



57th ENGINEERS' DAY

15th September, 2024

BHARAT RATNA SIR M. VISVESVARAYA (1861-1962)

SOUVENIR

Theme : 'Driving Sustainability with Engineering Solutions
Embracing the Latest AI Driven Technologies'



The Institution of Engineers (India)
U.P. STATE CENTRE, LUCKNOW



The Institution of Engineers (India)

8 Gokhale Road, Kolkata, 700 020, India

Established 1920, Incorporated by Royal Charter 1935

U.P. State Centre, Lucknow

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The Institution of Engineers (India) or IEI is the largest multidisciplinary professional body that encompasses 15 engineering disciplines and gives engineers a global platform from which to share professional interest. IEI has membership strength of over 0.8 million. Established in 1920, with its headquarters at 8 Gokhale Road, Kolkata - 700020, IEI has served the engineering fraternity for over nine decades. In this period of time it has been inextricably linked with the history of modern-day engineering. In 1935, IEI was incorporated by Royal Charter and remains the only professional body in India to be accorded this honour. Today, its quest for professional excellence has given it a place of pride in almost every prestigious and relevant organization across the globe. IEI functions among professional engineers, academicians and research workers. It provides a vast array of technical, professional and supporting services to the Government, Industries, Academia and the Engineering fraternity, operating from 125 Centres located across the country. The Institution also provides grant-in-aid to its members to conduct research and development on engineering subjects. IEI has been recognized as Scientific and Industrial Research Organization (SIRO) by the Ministry of Science & Technology, Govt. of India and besides conducting its own research, provides Grant-in-Aid to UG/PG/ PhD students of Engineering Institutes & Universities. IEI holds the International Professional Engineers (IntPE) Register for India under the global International Professional Engineers Alliance (IntPEA). The Institution also awards the Professional Engineers (PE) Certification. For details, please visit www.ieindia.org

1. **F.I.E. (Fellow)**

Fellowship (F.I.E) is the most senior and most reputed engineering degree of IEI in engineering and technology awarded by The Institution of Engineers (India). Holders are entitled to use the post-nominals, F.I.E.

2. **M.I.E.**

Member is also a more senior and more reputed engineering degree of IEI in engineering and technology awarded by The Institution of Engineers (India). Holders are entitled to use the post-nominals, M.I.E.

3. **A.M.I.E (Associate Member)**

Associate Member (A.M.I.E.) is a professional engineering degree certification awarded by the Institution. A.M.I.E. (Associate Member of The Institution of Engineers India) was earlier called A.I.E. (Associate of The Institution of Engineers India) and was even earlier known as Grade I.E. (Graduate of The Institution of Engineers India).

4. **Chartered Engineer**

All Corporate Members of The Institution of Engineers (India) are automatically designated as Chartered Engineers, and they all are entitled to use their designation Chartered Engineer- (C.Eng.) with their name, and have all right and privileges of A.M.I.E. Engineers, Corporate Members and Chartered Engineers. Chartered Engineer certificate holders are authorized to work as a professional practice in engineering field as Chartered Engineers with their own seal and signature; without any Government license.



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The Institution of Engineers (India)
U.P. State Centre, Lucknow

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57TH ENGINEERS' DAY



BHARAT RATNA SIR M. VISVESVARAYA
(1861-1962)

Souvenir

ORGANIZING COMMITTEE

Er. Satya Prakash, FIE

Er. V.B. Singh, FIE

Er. Masarrat Noor Khan, FIE

Er. Sudhir Kumar Verma, FIE

Er. Vijaya Pratap Singh, FIE

Chairman

Council Member & Past Vice President

Imm. Past Chairman

SCC Member

Hony. Secretary



Symbolical of Sir M.Visvesvaraya's Services to The Country `

The life, the fortune and the happiness of every one of us depend upon our knowing something of the rules of a game infinitely more difficult and complicated than chess. The chessboard is the world, the pieces are the phenomena of the universe, and the rules of the game are what we call the laws of nature. The player on the other side is hidden from us. We know that his play is always just, fair, and patient. But we also know to our cost that He never overlooks a mistake, or makes the smallest allowance for ignorance. To the man who plays well, the highest stakes are paid, with the sort of overflowing generosity with which the strong shows delight in strength. And one who plays ill is checkmated- without haste but without remorse. What I mean by education is learning the rules of this mighty game.



57th Engineers' Day 2024 Souvenir



आनंदीबेन पटेल
राज्यपाल, उत्तर प्रदेश



सत्यमेव जयते

राज भवन
लखनऊ - 226 027

06 सितम्बर, 2024

सन्देश

यह अत्यंत हर्ष का विषय है कि इंस्टीट्यूशन ऑफ इंजिनियर्स (इंडिया) द्वारा भारत रत्न डॉक्टर एम0 विश्वेश्वरैया का जन्म दिवस 15 सितंबर 2024 को 57वें अभियंता दिवस के रूप में मनाया जा रहा है। इस अवसर पर एक स्मारिका का प्रकाशन भी किया जाएगा।

डॉ विश्वेश्वरैया एक महान अभियंता, विद्वान और देशभक्त थे, जिन्होंने जल संसाधन, बाढ़ एवं सिंचाई परियोजनाओं में योगदान दे कर देश के विकास में महत्वपूर्ण भूमिका निभाई है। मैं आशा करती हूँ कि प्रकाश्य स्मारिका में डॉक्टर विश्वेश्वरैया के कार्यों एवं योगदान का उल्लेख किया जाएगा जो अभियंताओं एवं जनमानस को देश हित में कार्य करने हेतु प्रेरित करेगी।

स्मारिका के सफल प्रकाशन हेतु मैं अपनी हार्दिक शुभकामनाएं प्रेषित करती हूँ।

आनंदीबेन
(आनंदीबेन पटेल)



57th Engineers' Day 2024 Souvenir



दयाशंकर सिंह
राज्य मंत्री (स्वतंत्र प्रभार)
परिवहन विभाग



संख्या: /वी.आई.पी./रा.मं.(स्व.प्र.)परि./202
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दिनांक :



शुभकामना संदेश

मुझे यह जानकर प्रसन्नता हो रही है कि देश के महानतम अभियन्ता भारत रत्न डॉ० एम० विश्वेश्वरैया के जन्म दिवस को 57वें अभियन्ता दिवस के रूप में मनाया जा रहा है। इस अवसर पर एक गोष्ठी का आयोजन करने के साथ-साथ स्मारिका का प्रकाशन भी किया जा रहा है।

अभियन्ता समाज के विकास और प्रगति के महत्वपूर्ण स्तंभ हैं। उनके नवाचार, सम्पूर्ण और तकनीकी कौशल से न केवल देश की आधारभूत संरचना सुदृढ़ होती है बल्कि जीवन के हर क्षेत्र में प्रगति संभव हो पाती है। यह दिन हमें डॉ० एम० विश्वेश्वरैया की उत्कृष्टता और उनके द्वारा छोड़ी गई अमूल्य विरासत को स्मरण करने का अवसर प्रदान करता है। डॉ० एम० विश्वेश्वरैया एक विश्व स्तरीय इंजीनियर के रूप में ख्याति प्राप्त हैं। इनको वर्ष 1955 में भारत रत्न की उपाधि से सम्मानित किया गया तथा सार्वजनिक जीवन में योगदान के लिए किंग जार्ज प्रथम ने उन्हें ब्रिटिश इंडियन एम्पायर के नाइट कमांडर के सम्मान से भी नवाजा है। डॉ० एम० विश्वेश्वरैया द्वारा अनेको ऐसे अर्चंगित कार्य किये हैं जिसकी तारीफ विश्वस्तर पर आज भी होती रहती है।

मैं इस आयोजन की सफलता, स्मारिका के प्रकाशन एवं इस पत्रिका से जुड़े हुए सभी महानुभावों को शुभकामनाएं देता हूँ।

(दयाशंकर सिंह)
(दयाशंकर सिंह)
राज्य मंत्री स्वतंत्र प्रभार
परिवहन विभाग, उ०प्र०

शुभकामनाओं सहित।

श्री सत्य प्रकाश जी,
अध्यक्ष,
दि इंस्टीट्यूशन ऑफ इंजीनियर्स(इंडिया),
उत्तर प्रदेश स्टेट सेंटर।

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The Institution of Engineers (India) U.P. State Centre, Lucknow



57th Engineers' Day 2024 Souvenir



The Institution of Engineers (India)

UTTAR PRADESH STATE CENTRE, ENGINEERS BHAWAN, RIVER BANK COLONY, LUCKNOW-226018

दि इन्स्टीट्यूशन ऑफ इंजीनियर्स

उत्तर प्रदेश स्टेट सेन्टर, इंजीनियर्स भवन, रिवर बैंक कालोनी

ER. SATYA PRAKASH, FIE
CHAIRMAN



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(Established 1920, Incorporated by Royal Charter 1935)

"A Century of Service to the Nation"



MESSAGE

I am delighted to learn that the Institution of Engineers (India), UP State Centre, is set to celebrate the 57th Engineers Day on September 15, 2024. This special occasion marks the birth anniversary of the eminent engineering visionary, Bharat Ratna Sir M. Visvesvaraya. As we celebrate this occasion, we not only pay homage to his remarkable contributions but also embrace the theme of this year's celebration: **"Driving Sustainability with Engineering Solutions Embracing the Latest AI Driven Technologies"** to Commemorate this auspicious occasion, a souvenir will also be published.

Engineers are the architects of progress, the visionaries who shape our future, and the problem solvers who navigate challenges with innovation and resilience. This year's theme reflects our commitment to building a world that is not only stronger and smarter but also safer for all.

I extend my warmest wishes for the successful publication of the souvenir.


(SatyaPrakash, FIE)
Chairman

www.ieiup.org.in;  7839572369;  @ieiupstate;  @ieiupstate;  @ieiupstate

The Institution of Engineers (India) U.P. State Centre, Lucknow



57th Engineers' Day 2024 Souvenir



The Institution of Engineers (India)

AN ISO 9001 : 2015 CERTIFIED ORGANISATION
(ESTABLISHED 1920, INCORPORATED BY ROYAL CHARTER 1935)
8 Gokhale Road, Kolkata-700 020

A Century of Service to the Nation

V B Singh, FIE
Council Member &
Past Vice President

MESSAGE



It is my pleasure to note that Uttar Pradesh State Centre of the Institution of Engineers (India) is celebrating the 57th Engineers' Day on September 15, 2024 to commemorate the birth anniversary of Sir Mokshagundam Visvesvaraya. The theme for this year to deliberate is "**Driving Sustainability with Engineering Solutions Embracing the Latest AI Driven Technologies**".

In this dynamic era, engineers stand at the forefront of progress, crafting a future that is well fortified and unyielding. They are the architects of resilience, working tirelessly to build structures that withstand the test of time. With their expertise, they erect towers that brave the fiercest storms, bridges that span vast chasm and roads that pave the way to safer journeys.

They have reached to moon. With resilience, engineers stand tall, symbolizing their commitment to a stronger tomorrow. Engineers have to play a pivotal role towards finding engineering solutions for giving better livelihood to the poorer section of the society.

I am sure that the members of Centre will participate in the celebration in large number and take oath for rendering services for the welfare of both rural and urban masses as dreamt by Sir M Visvesvaraya. I convey my greetings to the members of the Uttar Pradesh State Centre of The Institution of Engineers (India) and wish the celebration a grand success.

Happy 57th Engineers' Day.

(V B Singh)



57th Engineers' Day 2024 Souvenir



The Institution of Engineers (India)

UTTAR PRADESH STATE CENTRE, ENGINEERS BHAWAN, RIVER BANK COLONY, LUCKNOW-226018

दि इन्स्टीट्यूशन ऑफ इंजीनियर्स (इण्डिया)

उत्तर प्रदेश स्टेट सेन्टर, इंजीनियर्स भवन, रिवर बैंक कालोनी, लखनऊ-226018

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(Established 1920, Incorporated by Royal Charter 1935)

A century of Service to the Nation



"On the occasion of the 57th Engineers Day, we celebrate the invaluable contributions of engineers towards the growth and development of our nation. Engineers are the architects of progress, and their innovation, dedication, and vision continue to shape a brighter future. The Institution of Engineers (India), UP State Centre, is proud to commemorate this day, honoring the spirit of engineering excellence and inspiring the next generation to rise to new challenges. Together, we build a sustainable and prosperous world."

I wish all the success of the event.

Happy Engineers Day

(Masarrat Noor Khan, FIE)
IP Chairman



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Life Sketch of Bharat Ratna Sir M. Visvesvaraya

BHARAT RATNA Sir M. Visvesvaraya was one of the few of the twentieth century engineers who have risen to become top national figures. He reached to such achievements owing to his discipline and devotion to profession. His masterly achievements in the field of engineering and administration outclassed the best of engineers. Visvesvaraya was born on September 15, 1861 at Chikkaballapur in Kolar District of Mysore State. He took the Bachelor of Arts Degree of Madras University in 1880 from Central College, Bangalore and then entered the College of Science, Poona in 1881 to pursue engineering education. Topping the list of engineering candidates in 1883 he joined Bombay P.W.D. as an Assistant Engineer. In his early career he was entrusted with direct execution of some important works like the design of Water Supply System for Dhulia in Khandesh Distt., Water Supply and Drainage Schemes for Sukkur in Sind (present day Pakistan) and Water Works for Surat. The successful handling of these schemes established him as an executive of Zeal and ability. His prominence procured him an invitation from Indian Irrigation Commission of 1901-1993 to prepare a memorandum of the Irrigation Works in Bombay Presidency. He designed and patented a system of automated floodgates at rise and fall of water in the reservoir to raise the storage level of Lake at Khadakvasla permanently without raising the dam. These gates installed in 1903 are still working successfully. In 1906 he was deputed to Aden to prepare schemes for sanitary, water supply and roads. Sept. 28, 1908, struck headlines as a day of terrible disaster in the history of Hyderabad due to devastation and deluge caused by the rivers Musi and Easi overflowing their banks and leaving behind a dismal trail of death and destruction. At the invitation in behalf of his Exalted Highness the Nizam, Visvesvaraya

consented to act as Special Consulting Engineering from April, 15, 1909. After a thorough investigation into the engineering aspect of the problem i.e. set out his scheme for reconstruction of the city and came out with the proposals for construction of two reservoirs.

Subsequently he assumed office as Dewan of Mysore State in November 1912. The farseeing leadership of this Great Man ushered in an era of industrial revolution and community development in the State of Mysore. The Krishnarajasagar, perhaps the first multipurpose project in India, and Visvesvaraya Canal, are living proofs of his creative genius and restless desire to make use of ingenuity, conviction, faith in science and technology for translating vision into reality. A number of Engineering Colleges and Schools were opened in Bangalore during his period. He voluntarily laid down the office as Dewan in 1919, where after a new phase of his life began. At an age when most men will content to retire and take life easy, he took numerous assignments for the benefit of the the society. The chronicle of his activities in this period would be too numerous and lengthy to enumerate. He was decorated with C.I.E. and K.C.I.E. by the British Empire in the years 1911 and 1916 respectively. He was honoured by Eight Universities who conferred on him with the Degree of Honorary Doctorate. Finally Sir Visvesvaraya was honoured by the President of India in 1955 and was decorated with the highest Award of the Land-BHARAT RATNA. This Great Engineer Administrator of our land passed away in 1962. Engineers of the land pay a modest homage to this Great Genius who is a torch to the Indian Engineers for all times to come by observing September, 15 as the "Engineers' DAY". Sir M. Visvesvaraya was the pioneer in bringing Automobile industry in the Country. By meeting the then magnates of the fields like Lord Austin



and the Henry Ford, he met the engineers working at FIAT, Italy. His daunted efforts resulted in the establishment of Premier Automobile Company at Bombay in 1939 by M/s Walchand and Hirachand.

Britishers were initially opposed to the idea of Aircraft manufacturing in India but by his support the Government of Mysore was succeeded in starting the industry of Aircrafts in 1940 at Bangalore. He was the main person for sowing the seed for the starting of present HAL. Sir Mokshagundam Visvesvaraya was an Engineering Hero who rose on the Indian scene in the 19th century and continued to serve the country for more than half of the 20th century. His was an all embracing personality to which one could look for guidance in solving India's problems of today and tomorrow. The test of a great life lies really in the worth it retains after it is no longer available to offer guidance, or shed its illumination on the economic landscape. It's greatness would, therefore, be decided by the awareness of the succeeding generations in respect of its capacity to guide them or pilot their course on the uncharted sea of economic problems, with its storms and tempests.

Bharat Ratna Sir M Visvesvaraya belonged to the group of engineering scientist, and inventor, an industrialist, an economic planner, a scientific advisor, and statesman. He was the key person in formulating the right direction of Indian engineering temper.

At this he has advised in-

1. Village planning to contain their population.
2. Compulsory primary education.
3. Free meals, free transport for school going boys and girls.
4. Adopting block system of Irrigation & Role of village tank.
5. Additional occupation of farmers.
6. Need for specialization.
7. Religion is science.

8. Vitalize the youth of the country.
9. Need for more Universities.
10. Industrialize the knowledge.
11. Control of population.
12. Scientific Research.
13. Electrical power grid essential for the development of the country.
14. Engineers should get incentives.
15. Starting of engineering consultancy services.
16. Starting of Automobiles & Aircrafts Industry.

With regards to the position of an engineer in the country's administration he was sorry to say: "The engineer, whether in the service of government, a municipal corporation or a large industrial undertaking does his work unobserved. He may inspire but cannot shape policies. In the course of his daily routine he usually does a vast amount of designing and constructional work, standing behind a ruler, administrator, financier, or business syndicate. The majority of engineers in this country have no independent status. His books "Reconstructing India" and "Planned Economy for India" are examples of his vision and dedication.

On celebration of his 100th birthday in 1961 at Bangalore the then Prime Minister of India Shri Jawaharlal Ji has rightly said: "We have gathered here on a memorable occasion, and I have come here to have the privilege of joining on this occasion. I would have come, anyhow to honour the great son of India. But, it so happen that I occupy a position granted to me by the goodwill and confidence of the people of India, and so without any arrogance I may say that in offering my homage to this distinguished son of India. I do so on behalf of the people of India". This simple & strong disciplined person lived for 101 years. We bow to him on this 52nd Engineers Day.

57th ENGINEERS' DAY

Theme: Driving Sustainability with Engineering Solutions Embracing the Latest AI Driven Technologies

September 15 is celebrated every year in the country since the year 1967 as "Engineers' Day" to commemorate the birthday of the legendary engineer Sir Mokshagundam Visvesvaraya. Sir Visvesvaraya, an eminent Indian engineer and statesman was born in a remote village of Karnataka, the State that is incidentally now the Hi-tech State of the country. Due to his outstanding contribution to the society, Government of India conferred "Bharat Ratna" on this legend in the year 1955. He was also called the precursor of economic planning in India. His learned discourse on Economic Planning in India, Planned Economy for India and Reconstructing India, was the first available document on the planning effort of the country and it is still held as the parent source matter for economic planners. A theme of national importance is chosen every year by the Council of the Institution and deliberated at its various State/Local Centres to educate the engineering fraternity in general and the society in particular. This year the 56th Engineers' Day will be celebrated all over the country on the theme "Driving Sustainability with Engineering Solutions Embracing the Latest AI-driven Technologies".

The Institution of Engineers (India) will celebrate the 57th Engineers' Day on September 15, commemorating the 163rd birthday of Bharat Ratna Sir



Bharat Ratna Sir M Visvesvaraya

Mokshagundam Visvesvaraya. This day not only honors his pioneering spirit but also serves as a tribute to engineers worldwide, whose innovations and dedication shape our modern world. This year's theme, "Driving Sustainability with Engineering Solutions Embracing the Latest AI-driven Technologies," underscores the pivotal role of engineering in solving global challenges.

AI is revolutionizing our journey towards sustainability. In the fight against climate change, AI enhances predictive models, enabling better preparation for extreme weather and optimizing renewable energy use. In agriculture, AI-driven analytics are transforming crop management, leading to higher yields and a smaller environmental footprint. Urban areas benefit immensely from AI-powered traffic systems that reduce congestion and emissions, while intelligent waste management systems ensure efficient recycling.

Furthermore, AI is the key to optimizing resource management, from water to manufacturing processes, ensuring maximum efficiency and minimal waste.

These advancements highlight the profound impact AI has on creating sustainable solutions for a brighter future. The integration of AI interfaces in sustainable engineering solutions has unlocked new realms of innovation. AI-driven platforms enable real-time monitoring and analysis, providing engineers with critical insights for informed decision-making. From smart grids that balance energy loads to adaptive systems that respond to environmental changes, AI interfaces enhance the effectiveness of sustainable engineering practices.

The Institution of Engineers (India) calls upon all State and Local Centres and associated entities to celebrate Engineers' Day in a grand and befitting manner. Let us honour the innovative spirit and contributions of engineers who are driving sustainability through cutting-edge AI-driven technologies. Together, we can pave the way for a greener and more sustainable tomorrow. Join the movement, celebrate innovation, and be part of the change



About the Institution of Engineers (India)

Er. Vijaya Pratap Singh FIE

Hony. Secretary

ADVANCING KNOWLEDGE

The Institution of Engineers (India), the IEI, is a national organization for engineers in India. It has more than eight million members in 15 engineering disciplines in 125 centers or chapters in India and 6 overseas, and is the world's largest multi-disciplinary engineering professional society.

The IEI was established in 1920 in Madras, with Sir Thomas R. J. Ward being the founding president. It was formally inaugurated in 1921 by Lord Chelmsford, the then-Viceroy of British India. On 19 December 1930, the then Viceroy Lord Irwin, laid the foundation for the IEI's building at 8 Gokhale Road, in Calcutta. The organisation moved into the building on 1 January 1932.

In September 1935, following a successful petition by Sir Thomas Guthrie Russell (President 1933-34), the IEI obtained a Royal Charter of Incorporation from King George V 'to promote and advance the science, practice, and business of engineering'.

IEI with its presence in 5 Overseas Countries, is also the first professional body to represent India in several international Forums like World Federation of Engineering Organisations (WFEO). Commonwealth Engineer Council (CEC). Federation international du Beton (Fib) Federation of Engineering Institutions of Asia and the Pacific (FEIFIC), and Federation of Engineering Institutions of South and Central Asia (FEIAP), besides a host of strategic tie-ups with professional societies across the globe.

IEI functions with and amongst the professional engineers, academicians and

research workers and provides a vast array of technical value-added professional services to the Government, Industries, academic and engineering communities.

IEI had been conducting its well recognized non-formal engineering education programme since pioneering the same in 1928, acknowledged to be equivalent to a degree in engineering by the Government of India, the Union Public Service Commission, the state Governments and many Public/Private Sector organizations in the country. Though matter is under legal dispute for students registered after 31st May 2013.

IEI Headquarters in Kolkata, India and administered by a National Council led by its President operates through 125 State and Local Centres, located at the capital cities and towns of industrial and academic importance all over the country, along with 6 Overseas Chapters. The Secretary & Director General is the Chief Executive Officer of the Institution.

IEI SERVICE SPECTRUM FOR ENGINEERING COMMUNITY

The range of services offered by the Institution of Engineers (India) to their Members includes:

- Dissemination of engineering and technological knowledge to all members, planning and organizing activities that impact engineering such as continuation of education courses, seminars, symposia, workshops, conventions, conferences, etc at both national and international levels.
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technological disciplines.

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Artificial Intelligence for Improved Water Management

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In an era where artificial intelligence (AI) is revolutionizing sectors across the board, its application within water and wastewater management is demonstrating the power of smart technology to secure a resilient future. AI's role in enhancing the efficiency and reliability of water utilities is not just an advancement but a necessity, given the growing complexity and demands of modern societies. This exploration isn't about a single entity's contribution but about how AI is emerging as a crucial player in this vital industry. The transition to AI-driven utilities is not about replacing human ingenuity but augmenting it to meet the challenges of the times. The deluge of data that smart sensors and IoT devices generate can overwhelm traditional data processing methods. AI's ability to swiftly analyze this information in real time allows for prompt identification and resolution of issues, preempting disruptions, and ensuring uninterrupted service. AI's collaboration with human experts marks a significant leap forward in managing water resources. This partnership ensures that nuanced human judgment is enhanced by AI's precision and speed, leading to an unprecedented level of operational excellence in the water sector.

Thus, Artificial Intelligence tools are becoming necessity with time and now every engineering solution has to be integrated with AI for making it more effective and sustainable. In this article, the use of AI in emerging scenario of watermanagement will be discussed. Under water

management, ground water management and waste water management have assumed very much importance due to falling ground water table and spiralling amount of waste water generation.

Ground Water Management:

The integration of Artificial Intelligence (AI) in groundwater management is a transformative stage, characterized by innovation and challenges. It is required to explore the multilayered application of AI in this field, dividing its contributions, addressing its associated challenges, and revealing the prospects of future potential. New AI-driven innovations are designed to revolutionize groundwater management, providing precise predictive modelling, real-time monitoring, and data integration. However, these innovations face challenges such as interpretability issues, specialized technical expertise requirements, and limited data quality and quantity for effective AI model performance. To manage ground water aquifer, there is urgent need of recharging ground water with runoff whose generation is going to increase due to change in pattern of rainfall, a fallout of climate change. A major problem of designing and operating ground water recharge structures is control of quality of runoff both physical and chemical. AI holds significant promise in this regard by real time monitoring of turbidity and contamination of recharge water. Advanced AI models can yield improved predictions of runoff generation, its quality both in terms of physical and chemical characteristics prompt proactive interventions. This will foster collaborative platforms among scientists, policymakers, and local communities. Collaborative platforms driven by AI



offer potential for synergistic engagement among scientists, policymakers, and local communities, collectively guiding groundwater resource management. Embracing AI's potential while addressing its challenges remains pivotal for sustainable and resilient groundwater management practices. By embracing AI's potential while addressing its challenges, the landscape of groundwater resource management will continue to evolve.

AI can play a crucial role in monitoring and ensuring the quality of water being sent to recharge systems. Here are some ways AI can help:

1. **Real-Time Monitoring:** AI-powered sensors can continuously monitor water quality parameters such as turbidity, pH, dissolved oxygen, and contaminants. These sensors can send real-time data to a central system for analysis.
2. **Predictive Analytics:** AI algorithms can analyze historical and real-time data to predict potential quality issues before they occur. This allows for proactive measures to be taken to prevent contamination.
3. **Automated Alerts:** When water quality parameters exceed permissible levels, AI systems can automatically trigger alerts to operators. This ensures immediate action can be taken to address the issue.
4. **Smart Filtration Systems:** AI-driven filtration systems can adapt to changing water quality conditions. These systems can optimize filtration processes based on the specific contaminants detected, ensuring thorough purification before water is sent to recharge systems.
5. **Data Integration and Analysis:** AI can integrate data from various sources, including weather forecasts, industrial discharge reports, and agricultural runoff data, to provide a comprehensive view of factors affecting water quality. This holistic approach helps in better decision-making.

6. **Machine Learning Models:** Advanced machine learning models can classify water quality based on multiple parameters and provide insights into the most significant factors affecting water quality. These models can also explain the reasoning behind their predictions, making it easier for operators to understand and act on the data.

By leveraging these AI capabilities, water management systems can ensure that only high-quality water is used for groundwater recharge, protecting both the environment and public health.

Waste Water Management

In waste water management, most important factors are quality of waste water before entering treatment unit and quality of treated water. The quality of input waste water will determine the extent of treatment required. Similarly the quality of output water post treatment has to be assessed whether it meets the criterion of sector where it has to be used. AI can be used in water and wastewater management in the following ways:

- " **Continuous monitoring:** AI helps fine-tune processes, reduce waste, and optimize resource usage.
- " **Prediction and modelling:** Machine learning and AI are successful in predicting and modelling water-related operations.
- " **Automation and optimization:** AI improves responsiveness and efficiency in water management systems
- " **Real-Time Data Analytics and Human-AI Collaboration:** AI facilitate better human Ai collaboration with real time data analysis

The Strategic Advantages of AI in Water Management

Operational Efficiency: AI's capacity to detect deviations from optimal performance is crucial for maintaining operational efficiency. By continuously



monitoring systems, AI helps in fine-tuning processes, reducing waste, and optimizing resource usage.

Concurrent Processing Abilities: With AI, multiple tasks can be handled at once, improving the responsiveness of water management systems. This multitasking prowess enables the seamless integration of data points, from weather patterns to usage trends, ensuring proactive maintenance and resource distribution.

Energy Conservation and Quality Assurance: AI excels in identifying and rectifying inefficient control strategies that lead to unnecessary energy expenditure and potential quality lapses. Adjusting operational parameters for better energy use, AI supports sustainable practices and adherence to quality standards.

In the broader context, AI's transformative impact on the water industry is akin to that of large language models on data processing and analysis. As the industry grapples with real-time data influx, workforce transitions, and resource constraints, AI stands as a vital tool in the utility belt of water management professionals.

Way Forward for use of AI:

It's imperative to recognize that AI supplements, not supplants, human decision-making. This aligns with the ethical deployment of AI across different fields. Ensuring the integrity of data and the application of human oversight is paramount for AI systems to yield beneficial outcomes without overstepping their intended role.

The incorporation of AI into ground water and wastewater management is a testament to the evolving landscape of utility operations, driving progress toward sustainability and resilience. By tapping into the potential of AI, akin to the advancements seen with large language models, the water industry is poised to experience a renaissance in its operations-making informed decisions, refining processes, and meeting regulatory compliance more effectively. This movement towards an AI-integrated future in water management not only exemplifies the innovation within the sector but also serves as a blueprint for other industries to follow, setting the stage for an intelligent, efficient, and sustainable tomorrow.



Artificial Intelligence -A way forward towards Sustainable Civil Engineering Technologies"

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Abstract:

Artificial Intelligence (AI) is a science that was developed based on the interaction of several kinds of disciplines, such as computer science, cybernetics, information theory, psychology, linguistics, and neurophysiology. There are innumerable uncertain factors, complicated influence factors in civil engineering, each project has its individual character and generality; function of expert system in the special links and cases is a notable effect and application of AI was proved to be a major solution to all complexities of Civil Engineering. Intelligent Design Construction and Maintenance (IDCM) is also the core of and engineering capability of AI in civil engineering and having 4-modules viz., Intelligent planning and Design; Intelligent equipment and Construction; Intelligent facilities and disaster prevention and Intelligent Operation, maintenance & services. Artificial Neural Networks (ANN) is a computational model that consists of several processing elements that receive inputs and deliver outputs based on their predefined activation functions. It is machine learning approach that models the human brain and consists of several artificial neurons linked by weighted connections. AI applies in many areas of Civil Engineering and is a power full tool for solving many problems with due diligence by practicality. The AI is instruction based on the algorithm and data base to reduce the project costs and construction tike lines. Artificial Intelligence (AI) can help inexperienced users solve engineering problems, can also help experienced users to improve the work efficiency, and also in the team through the artificial intelligence technology to share the experience of each member.

Key words: Artificial Neural networks; Machine learning; IDCM, Genetic Algorithms; Expert Solutions; Evolutionary Computation; Artificial Immune solutions....

1.0 Preamble:

The branch of computer science called artificial intelligence deals with the study, creation, and use of machine intelligence and also science on the research and application of the law of the activities of human intelligence. Artificial intelligence, a comprehensive discipline, was developed based on the interaction of several kinds of disciplines, such as computer science, cybernetics, information theory, psychology, linguistics, and neurophysiology. Artificial intelligence is a branch of computer science, involved in the research, design and application of intelligent computer. Artificial intelligence-based technologies may

frequently offer useful options in effectively addressing challenges in civil engineering, as traditional approaches for modelling as well as optimising building and engineering networks need immense quantities of computational power. Artificial intelligence (AI), also referred to as enhanced intelligence (AI), seems to be a transformative method that uses machines to carry out tasks intelligently, effectively, and efficiently. This is regarded as being one of the methods which combines human strengths in what seems like a way that enables the project to be completed neither a robot nor a person by itself can perform. By considering AI ideas, whatever knowledge may be



made standardized and easily accessible towards consumers, enabling them to make the best decision possible while considering both facts at hand as well as verifiable evidence. AI requires a foundation of specialized hardware and software for writing and training machine learning algorithms. No single programming language is synonymous with AI, but Python, R, Java, C++, and Julia have features popular with AI developers.

2.0 Artificial Intelligence (AI): Artificial Intelligence is composed of two words Artificial and Intelligence, where Artificial defines "man-made," and intelligence defines "thinking power", hence AI means "a man-made thinking power." Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

AI programming focuses on cognitive skills that include the following:

- ❖ **Learning.** This aspect of AI programming focuses on acquiring data and creating rules for how to turn it into actionable information. The rules, which are called algorithms, provide computing devices with step-by-step instructions for how to complete a specific task.
- ❖ **Reasoning.** This aspect of AI programming focuses on choosing the right algorithm to reach a desired outcome.
- ❖ **Self-correction.** This aspect of AI programming is designed to continually fine-tune algorithms and ensure they provide the most accurate results possible.
- ❖ **Creativity.** This aspect of AI uses neural networks, rules-based systems, statistical methods, and other AI techniques to generate new images, new text, new music and new ideas.

2.1 Why is Artificial Intelligence (AI) is important?

AI is important for its potential to change how we live, work and play. It has been effectively used in business to automate tasks done by humans, including customer service work, lead generation, fraud detection and quality control. In several areas, AI can perform tasks much better than humans. Particularly when it comes to repetitive, detail-oriented tasks, such as analysing large numbers of legal documents to ensure relevant fields are filled in properly, AI tools often complete jobs quickly and with relatively few errors. Because of the massive data sets it can process, AI can also give enterprises insights into their operations they might not have been aware of. The rapidly expanding population of generative AI tools will be important in fields ranging from education and marketing to product design.

2.2 Types of Artificial Intelligence:

Mr. Arend Hintze, an assistant professor of integrative biology and computer science, engineering at Michigan State University of US, explained that AI can be categorized into four types, beginning with the task-specific intelligent systems in wide use today and progressing to sentient systems, which do not yet exist. The categories are as follows-

- ❖ **Type 1: Reactive machines.** These AI systems have no memory and are task-specific. An example is Deep Blue, the IBM chess program that beat Garry Kasparov in the 1990s. Deep Blue can identify pieces on a chessboard and make predictions, but because it has no memory, it cannot use past experiences to inform future ones.
- ❖ **Type 2: Limited memory.** These AI systems have memory, so they can use past experiences to inform future decisions. Some of the decision-making functions in self-driving cars are designed this way.



❖ Type 3: Theory of mind. Theory of mind is a psychology term. When applied to AI, it means the system would have the social intelligence to understand emotions. This type of AI will be able to infer human intentions and predict behaviour, a necessary skill for AI systems to become integral members of human teams.

❖ Type 4: Self-awareness. In this category, AI systems have a sense of self, which gives them consciousness. Machines with self-awareness understand their own current state. This type of AI does not yet exist.

3.0 Artificial Neural Networks (ANNs):

Artificial Neural Networks (ANN) and deep learning AI technologies are quickly evolving, primarily because AI can process large amounts of data much faster and make predictions more accurately than humanly possible. ANN is a computational model that consists of several processing elements that receive inputs and deliver outputs based on their predefined activation functions. It is machine learning approach that models the human brain and consists of several artificial neurons linked by weighted connections. ANN demonstrate the ability to learn, recall, and generalize from training patterns or data (numeric or non-numeric).

While the huge volume of data created on a daily basis would bury a human researcher, AI applications using machine learning can take that data and quickly turn it into actionable information. As of this writing, a primary disadvantage of AI is that it is expensive to process the large amounts of data AI programming requires. As AI techniques are incorporated into more products and services, organizations must also be attuned to AI's potential to create biased and discriminatory systems, intentionally or inadvertently.

4.0 Advantages and Disadvantages of Artificial

Intelligence:

The following are some advantages of AI.

- ❖ Good at detail-oriented jobs: AI has proven to be as good or better than doctors at diagnosing certain cancers, including breast cancer and melanoma.
- ❖ Reduced time for data-heavy tasks: AI is widely used in data-heavy industries, including banking and securities, pharma, and insurance, to reduce the time it takes to analyse big data sets. Financial services, for example, routinely use AI to process loan applications and detect fraud.
- ❖ Saves labour and increases productivity: An example here is the use of Warehouse automation, which grew during the pandemic and is expected to increase with the integration of AI and machine learning.
- ❖ Delivers consistent results: The best AI translation tools deliver high levels of consistency, offering even small businesses the ability to reach customers in their native language.
- ❖ Can improve customer satisfaction through personalization: AI can personalize content, messaging, ads, recommendations, and websites to individual customers.
- ❖ AI-powered virtual agents are always available: AI programs do not need to sleep or take breaks, providing 24/7 service.

The following are some disadvantages of AI.

- ❖ Expensive.
- ❖ Requires deep technical expertise.
- ❖ Limited supply of qualified workers to build AI tools.
- ❖ Reflects the biases of its training data, at



scale.

- ❖ Lack of ability to generalize from one task to another.
- ❖ Eliminates human jobs, increasing unemployment rates.

5.0 Civil Engineering and Artificial Intelligence:

There are innumerable uncertain factors, complicated influence factors in civil engineering, each project has its individual character and generality; function of expert system in the special links and cases is a notable effect. Over the past 20 years, in the civil engineering field, development and application of the expert system have made a lot of achievements, mainly used in project evaluation, diagnosis, decision-making and prediction, building design and optimization, the project management construction technology, road and bridge health detection and some special field, and so forth. As such Artificial Intelligence (AI) best suits the Civil Engineering applications towards safety, reliability, sustainability and effective use human intelligence saving valuable time of a multitasking civil engineering as designer, planner cum executor of projects to clients' satisfaction.

One such Intelligent Design Construction and Maintenance (IDCM) is also the core of and engineering capability of AI in civil engineering. AI represents the intelligence while civil engineering covers the whole life-cycle of a project including design, construction, and maintenance. The nature of the discipline IDCM is interdisciplinary with civil engineering as the base while integrating disciplines such as mechanical engineering, materials engineering, electronic information, engineering management and all other disciplines reflecting the enormous development of the construction industry in the intelligent era. Safety, economy, and sustainability are pursued in civil

engineering, which is of no exception for IDCM. In addition, IDCM has been trying to achieve ultimate accuracy, efficiency, and robustness to really contribute to the development of construction industry. Along with the development of industry technology, construction industry has evolved from Construction 1.0 to Construction 4.0. The industrial revolution triggered by steam made the construction mechanized, which is the era of Construction 1.0; when the use of electricity has brought the construction industry into the era of 2.0, modular buildings with higher productivity and the large-scale application of assembly lines had become possible; the use of computer has brought the construction industry into the 3.0 era; at present, the integration of emerging technologies such as big data,

Internet of Things (IoT), Virtual Reality with the construction industry has entered the era of Construction 4.0. Construction 4.0, i.e., IDCM, includes four modules:

- (1) Intelligent planning and design: relying on artificial intelligence, mathematical optimization, and computer simulation of the human brain to carry out the intelligent architectural and engineering design that can meet the needs of user-friendliness characteristics;
- (2) Intelligent equipment and construction: with the development of heavy-duty robots, 3D printing and flexible the needs of user-friendliness characteristics; manufacturing systems, the construction sector has been transformed from labour-intensive to technology-intensive;
- (3) Intelligent facilities and disaster prevention: the production of intelligent sensing equipment and self-recovery materials make smart home, smart infra-structure, smart city operation and disaster prevention possible; and



(4) Intelligent operation, maintenance and services: relying on the integration and R&D of technologies such as intelligent sensing, big data, cloud computing, and Internet of Things to realize the whole-life intelligent operation and the maintenance management of buildings and infrastructures.

Augmented intelligence (AI) has become increasingly essential across the various comment thread of civil engineering as a result of technological and scientific advances together with the concepts of industry 5.0 and construction 5.0.

AI-based research becomes one of the most advanced progresses of the new era in the field of civil engineering, because it can not only solve problems efficiently but also provide alternative optimized solutions of completed problems. IDCM will promote the rapid development of the construction industry from multiple perspectives such as intelligent planning and design, intelligent equipment construction, and intelligent disaster prevention

operation and life-cycle maintenance. These new developments bring the call for an inter-national academic platform to deliver the cutting-edge technology and establish joint research between civil engineering and artificial intelligence to worldwide scholars.

6.0 Civil Engineering Applications of Artificial Intelligence (AI):

❖ Evolutionary computation (EC) is a subfield of artificial intelligence, which uses iterative process (often inspired by biological mechanisms of evolution) to evolve a population of solution to a desired end. EC has been applied to the domain of civil engineering for several decades, mainly served as an effective method for solving complex optimization problems.

❖ Genetic algorithms (GAs) are one of the famous evolutionary algorithms which simulate the Darwinian principle of evolution and the survival of the fittest in optimization. It has extensive application value in the civil engineering field, but in many aspects, it needs to be further studied and improved.

❖ Artificial Immune System (AIS) resolves issues related to the theoretical immunology, observed immune functions, principles, and models, artificial immune system (AIS) stimulates the adaptive immune system of a living creature to unravel the various complexities in real-world engineering optimization problems. In this technique, a combination of the genetic algorithm and the least-squares method was used to find feasible structures and the appropriate constants for those structures. The new approach overcomes the shortcomings of the traditional and artificial neural network-based methods presented in the literature for the analysis of civil engineering systems.

❖ Genetic Programming (GP) is a model of programming which uses the ideas of biological evolution to handle complex optimization problems. A new empirical model to estimate the base shear of plane steel structures subjected to earthquake load using a hybrid method integrating genetic programming (GP) and simulated annealing (SA), called GP/SA.

❖ Neural Network (NN) was developed to prove that the fuzzy-control tool has a behaviour that can be recognized by a neural network and an efficient approach was developed to estimate the friction coefficient via an artificial neural network, which was a promising computational tool in civil engineering. The estimated value of the friction coefficient was used in Manning Equation to predict the open channel flows in order to carry out a comparison between the proposed neural networks-



based approach and the conventional ones.

❖ An Expert System (ES) is relying on human experts existing knowledge based on set up knowledge system; the expert system develops the earliest, the most effective in the artificial intelligence research field. The expert system is widely used in road and bridge, construction engineering, geotechnical engineering, underground engineering, disaster prevention project, material engineering, geological exploration and petroleum chemical industry.

6.1 AI drives Smarter Construction Methods

It can be concurred that perhaps the limitations of design and engineering have been exceeded because architectural features among all different types litter the skyscrapers of important cities all over the world. All of this is possible because of the industry in terms biggest game-changer, artificial intelligence in 3D, building information modelling (BIM).

Before starting project, BIM tools assist civil engineers in facilitating the creation and design of more precise 3D representations. Engineers may nowadays use information collected through simulations, modelling, as well as previous initiatives to better development thanks towards the integration in AI-based design discovery.

The construction professionals may develop construction architectural drawings, schematics, and other documents by incorporating machine learning into the BIM execution plan. Those who are indeed able to adjust every aspect with the highest level of precision possible.

6.2. Getting Rid of Cost/Schedule Overruns

The massive construction projects frequently go over budget and are prone to errors because they have been planned under pressure and with very little knowledge of something like the program's full extent. Application of AI in building enables an

engineer to gain a visual overview of estimated costs as well as outcomes from prior projects to come up with better planning as well as more precise budgeting, even while cost overruns cannot be avoided. Civil engineers can forecast budget shortfalls and imagine reasonable timetables for work progress thanks using algorithms who use traits of finished projects. Additionally, AI enables engineers can incorporate regular training materials to boost teamwork overall abilities as well as allows distant accessibility. At employment agencies, they employ deep learning algorithms, LIDAR, and Camera equipped drones can identify things, examine the quality of building, as well as calculate the amount of resources utilised. Both actual expenditures as well as effort spent relative to the initial budget and timetable are then compared using the same data to provide real-time feedback to all participants. The continuity of data collection aids in reducing cost and timeline escalations and enhancing overall employment main motivator.

6.3 Risk Identification and Mitigation

There are some dangers associated with building which might cause injuries. For order to assist civil engineers with identifying potential problems throughout the building project, AI offers the option for even more precise collecting data using result in substantial simulations. Supporting its development and application of pertinent technology in the construction industry enables engineers to adopt practical risk management strategies since AI could understand a variety of data from a construction area to produce insightful results.

Additionally, AI-enabled cameras and networks can continuously monitor all construction-related operations, enabling designers to evaluate how well their tools are being used, measure their progress, but instead decision-making behaviour in genuine, assisting inside the earlier identification of possible key risks. The success of Indus.ai is a nice



demonstration of how such technology is being used. This San Francisco technology company installed AI-enabled cameras all over building sites to capture actual video whereas gathering as well as analysing information purpose of providing construction companies with insights on things like the movement of materials as well as the distribution of labour at different locations on the site. Additionally, this interactive higher probability civil engineers can foresee potential dangers but also take smarter choices concerning the safety of their workforce.

6.4 Through Intelligent Development to hasten Project Implementation

For precise, less expensive, and less disruptive construction activities, civil engineers can apply AI models. The technology likewise incorporates infrastructure off-site run using intelligent machines which put together crucial parts of a construction project, which are subsequently put it together with entry level workers upon that worksite. In accordance with a McKinsey analysis from June, those web and disconnected constructors provide its building sector a significant productivity boost with a speedier response than being on development. The trained employees may concentrate on other more difficult activities like constructing electrical and HVAC equipment as well as sewage by using Intelligence machines to construct readymade constructions like wall and building panels more quickly than humans.

6.5 AI to Improve Operation and Maintenance (O&M) Efficiency

The designers may receive advice via AI-powered database management systems on the most effective on-site manufacturing techniques depending on the already collected data including schematics as well as designs of construction experiences. AI might also be utilised in management positions, such as

enabling staff to book vacation and sick weeks, monitoring basic materials shipments, and highlighting inefficiencies. Given the enormous amount of information recorded, AI may be used to change the construction project in question as necessary as well as identify unknown underfunded development locations that may require additional workers.

6.6 AI Implementation in Identifying, establish damages in building Industry and develop:

The use of artificial intelligence in building may end up being practically endless as time goes on. Undoubtedly, the introduction of ai technology helps solve many issues experienced in design optimization, parameters estimation and identification, and damage detection in a profession that seems to be severely inadequately, with both the civil engineering having among the biggest consumer foundations as well as valued billions of dollars. annually. They are confident that the ongoing use of artificial intelligence in civil engineering will result in a major change in how things are done throughout the building industry.

7.0 Conclusion: The Artificial Intelligence technology will change with each passing day, as the computer is applied more and more popularly, and in civil engineering field will have a broad prospect. AI applies in many areas of Civil Engineering and is a power full tool for solving many problems with due diligence by practicality. The Intelligent Design Construction and Maintenance (IDCM) is one of the core areas of and engineering capability of AI in civil engineering. It plays a major role in constructing and maintaining different aspects of Civil Engineering projects. The Artificial Intelligence can help inexperienced users solve engineering problems, can also help experienced users to improve the work e?ciency. The AI is instruction based on the algorithm and data base to reduce the project costs and construction tike



lines. Artificial Intelligence (AI) can help inexperienced users solve engineering problems, can also help experienced users to improve the work efficiency, and also in the team through the artificial intelligence technology to share the experience of each member. Artificial intelligence technology will change with each passing day, as the computer is applied more and more popularly, and in civil engineering field will have a broad prospect

Bibliography:

1. JAWAT Point downloaded on 13-10-2023.
2. Zhao AI in Civil Engineering (2022) 1:1 <https://doi.org/10.1007/s43503-022-00006-8>.
3. <https://online.library.wiley.com/10.1155/2012/145974>.
4. Artificialintelligence,2012,<http://en.wikipedia.org/wiki/Artificialintelligence>.
5. Y. Kao, M. H. Chen, and Y. T. Huang, "A hybrid algorithm based on ACO and PSO for capacitatedvehicleroutingproblems,"*MathematicalProblemsinEngineering*, vol.2012,ArticleID726564,2012.
6. S. Y. Chen, Y. Zheng, C. Cattani, and W. Wang, "Modelling of biological intelligence for SCM systemoptimization,"*Computational and Mathematical Methods in Medicine*, vol. 2012, Article ID 769702, 30pages,2012.
7. History of Artificial Intelligence, 2012, http://en.wikipedia.org/wiki/History_of_artificial_intelligence.
8. B. Adam and I. F. C. Smith, "Active tensegrity: a control framework for an adaptive civil engineering structure,"*Computersand Structures*, vol.86, no.23-24, pp.2215-2223, 2008.



AI Space Inputs for Sustainable Growth of the Mankind

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Abstract

Whole universe is a beautiful natural Artificial Intelligence governed by enormous forces. In our globe the AI is being utilized for the sustainable growth of mankind using the natural resources. While AI will affect all SDGs, experts believe that AI has a particularly high potential to make a difference for five: Good Health and Well-Being (SDG 3), Quality Education (SDG 4), Climate Action (SDG 13), Affordable and Clean Energy (SDG 7), and Sustainable Cities and Communities (SDG 11). In fact, 60 percent of deployments of not-for-profit AI for social good were in these areas. Relative to their perceived AI-potential, the SDGs for Zero Hunger (SDG 2), Life on Land (SDG 15), and Peace, Justice and Strong Institutions (SDG 16) have many use case deployments. Whereas Quality Education (SDG 4), Affordable and Clean Energy (SDG 7), and Climate Action (SDG 13), Economic Growth (SDG 8); Industry, Innovation & Infrastructure (SDG 9); and Partnerships for Goals (SDG 17) from the not-for-profit deployment, foundation grants, and private capital analysis. This is because most projects can be tagged to these areas given the broad AI applicability. All the projects are initiated and getting monitored and executed using Space Technology for benefit of man Kind.

Keywords- Sustainable, Space Technology, Sustainable Development Goals, Clean energy, Mankind

I. INTRODUCTION

How AI-Space based monitoring is better for humanity?

AI-powered space-based monitoring offers numerous benefits for humanity. It is proven technology wrt Environmental Monitoring, Resource Management, Disaster response & recovery, Satellite communication and various scientific research to help for the overall benefit to humanity.

As the world turns its attention to the requirements and its goals, Global Goals were charted for the sustainable development. Most of the goals can be well supported by space technologies. Thus, we analyzed United Nations Sustainable Development Goals (SDGs) and how space-based technologies can support to achieve that. By preliminary analysis, it is found that 12 of the 17 SDGs could be supported with the help of the satellites.

Here we have presented few important humanitarian requirements and their respective identified goals

and examples of how satellites can help to achieve the same:

Earth imaging satellites:

1. Ending Hunger(Goal 2):

Satellite imagery can tell crop yield on a pixel-by-pixel basis - enabling farmers to better decide when to add water or fertilizer and when to harvest. By imaging the land using special spectral bands (such as near infra-red) we can develop a vegetation index that represents crop vigour and productivity. Agricultural land represents 37% of the land area of earth and satellites are uniquely capable of collecting this data across such a vast territory.

2. Clean Water(Goal 6) :

Satellite images enable broad and efficient monitoring of reservoir water levels, providing early warning of shortages and uniform data across different countries that share water sources, increasing transparency and consistency in water delivery.



3. Climate Action(Goal 13):

Often the earliest and clearest indications of climate change can be observed in very remote regions of the world. Earth-observation satellites enable global

monitoring of deforestation, pollution levels in bodies of water, status of ice caps and desertification, and enable early and immediate action to prevent these events.

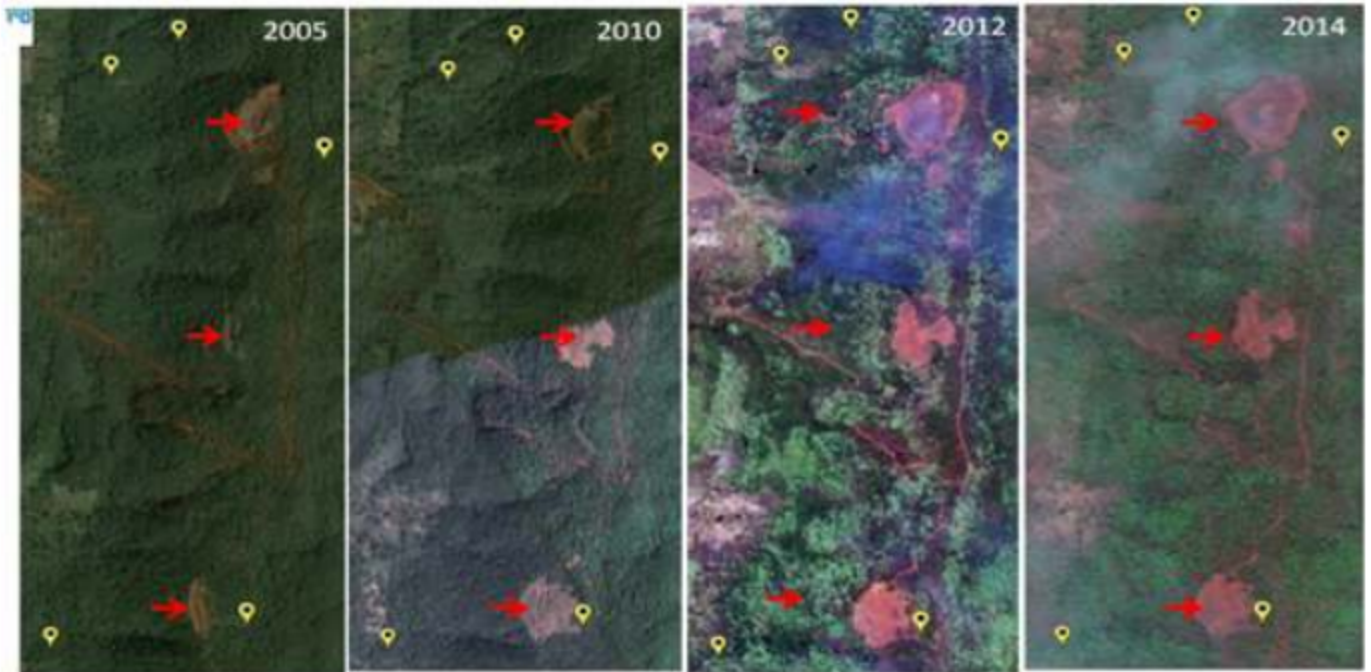


Fig.1 Deforestation activities wrt time

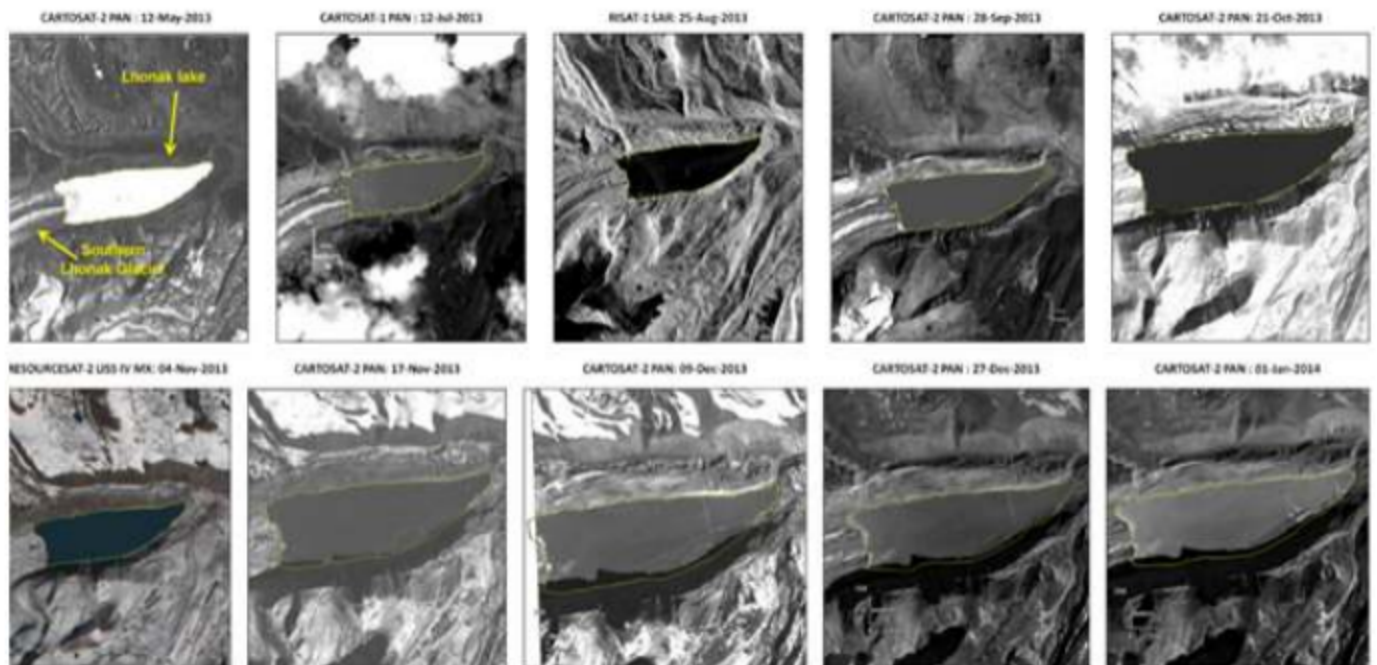


Fig.2 : Periodic monitoring of glacier lakes.



4. Life Below Water (Goal 14):

Satellites can help track and stop illegal fishing by pairing vessel Automatic Identification System (AIS) transponders - which show the location of legal fishing vessels and are legally required to be

switched on - with up-to-date satellite imagery, enabling the identification of vessels operating without AIS signals and which are more likely to be engaged in illegal fishing activity.

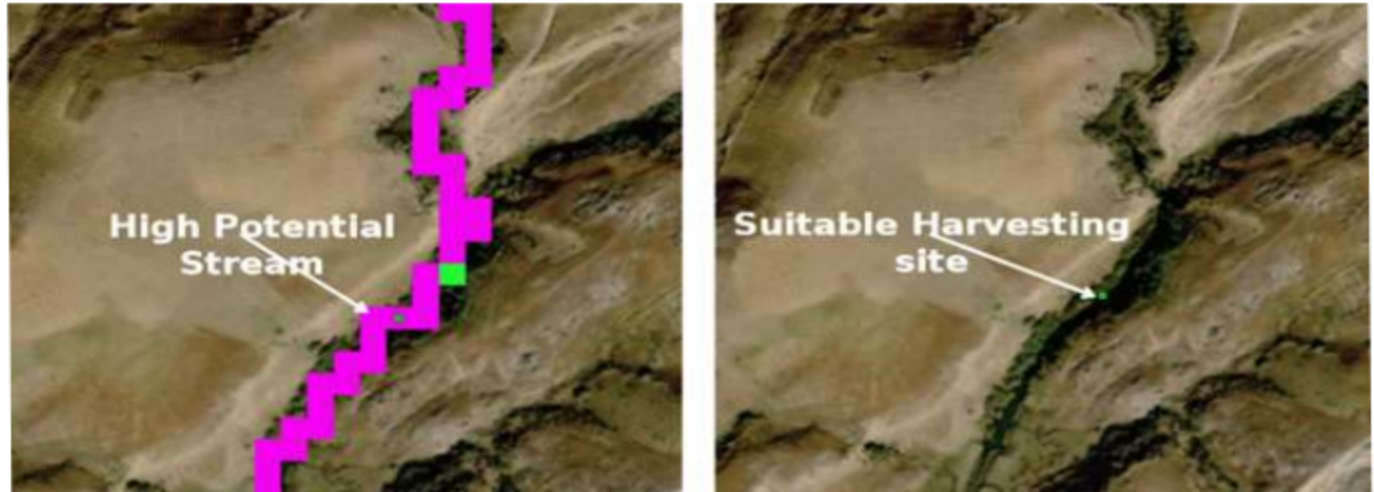


Fig.3 Detection of sites for water harvesting structure.

5. Life on Land (Goal 15):

Satellites can help monitor and protect wildlife habitats by identifying indicators of impending development or destruction and alerting authorities to engage early and stop it.

Communications satellites

6 & 7. Good Health and Well-being; and Quality Education (Goals 3 and 4)

Just 50% of Earth's 7.5 billion people have access to the internet. A global network of communications satellites, such as those being developed by ISRO, SpaceX and OneWeb, could enable internet connectivity to a clear majority of people, especially those in remote regions where infrastructure and development is scarce. With access to the internet comes increased knowledge sharing, the benefits of the best doctors and teachers via tele-medicine and education, and greater communication.

II. CONCLUSION

Space technology is an important AI tool for the good governance and development of sustainable growth of mankind. The applications of Remote sensing and Communication satellites not only contribute to the development of nation but also to the growth of its people, in terms of health, security, optimum utilization of natural resources, carbon emission control etc. It helps in monitoring the illegal activities for damaging our natural resources and to increase the cultivation of green energy to save our planet for the benefit of mankind.

References:

1. www.un.org : United Nations
2. www.weforum.org : World Economic Forum
3. www.isro.gov.in : Indian Space Research Organisation



Role of Agricultural Engineers & Novel Technique AI to empower Small Producers in FPOs for Sustainable Multidimensional Success

Krishna Kumar Patel, Shishir Kumar Verma²,
Jaswant Singh³ and Shalabh Kumar. Singh⁴

ABSTRACT

This study examines the critical role of agricultural engineers in the sustainable development of Farmer Producer Organizations (FPOs) in India, particularly amidst a growing population and the challenges of food security. With India's population projected to reach 1.668 billion by 2050, ensuring adequate food production is a pressing concern. The agricultural sector, dominated by small and marginal farmers, faces challenges such as fragmented land holdings, low income, and difficulties in mechanization. FPOs, as collective entities, offer a potential solution to these issues. Agricultural engineers are pivotal in FPOs, providing expertise in areas of mechanization, irrigation, and post-harvest technologies. By introducing advanced machinery, optimizing irrigation systems, and improving processing techniques, agricultural engineers can enhance productivity, reduce costs, and improve the quality of agricultural produces. Additionally, their role in integrating artificial intelligence (AI) into agricultural practices can further revolutionize the sector. The study highlights the potential of AI in addressing challenges such as crop monitoring, disease detection, and automation of labor-intensive tasks. By leveraging AI, FPOs can make data-driven decisions, improve efficiency, and enhance sustainability. However, the successful implementation of AI requires a strong foundation of data and infrastructure. The study concludes that agricultural engineers are essential for the sustainable development of FPOs in India. Their expertise in mechanization, irrigation, post-harvest technologies, and AI can significantly contribute to addressing the challenges faced by small and marginal farmers and ensuring food security for the growing population.

Key Words: *Farmer Producer Organizations. Producer Organization, Artificial Intelligence.*

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Introduction

The United Nations predicts that India's population will reach 1.668 billion by 2050. This forecast suggests that India's population will continue to increase over the next thirty years before beginning to decrease, and the number of elderly people in India will almost double to reach 192 million by 2030. It will be a significant challenge for our government to ensure food security for such a growing population, and food production will need to double by 2050 to sustain this expanding population. The Indian agriculture sector is mainly comprised of small and marginal farmers, who struggle to receive fair values for their products due to increasing fragmentation of agricultural holdings. Providing small farmers with access to technology and better markets is the key to addressing this issue.

Small-scale producers are at the receiving end in the market as they have little capital to invest; use traditional/conventional production techniques; depend largely on family labour; and lack channels and resources to participate in global value chains (Reardon & Barret 2000; Daviron & Gibbon 2002; De Janvry & Sadoulet 2005). The fragmentation of land leads to low income for farmers due to challenges in mechanization and negative effects of traditional farming practices. This results in high production costs, marketing difficulties, and low productivity. India's NABARD reported that current machineries have not been suitable for small farmers, highlighting the need for more effective mechanization techniques, potentially involving AI. Therefore, it can be said that there is a need for useful mechanization for small farmers. To improve the bargaining power of agricultural producers through collaborative farm and marketing practices, farmer producer companies and farmer producer organizations (FPOs) were introduced in India during 2011-12 (Singh et al. 2018; Singh 2012). The significant role of agricultural engineers in developing and applying small-scale machinery in FPOs, which are platforms for small and marginal

farmers, cannot thus be overstated.

The main objective of the current article is, thus, to present significant role of an agricultural engineer and the AI in thriving and flourishing of an FPO.

What is FPO?

Farmer Producer Organizations (FPOs) are firmly rooted in values such as self-help, self-responsibility, democracy, equality, equity, and solidarity. Members of FPOs are expected to uphold ethical values such as honesty, openness, social responsibility, and a genuine concern for the welfare of others. The ownership of a Producer Organization rests squarely with its members, making it an entity created and operated by the producers, for the producers. (Awasthi H.K. et. al., 2000; Salokhe S. 2016). While one or more institutions or individuals may have played a role in promoting the establishment of the FPOs by providing support in mobilization, registration, business planning, and operations, ultimate ownership and control always remain in the hands of the FPO's members, with management overseen by representatives chosen from among the members. The governance structure of a Producer Company involves the active participation of its members/shareholders, a Board of Directors, and various office bearers. The Board of Directors (BoD) is chosen through elections conducted among the members. The BoD can make collective decisions only during their meetings. (Salokhe S. 2017; Singh M. et al., 2021). Office bearers, on the other hand, are individuals appointed to oversee the day-to-day operations of the Producer Company, and they may include roles like Chief Executive Officer (CEO) and Accountant. All the office bearers are compensated with salaries for their roles.

Role of Agricultural Engineers in Sustainable Development of FPOs

Agricultural engineers are instrumental in modernizing agricultural practices within Farmer Producer Organizations (FPOs) in India. They



specialize in mechanization, irrigation, and post-harvest technologies, ensuring efficient production and enhancing farmer incomes. By assessing FPO members' needs, introducing advanced machinery, and providing training, they optimize agricultural processes, increase productivity, and improve product quality. Agricultural engineers also play a vital role in developing sustainable farming practices, conserving resources, and enhancing market linkages for FPOs. Their expertise in combining traditional methods with modern technologies contributes to the overall development of the agricultural sector in India.

Equipping FPOs with AI

AI and drones are revolutionizing agriculture, particularly within Farmer Producer Organizations (FPOs), by increasing productivity and efficiency. However, data quality is crucial for AI's success. AI offers promising solutions for FPOs, including farm machinery utilization, crop monitoring, and automation. To meet the growing global food demand, AI can transform agriculture through sustainable production, cost savings, and improved quality. It enables smarter decision-making, customized services, and quality control, contributing to market expansion and agricultural modernization in India. (PwC, 2022).

FPO Formation and Promotion

The Resource Institution (RI) will select cluster areas and conduct a Diagnostic Study to assess agricultural needs. Feasibility Analysis for forming Farmer Producer Companies (FPCs) will be conducted. Baseline Assessment and Business Planning will gather data and shape the FPO's direction. Mobilization of farmers into Farmer Informal Groups (FIGs) and FPOs will follow. Registration under the Companies Act is crucial. Resource mobilization and management system development are essential before FPO operations. Training and assessment are key for FPO evolution. (Singh et al. 2018).

The FPO will provide a wide range of services to its members, covering all aspects of cultivation and facilitating linkages between farmers, processors, traders, and retailers. These services include financial services, input supply services, procurement and packaging services, marketing services, insurance services, technical services, networking services and welfare services, with the possibility of adding new services over time.

Impact of FPOs

The Farmer Producers Organizations (FPO) are grassroot level, farmer managed legal companies which aggregate the small producers' inputs and products, perform commercial activities, and share the profits/benefits among the members. Currently, over 5000 FPOs are functioning in India, but their critical success factors in serving the member farmers are relatively unknown. The analysis indicated two dimensions of perceived impact of FPOs such as "Facilitating members for profitable farming" and "Fundraising for value addition". The facilitating members for profitable farming included seven items such as "Increase in utilization of farm mechanization and power", "Increase in input availability", "Increase in cropping intensity", "Increase in knowledge of improved production technology", and "Increase in adoption towards production technology" while the Fundraising for value addition had three items namely "Value addition linkage and related infrastructure", "Ways of raising funds" and "Dovetailing of Govt. schemes". (Venkatesan P. et al., 2021)

Conclusion and Future Perspectives

Farmer Producer Organizations (FPOs), supported by agricultural engineers and AI technologies, offer a promising avenue for empowering small producers. By optimizing production, enhancing efficiency, and improving decision-making, FPOs can drive sustainable agricultural development. Looking ahead, AI advancements can further



revolutionize agriculture. Machine learning, deep learning, and computer vision can enhance crop monitoring, disease detection, and resource allocation. Precision agriculture enabled by AI can minimize environmental impact and improve sustainability. As FPOs adopt these technologies, they can play a crucial role in addressing global challenges and fostering a more resilient and equitable food system.

References

Awasthi H.K., Singh P.R., Sharma R.N., (2000) Knowledge and attitude of dairy farmer towards dairy development program. *Maha. Jour. Exten. Edu.*;21(0):290-292.

Daviron, B. & Gibbon, P. (2002). Global commodity chains and African export agriculture. *Journal of Agrarian Change*, 2(2), 137-161.

De Janvry, A. & Sadoulet, E. (2005). Achieving success in rural development: toward implementation of an integral approach. *Agricultural Economics*, 32(s1), 75-89.

GOI (2013) Policy and process guidelines for farmer producer organizations. Ministry of Agriculture, Department of Agriculture and Cooperation, GoI.

GOI (2024) National Policy on Farmer Producer Organizations. Ministry of Agriculture and Farmers Welfare https://agriwelfare.gov.in/Documents/RecentInitiative/National_policy_onFPOs_18Jun2024.pdf

NABARD (2015) Farmer Producer Organizations: Frequently asked questions. Farm sector policy department and farm sector development department, NABARD head office, Mumbai.

PwC India (2022) Redefining agriculture through

artificial intelligence: Predicting the unpredictable. <https://www.pwc.in/assets/pdfs/grid/agriculture/redefining-agriculture-through-artificial-intelligence.pdf>.

Salokhe S. (2016) Farmers producer organization for effective linkage of small producers with market, *International Journal of Applied Research.*; 2(10):142-146.

Singh, G., Budhiraja, P. & Vatta, K. (2018). Sustainability of farmer producer organizations under agricultural value networks in India: a case of Punjab and Gujarat. *Indian Journal of Agricultural Economics*, 73(3), 70-85.

Salokhe S, Junnar Taluka Farmers Producers Company Limited: A case study on farmers mobilization and empowerment, *Perspective: A Case Research Journal*. 2017;III:37-45.

Singh M, Tiwari D, Monga S, Rana RK. Behavioural Determinants of Functionality of Farmer Producer Organizations in Punjab. *Indian Journal of Extension Education*. 2021;58(1):130-135.

Singh, S. (2012). New markets for smallholders in India: exclusion, policy and mechanisms. *Economic and Political Weekly*, 47(52), 95-105.

Reardon, T. & Barrett, C. B. (2000). Agro-industrialization, globalization and international development: an overview of issues, patterns, and determinants. *Agricultural Economics*, 23(3), 195-205.

Venkatesan P., S. Sontakki Bharat, Shenoy N. Sandhya, Sivaramane N. and Sivakumar P. Sethuraman (2021) Impact of farmer producer organizations in fostering community entrepreneurship., *Indian Journal of Extension Education*, 2020, Volume : 56, Issue : 2, pp.111-117.





ARTIFICIAL INTELLIGENCE TO SOLVE ISSUES

Prof. Jamal Nusrat, FIE

1. Introduction:

The doyen of engineers Sir M. Visvesvaraya was born 163 years before and has solved very many issues for us. We the most populous and most fastly growing economy have not only to solve our issues but for the entire globe. Luckily we have his guidance and now have a method and are well versed with it: the Artificial Intelligence (AI).

2. About Ourselves:

The enormous population of 1400 millions, the cold and hot temperatures ranging from -25 to +50 degree, the rains of 10 meters and 0.2m.per year many neighbors while 3 sides are bounded by sea and one by Himalyas. 65% of our people are farm related and rest in others. We are proud to have all 5 seasons and grow almost all crops. Vast minerals, vast range of plants and animals, and were rightly addresses as GOLD BIRD. Now again we employ sufficiently advanced technologies. Since independence we have achieved to raise our grains output from 50 MT to more than 275MT.and are able to export also which Japan like country badly craves.

3. The number of issues:

These are many which are to be addressed because we wish it to be a VIKSIT BHARAT and around development is to be dealt. We are rightfully coping for Atomic power, to go ahead of Chandrayan III, become a big exporter of war material etc for which we have suitable technologies and AI. We can proudly say that for the last 25 years have not fought any war which any big country cannot boast. In spite in few years we have helped our neighboring countries. viz: Pakistan in their floods, Bangladesh -solved the age old border problem by exchanging lands and villages, Nepal-in its around developments and giving employment to their

peoples, Afghanistan-providing basic civil amenities etc besides providing corona 19 vaccine to all neighbors and others. Besides these we have go at a pace higher than those advanced countries who have gone ahead like Japan. U.S.A., Russia, China. For it AI, Planning and management are there. We fully know that only good planning will not yield result but its execution is the key.

4. Artificial Intelligence:

It is an special method to do a series of jobs in the form of functions and technical advice through its own special language of things. It is in four types, each one is employed according to the task intended.

4a. Reactive AI :It is the basic type of AI. The ends are fixed and we can chose which aim is to be achieved, it can design, it can transfer. it enables to reach the pre conceived end. It always give same results on the series of options.viz: seeing a definite film, playing chess etc.

4b.Limited Memory AI. This facility can take us to a variety of stations which are tried and tested. We can put our questions and it provides the conclusion or gives a set of options to proceed further. This method is most widely employed, viz: auto vehicles, observe the other object while both are moving. It behaves caccording to the fed situations. It can be said that it is perfect in the task performance.

4c.Theory of Mind: All possible relevant or can be some time relevant type questions are fed in a definite sequence, then it will give meaningful decisions, advice or options, it can keep secrets also. It reveals the secrets on definite sign, voice, impressions or identifications like in the form of one time password OTP. It is the working advanced system, ROBOTS.

4d. Self aware type: It is the most advanced type of AI which is under the process of adoption. It has



auto intelligence, desires, emotions, and others . It provides advisable options with positive and negative features.

Future : it is envisaged that in coming years we shall have talking and moving type with whom problems are shared and it will advice the best course.

5.Genesis: These all work on the wifi, sensors, passwords one time passwords special type of dot joining, special signs, finger impressions, signatures clicking at a secret place etc and the result is shown. viz it will ask to open a certain app, then shall ask to feed the definite number, then a definite code is to be fed then what type of information is sought, may or may not another sign is demanded and on feeding that part of it and the needed information is revealed.

6. There is a big CAUTION also that it is a novel method if we are bonafide and sincere, but it is very destructive if some has malafide intentions. We are seeing so many bank frauds, getting the secret stories, impersonifications etc.

7.Our Issues: There are very many issues in our country which need to be addressed. Here only titles of the issues are placed and only TWO shall be tackled, because it is not in the purview of seminarial paper, otherwise it shall become a book.

8. Our issues can be termed as:

- 8.1 Unemployment, it has to be tackled with new avenues as less staff is needed due to machines and better procedures.
- 8.2 Shelter ie. Housing near to the place of work and other constraints.
- 8.3 Foodgrains due to growth in population.
- 8.4 Health issues due to diseases, epidemics, need of doctors, equipments and hospitals.
- 8.5 Controlling prices of food, shelter and clothing.
- 8.6 Controlling Pollution of all types.
- 8.7 Water for irrigation at right time and in right quantity.

- 8.8 Water for drinking for men and animals.
- 8.9 Power availability in urban and rural areas.
- 8.10 Education basic, social, cultural, technical and advanced at all places of the country.
- 8.11 Removing and reducing the gaps between rich and poor.
- 8.12 Controlling corruption, bribery and adultration.
- 8.13 False reporting of achievements.
- 8.14 Showing and changing the documents and also secret ones. viz a revenue person changes the number, name or doing wrong spellings thus mounting of legal cases.
- 8.15 Law and orders and difficulties in implementation.
- 8.16 Enormous legal case in various courts.
- 8.17 Controlling the price of a talent and cost of a product.
- 8.18 Petroleum and cooking gas w.r.t cost and pollution.
- 8.19 Priorities of issues, to be handled at with time and efficiency.
- 8.20 Control of population and difficulties in issuing proper orders for its implementation.
- 8.21 Problems in democracy, as is difficult to issue positive orders, it has also to pass through scanners.
- 8.22 Safe guarding the borderes staff the safety and cost.
- 8.23 Abolishing the subsidies will create chaos.
- 8.24 Creation of economy to meet the developmental, managerial and other expences.
- 8.25 Atomic power, researches, space crafts harnessing the natural resources.
- 8.26 Control of imports and increasing the exports.



- 8.27 Checking the exodus of experts of sorts and their migration. We spend so much on them and they put their achievements and money outside.
- 8.28 Somehow retaining the rural youth in villages for the total improvement of the nation. Sincere schemes with initial subsidies be employed. This will improve their as well as the health of their families. It is character building also.
- 8.29 Curbing the health hazarding schemes, drinking smoking, gambling ,lottery, chit funding etc.
- 8.30 Fast disposal of court cases through mutual consents. Also women related and posco ones be given top priority and severe rules to improve character and also tourism.
- 8.31 Accidents occur due to speed, defect in vehicles ,road overloading, drinking etc. 100% truthful checking and 100% punishment is the only solution, but alas ! our machinery.
- 8.32 Making such plans which can be implemented.

There are still some more issues which can be added here ,but few ones are deliberately left to avoid the politicalisation of the article viz the Constitution, EVM, UCC, etc. Here only 2 issues are dealt : FOOD and HEALTH.

9. FOOD, availability and production: It is desirable that eatables with suitable calorific value and desired vitamins , proteins, minerals, fats, carbohydrates and water be made available at a reasonable cost so that our low wage earner be able to afford and get it. Also those who could afford may get food of their choice and variety this way the food growers will get encouragement and suitable return to their pains and labour. The example of rice is very appropriate, its cost per kg ranges between Rs 20 to 200, similarly for tea it is from 200 to 2000.

9.1 If a certain crop with suitable nutrients, and

sufficient yield is not grown in the area but the soil and atmospheric conditions are conducive to it then AI will suggest it and then everyone shall be benefited.

9.2 In the entire world including India about 90 % people grow only 8 crops while there are 3000 eatable crops are there which can be sown but are not being tried. We grow only, paddy, wheat, maize, sugarcane soya, beans of sorts, potato and vegetables. Earlier we used to grow several types of Shri Ann but have left it when high yielding crops are introduced this has resulted in poor soil quality and high yielding costs. A suitable balance is to be arranged through AI in yield, production cost. including watering, fertilizers, pesticides, and decay in soil quality. Here the atmospheric conditions the position of market and global demand is also to be analysed. Only AI will provide the desired advice.

9.3 Instead of sowing crops of traditions the big land owners can shift to orchard plantations. Mango, lichi, guava, oranges, papaya, grapes, jamun apples, lemon, berries Bel, neem etc are sometimes much better options. The small holders may also go for their part areas as these trees take few years to yield the crop and provide no return, which they cannot afford.

9.4 Some spices, like turmeric, ginger, garlic, onion, cardamom, clove are better options.

9.5 Similarly we are already reckoned as pioneers in the field of ayurveda so suitable medicinal plants like tulsi, aluvera, neem, amaltas, ashwagandha, etc be introduced in the part lands. It can provide additional income throughout the year to the cultivators and the nation will be able to get foreign exchange by making exports .

9.6 In the intermediate time the rural folk can arrange for food processing, preservation of dried vegetables, packaging and forwarding. AI will thus be checking through 3 different directions, purposeful engagement of farmer, helping to control the unemployment ,and development of the rural region.



10.0 HEALTH CARE and precautions: suitable intake, good habits, preferable living and working atmosphere besides right advice are essential for ascertaining good health, of course with few exceptions. Also there is a general saying that right diet, suitable exercise and proper sleep makes one healthy.

10.1 In our country the major attention is needed for heart ailments, cancer, diabetes, breathing issues, digestion, neurological effects, infection related, epidemics and several more are to be addressed. For most of them we are ourselves responsible but are to be treated and for others suitable guidance, help and advices are desirable.

10.2 The AI will analyse the general conditions of the people, intensity of every disease, atmospheric conditions and the environment of the area, the pollution status, eating habits, the customs and behavior of the people. Reoccurrence, propagation through insects, mosquitoes, mouse etc, suitability of water, besides the availability of medical facilities will also be gauged.

10.3 Recently an study of earlier USSR was published in which peoples had forgotten the methods of disposal of dead bodies and related customs. The people went to the nearby area to ascertain as there were no deaths for about 80 years, this report got prominence through news papers. Therefore health teams and municipal authorities went to study the styles of living. But there was no exception, some were late sleepers, drinkers, smokers, unconcerned about healthy habits. Therefore the analysis was more attentive. Then silently the food they generally consumed was studied and the solution was there!. Three things were common in their diet, they invariably consumed lemon, curd and honey. These three constituted elixir that is AMRIT.

10.4 For the health care the density of population is also very important. More children in a room house or a hut will result in more diseases, if in the initial stage care is not given then the disease will become more grave, and the treatment shall be more difficult. Being a democratic nation any stringent method will entail more problems. This is a major issue and shall be dealt separately.

10.5 The availability of general doctors, gynecologists, and specialists of sorts are to be ascertained after seeing other factors also. The hospitals distances between them, the equipments viz: x-ray, MRI, ultrasound, pathology, cardiac echo etc its price their technicians, emergency, equipped operation theatre, ambulance etc etc all are vulnerable factors. We are not that rich to provide all at all places, so it shall be only AI to give us the right advice and suggestion. For it we have local health care centres then at tehsil level which are better equipped and then at district level with much more facilitated Hospitals and medical colleges. We envisage to have fully developed big hospitals and medical colleges at every commissionaires. The patients need to be transferred according to the need from one to the other.

10.6 For right decisions in the cases given in para 10.5, the study of patients, his ADHAR, his file, reports, will be fed to the AI methoding his transfer to lower to higher or vice versa, consultation at national level or at international levels will be advised, the method of distant advice at even operation theatre is now to be made available for special cases.

10.7 The cases of insurances and their rightful checking, reimbursements etc is also to be seen. Only AI is capable for it. Forensic



study, medical jurisprudence , timely body examination and post mortem are also to be seen by it.

- 10.8 One more eventuality i.e. of organ replacements, the donors, making it available from the dead bodies its preservation ,records keeping the intensity of case besides justice in it are very essential.
- 10.9 Availability of the medicines and its price is also a major dimension for addressing the healthcare issues.
- 10.10 We can proudly say that at the time of independence the life expectancy was only 32 years which became 45 years in the year 1970. Now in 2023 the figure is 70 years. This will further improve if we control the issue of rising population, timely

vaccination, and suitable planning in all health related fields. Something has been said but more are to be enumerated.

BEST tributes to Visvesvaraya ji who modeled our technical education with scientific temper and positive bent of mind, this will provide solutions. Such Artificial Intelligence engineering minds at the decision making desks will suitably address the important and necessary issues of the country.

I end with an Urdu couplet:

ye dil ki baat ankhon se samajh lete hain,
karna hai kya ! iska hal bhi bata dete hain.

Prof. Jamal Nusrat ,FIE,FIWRS, mob.7355962950.
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Irrigation, Tourism development & Ghat works.
Offices, Residential & Commercial buildings.
Sports stadium, Cricket ground, running tracks.

School, Colleges & University buildings.
Hospital, O.T., Dispensary & Wellness centres.
Ultra modern labs, Workshop & training centres



शिक्षा



पर्यटन



चिकित्सा



खेल



आवास

हमारा संकल्प : समयबद्धता, गुणवत्ता, प्रतिबद्धता

संतोष कुमार सिंह
प्रबन्ध निदेशक

अनिल गर्ग (IAS)
अध्यक्ष



MAA VAISHNO INFRA CONTRACT

(AN ISO 9001 - 2008 CERTIFIED COMPANY)



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