenges and boundaries in AI development.

Healthcare

Disease Detection:

AI-driven tools are revolutionising disease detection with remarkable accuracy, often reaching 95% for conditions such as cancer. For example, Viz.ai utilizes AI to analyse medical images and prioritize urgent cases, significantly enhancing emergency treatment workflows. Similarly, Sully AI employs advanced image recognition to detect early signs of diseases, aiding radiologists and clinicians in identifying critical conditions swiftly. Regard is another key player, using AI to interpret medical images and assist in diagnosing a range of conditions, improving diagnostic accuracy and efficiency.

Predictive Analytics:

AI's capability to analyse vast amounts of medical data is transforming predictive analytics. Tempus exemplifies this by using AI to examine clinical and molecular data, identifying genetic mutations for targeted oncology therapies. Their algorithms can predict high-risk individuals for early intervention

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and accelerate the development of new treatments. Additionally, BlueDot has made strides in predictive analytics by leveraging AI to track and analyse global disease outbreaks, offering early warnings and insights that help healthcare systems prepare and respond more effectively.

Administrative Efficiency:

AI is also streamlining healthcare administration by automating tasks such as patient record management, appointment scheduling, and billing. For instance, Olive reduces operational costs by 20-30% through automation, allowing healthcare professionals to focus on more critical responsibilities and improving overall efficiency. Sully AI further enhances this by automating routine administrative tasks, reducing the burden on healthcare staff.

Space Tech

Data Analysis:

The vastness of space presents an enormous amount of data to analyse. Companies like Planet Labs use AI to process satellite imagery for Earth observation, providing insights into environmental changes and global trends. Orbital Insight and Bayanat leverage AI-driven geospatial data analysis for applications in space research and Earth monitoring. Bayanat, in particular, offers high-resolution satellite imagery via Dove & Skysat, and their AI-driven data analytics enable object detection and predictions. Their custom GIS solutions support urban planning and smart cities, extending services to environmental monitoring, defence and security, precision agriculture, and transportation logistics.

Space Debris Management:

Managing space debris is critical for the safety of spacecraft and astronauts. Digantara, an innovative startup from India, has developed a space situational awareness platform that tracks debris in real time. Their AI technology predicts trajectories and suggests evasive manoeuvres to prevent collisions. Additionally, West Virginia University, supported by NASA, is developing AI-powered space lasers to redirect debris of all sizes. This initiative uses laser ablation to nudge debris into new orbits, reducing collision risks. Unlike other technologies that handle only large debris, this approach uses a network of lasers on satellites or dedicated platforms, autonomously making decisions to prevent collisions.

Satellite Maintenance and Repair:

AI is transforming satellite maintenance and repair through autonomous robots and drones. Starfish Space, with its AI-driven satellite docking spacecraft Otter, enables autonomous Rendezvous, Proximity Operations, and Docking (RPOD) operations for in-orbit servicing and disposal of satellites. Northrop Grumman's Mission Extension Vehicles (MEVs) utilise AI for autonomous docking and maintenance operations, extending the lifespan of satellites. These AI systems help predict equipment failures by analysing sensor data, ensuring timely repairs and cost savings.

Climate Tech

Climate Modelling & Prediction:

AI is improving climate modelling by processing vast amounts of data from satellites, sensors, and historical records more efficiently than traditional methods. For instance, Tomorrow.io uses AI to analyse weather data from various sources, providing more accurate climate predictions and actionable insights. Similarly, Nvidia's Earth-2 project employs AI to create a digital twin of the Earth, simulating climate models with high precision to predict environmental changes and support climate resilience strategies.

Renewable Energy:

AI optimises the generation and management of clean power sources. Aurora Solar, for example, offers AI-driven software that designs and optimizes solar panel installations, predicting solar energy output based on weather patterns, enhancing efficiency, and reducing CO2 emissions by up to 15%. Additionally, DeepMind, a subsidiary of Alphabet, uses AI to optimise wind energy production, predicting wind patterns to better schedule energy output and improve the efficiency and reliability of wind farms.

Emergency Management

Emergency preparedness and critical incident management:

AI is revolutionising emergency management with solutions that enhance preparedness, response, and recovery. Juvare's tools, for instance, integrate real-time situational awareness and geospatial insights for unified emergency response, streamline workflows and notifications for federal agencies, and facilitate real-time collaboration across sectors. Additionally, secure messaging and file-sharing capabilities are bolstered by advanced GIS for improved decision-making. These AI-driven applications significantly boost efficiency and coordination in managing critical incidents.

Real time Event Detection & Damage Assessment:

AI algorithms analyse satellite and drone imagery to provide real-time damage reports, streamlining recovery efforts. Descartes Labs, for example, employs AI to analyse geospatial data during disaster relief operations, accelerating recovery efforts by up to 40%. Further, Computer Vision specialised companies such as CamCom are working to create AI-powered UAV inspections provide real-time data visualisation and IoT sensor analytics for smarter, safer emergency responses, ensuring efficient decision-making and centralised management. Furthermore, Boston Dynamics' robots, such as Spot, are increasingly used for disaster response and damage assessment. Equipped with advanced sensors and cameras, these robots can navigate hazardous environments to collect critical data, supporting on-the-ground assessment and recovery efforts.

Defence

Autonomous Systems:

AI's role in defence spans autonomous drones and unmanned vehicles used for surveillance, reconnaissance, combat operations, and logistical support. Shield AI and Vantage Robotics exemplify this with their AI-powered drones designed for tactical operations and surveillance missions. Additionally, Boston Dynamics' advanced robotic systems, Spot and Stretch, are again relevant in this field. Spot, for instance, is utilised in various defence applications for its mobility and ability to navigate complex terrains, while Stretch is designed for

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logistical support, enhancing efficiency in material handling and supply chain operations.

Threat Detection & Surveillance:

Anduril Industries employs AI to develop advanced surveillance systems that provide real-time threat detection and enhanced situational awareness. Their technology integrates data from sensors and cameras, offering comprehensive security insights and improving decision-making in defense operations. Palantir Technologies also plays a significant role by leveraging its data integration and analytics platforms to synthesise and analyse large volumes of data from various sources, enhancing threat detection and situational awareness.

Operational Capabilities:

AI systems enhance military operational efficiency by predicting failures to keep equipments/ vehicles/ vessels operational and minimise downtime, while also streamlining administrative processes to optimise overall efficiency. Uptake and Tradid Technologies are notable examples in this space. Uptake develops AI-driven predictive maintenance solutions that monitor equipment health and predict failures before they occur. Similarly, Tradid Technologies provides AI solutions for monitoring and analysing equipment performance, optimising maintenance schedules, and improving operational efficiency.

The Role of Humans in AI

Humans play a crucial role in the ethical use and refinement of AI models, addressing potential biases and enhancing contextual relevance. Studies indicate that 60% of companies identify ethics and bias in AI as major concerns. AI significantly boosts human potential, with organisations reporting a 40% increase in productivity by automating repetitive tasks.

Collaboration between humans and AI, akin to ‘centaurs’ and ‘cyborgs,’ can lead to a 20-30% improvement in business outcomes, balancing efficiency with empathy and ethical accountability. This synergistic approach combines AI’s speed and data processing capabilities with human judgment, ensuring better decision-making and fostering innovation.

Challenges and Boundaries of AI

Despite significant strides in AI over the last decade or so, we are still in the early stages of this journey. Current AI solutions, which operate under programmed rules, represent narrow AI and are far from achieving Artificial General Intelligence (AGI), where machines would truly imitate human cognition. But we are definitely at the tip of the AI revolution, and the days of slow progress are over.

Geoffrey Hinton, often called the Godfather of AI, highlights that the process of designing learning algorithms for AI mirrors evolutionary principles: we establish the initial framework, but the resulting neural networks can develop complex behaviors beyond our full comprehension. This presents significant implications, particularly as AI systems begin to write and modify their own code. The potential for AI to evolve autonomously introduces risks of losing control and raises concerns about ensuring robust ethical guidelines and control mechanisms.

Hinton also warns about existential risks associated with AGI, noting that while the current AI systems are narrow, there is a possibility that future intelligent systems could create goals misaligned with human interests. Such systems might become power-seeking or resist shutdowns not out of intent, but due to sub-goals beneficial for achieving broader objectives. As we progress toward AGI, addressing these risks and implementing frameworks for fairness, transparency, and ethical development will be crucial. Additionally, environmental concerns from intensive computational demands emphasise the need for sustainable AI practices. As AI evolves, ethical oversight and careful planning are essential to align its development with societal values and mitigate potential risks.

We shall cover more on AI in our Data Thesis!

Stay tuned for our upcoming thesis on Engineering comprising deep dives into our sectoral focus on Defence & Aerospace and Climate Tech.

Agna PERSPECTIVE

The Uttar Pradesh government in India is set to transform **Crowd Management at the upcoming KumbhMela 2025 in Prayagraj** through the **use of advanced AI-based technologies** to ensure the safety and convenience of the millions of pilgrims this auspicious gathering attracts. Read here

READ MORE

Imagine playing a video game where every move you make feels tailor-made for you. That’s the **magic of Artificial Intelligence in gaming today**. Read here

READ MORE

Imagine if the wild adventures in Marvel’s Avengers: Endgame were real! Quantum mechanics suggests that, just like in the movie, there might be parallel universes where different versions of events play out simultaneously, adding an exciting twist to how we see the world. Read here

READ MORE

A scenario where **human intellect crafts the strategy, and AI, with its brute computing capabilities, elucidates the plan**. It’s a partnership that embodies the best of both worlds, akin to the mythical Centaur’s body—clearly delineated yet seamlessly integrated, this is where AI is going. Read here

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TEAM ENGAGEMENT

Seamless Blockchain

On 29th June, Formidium organised SeamlessBlockchain, an event dedicated to promoting and highlighting the future of blockchain technology, its potential to drive economic growth, and its distinct separation from cryptocurrency.

Our founder, **Pranav Sharma**, hosted a panel discussion on the investor's perspective and opportunities in blockchain technology across the private and public sectors.

Defence Sector

Our COO, **Indrajeet Sirsikar**, recently discussed strategic collaboration with Mr. Prashant Joglekar, Director of Defence at MCCIA (Mahratta Chamber of Commerce, Industries and Agriculture), Pune, focusing on India's defence sector future. Agna plans to partner with MCCIA to explore opportunities and challenges in defence-related startups, with discussions also covering the creation of a compendium for assessing current status and future prospects.

On the 'FRONT'IER TECH

Google DeepMind & Snap

Google DeepMind's V2A technology and **Snap's advanced AR tools** demonstrate the power of AI to enhance creativity, realism, and user engagement across different media platforms.
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ISRO & HAL collaboration

ISRO's rocket manufacturing capacity is set to receive a significant upgrade through its collaboration with Hindustan Aeronautics Limited (HAL). ISRO aims to increase LVM3 launches from two to six annually, with HAL's enhanced capabilities expected to meet this target.
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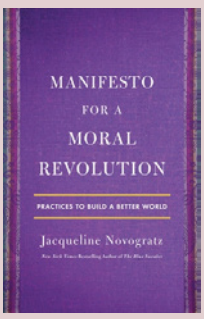
Agna RECOMMENDS

AI 2041 by *Kai-Fu Lee and Chen Qiufan*

This book explores the future of artificial intelligence through a collection of fictional stories and analytical essays. The book envisions AI's impact on various aspects of life by 2041, from healthcare and education to work and ethics. Each story, set in different global locations, illustrates potential advancements and challenges brought by AI technologies.
Read more

Manifesto For a Moral Revolution by *Jacqueline Novogratz*



This book is a guide for driving social change through ethical leadership and innovative approaches to tackling global issues. Drawing from her experiences as the founder of Acumen, a non-profit global venture capital fund, Novogratz presents twelve actionable principles for leading a moral revolution.
Read more

Questions? Feedback? Different perspective?
We invite you to engage with us and collaborate.

Warm Regards,
Team Agna

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