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Leadership and the Age of Artificial Intelligence

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Key Points

- The rapid transformation of Infotech into Information Revolution and now Artificial Intelligence will have an impact on leadership styles in industrial as well as defence sectors.
- Organisations in today's era are a mix of human resource as well as smart machines which have teamed up to contribute towards overall output of the system.
- This integration of human-AI will have an impact on how the leadership need to tackle organisations, both, in terms of organisational culture as well as functioning.
- Military leadership, in human-machine environment, will need to adopt to the changing realities and overcome associated challenges.
- Organisations require to remain abreast with moral, ethical as well as legal issues to get the best out of their human-machine assets.

"There are three kinds of intelligence, one kind understands things for itself, the other one appreciates what others can understand, the third understands neither for itself nor through others. This first kind is excellent, the second good and the third kind useless".

—Niccolò Machiavelli (1469-1527),

Italian Diplomat and Political Philosopher[1]

Introduction

The past four decades have witnessed an era of multiple digital transformations; new technologies took birth, reached their peak, swept the mankind into a new thought process, but soon got overshadowed by another technology. It has been an era of births, rise, death and re-birth of technologies in another form; a more advanced form awaiting yet another series of transformations. The pigeons and horse-mounted messengers were lucky to have ruled the world of messaging for centuries; the

visual and electric telegraphs were part of pre-world war era until few years after WW II; the more recent postal services enabled by better transport and connectivity, transformed more rapidly into emails and now into instant messaging in the digital era. Similarly, theatres were pillars of entertainment for centuries, but cinema, radio and televisions have witnessed rapid transformations within 5 to 6 decades only. The weekly movies, Chitrahaar, epics like Ramayana and Mahabharata on Doordarshan or Ameen Sayani's Binaca (later Cibaca) Geetmala which were the favourite of all Indians in that era are now in everyone's pocket 24x7, ready to be played anytime on wider bandwidths enabled by 4G technology. This too, does not end here, as technology continues to remain hyper-dynamic, as the show goes on!

Technology has invaded the human mind with a speed much more than an average mind can even think of. The news on the last purely conventional war fought by India in 1971 was broadcasted only through as official bulletins by the All India Radio and was available to only a select few. Today, the Russia-Ukraine war fought thousands of miles away is being discussed by every section of society in India. The complex computing and data storage enabled by 'not so intelligent' machines called 'computers' of 1980 era, witnessed a revolution in 'Information Technology' marked by an era called 'Information Era' with numerous job opportunities for human beings in the form of data entry operators, web & network managers. But these appear to be short lived and are on the verge of getting extinct due to big data backed, deep-learning enabled machines; connected over widely spread neural networks with capability to do wonders, under its new brand name - 'Artificial Intelligence' (AI).

The next 5 to 6 decades will mark the rise of artificial 'intelligence' – an attribute of human beings; developed as a technology by human beings, powered to do jobs of human beings, for the human beings. Thus, one of the biggest futuristic challenges will lie in leading these 'emotionless' 'non-empathetic' 'man-made human-beings(robots),' in an environment where fellow 'human beings – being led' are in competition with these machine human-beings. Thus, as more advanced technologies make their way into our society, it is incumbent on future leaders to control the manner in which these will develop, draw lines between 'human-machine interface' and shape-up the minds of fellow human beings to create a human-machine jointmanship in respective organisations.

Artificial Intelligence: A Perspective in Brief

What is Artificial Intelligence (AI)?

As per ***Britannica Encyclopedia***, AI is the "ability of a computer or a robot controlled by a computer to do tasks that are usually done by humans because they require human-intelligence and discernment". The ***Oxford dictionary*** defines AI more specifically as "the theory and development of computer systems able to perform tasks normally requiring human intelligence such as visual perception, speech recognition, decision-making and translation between languages". The ***Cambridge Dictionary*** articulates AI as the "study of how to make computers that have some of the qualities of human mind". Thus, AI is yet to make an individual statement as it is defined merely as a 'study/ theory' of more advanced form of 'computers' been used for 'mathematical' and 'logical' calculations till now.

The earliest AI driven machine was made by Alan Turing[2] who had made a scanner which surfed to and fro through the memory, symbol by symbol, read what it found and automatically wrote further symbols. The actions of the scanner were dictated by a pre-fed program of instructions that was stored in its memory in the form of symbols, and therefore, had capability to modify/ improve its own program. The Universal Turing Machine[3] and other works by various scientists who worked on machines which had capability to improve/ alter the instructions themselves with experience, were eventually grouped under AI.

Turing also worked on a computer which could play chess on its own, 'turo champ(1948)'[4] —a difficult proposition at that time due to the mammoth number of instructions required to be given to the machine. But it became possible in 1997 when a chess computer by IBM named "Deep Blue" defeated the reigning world champion Garry Kasparov in a six-game match.[5] This machine was able to function through 256 parallel processors which could examine 200 million possible moves per second to look ahead as many as 14 turns of play, was described by Naom Chomsky from MIT as a "bulldozer winning an Olympic Weightlifting Gold Medal".[6] This was not a classical AI platform, but today, smaller chips of the size of nanometers with greater processing capability, coupled with cameras, microphones as well as bio sensors and higher internet speeds has made it possible.

Human Activities Undertaken by AI[7]

Some of the human activities which can be undertaken through AI are as under:

- ***Human Senses – See, Hear & Speak.*** AI systems have the capability of human senses, that is, to see, hear and speak. This enables them to respond to situations akin to a human being. Few AI systems can also sense the temperature and respond accordingly. Few specific technologies are:
    - **Identification of Voice & Bio Metrics.** AI based systems can be trained to identify and process voice & other bio metric data and carry out various activities— for example Siri and Alexa from Google.
    - **Identify and Analyse Visual Messages/ Photos.** AI based systems can be trained to identify visual messages, sift them as per needs and generate output.
    - **Read and Write.** Few AI Systems have been known to have learnt to read **large** volume of texts, understand the grammar/ style of writing and generate response. After considerable training and experience, these systems may be capable of automatically forwarding reply to emails. Thus, they will be able to perform job of Personal Assistant/ clerical staff. Few examples of exiting systems are - Grammarly app/, Gmail's auto suggest function.
    - **Human Limbs.** Robotics is the field wherein machines are trained to do jobs which are only possible with human limbs. These are generally in the fields of surgery, art & craft, 3d printing, driverless cars/ planes etc.
    - **Analytical Ability.** AI systems have the capability to analyse huge volumes of data and respond as per command given. This will enable use of AI for Data Analytics and Network Manager jobs. Google Earth and various social media apps are some examples.

- ***Human Abilities Yet to Be Developed.*** Few abilities that are yet to fructify at the conceptual level in the field of AI are as under:
    - **Emotions.** Human emotions, i.e., anger, love, empathy, judgement etc. are yet to be developed and are a far-fetched reality as on date. However, as a concept, scientists have imagined developing robots which may have emotions; to give a human touch to decision-making. However, absence of emotions in AI/ robots is a boon since human-like needs, emotions might outplay the strengths of AI, i.e., Emotional Intelligence, bias etc.
    - **Physical Needs.** Physical needs comprising of hunger and thirst.

- **Decision Making.** This is the most important aspect of AI and is under development by many advanced nations. Incorporating decision-making capability, in AI will be become one of the biggest achievements of mankind. Owing to its associated drawbacks on the human beings as a race, especially leadership, this aspect is being debated/ contested by industry/ research scientists.

- ***Current Applications of AI in Corporates/ Industry***[8]

  - **HealthCare.** Includes diagnostics, medical prescriptions and advance warning to diseases; as also medication management, drug discovery, robotic surgery, genetic engineering etc.
  - **Retail and E-Commerce.** This is one of the most observable areas of application of AI to the end users. Being a competitive area, retail organisations and brands look for patterns of human behaviour to align with their marketing strategy.
  - **Food Tech and Agriculture.** Some of the applications include Smart Tea Makers and food sorting equipment as per the needs of the market.
  - **Banking and Finance.** AI in this sector can be used for processing banking activities, forecasting user behaviour and needs; insurance sector and stock markets.
  - **Logistics and Transportation.** For sorting and packaging of products in warehouses, identifying better transportation routes as well as traffic light management as per traffic density. Auto-pilot cars are also under development.
  - **Entertainment and Gaming**. Gaming is one of the areas wherein AI has been applied. OTT Platforms are using AI to understand the behaviour and need of consumers to serve them with programs as per their specific choices and moods. AI is also being used to speed up editing of movies as well as reduce post-production costs.
  - **Manufacturing.** AI is being used in workforce planning for product design, predictive maintenance of critical industrial equipment and suggest timely measures to restore the equipment. It can also be used in quality control and overcome anomalies in the final product output.

- ***Current Applications of AI in Defence and Space[9].*** As the character of warfare changes, AI is being increasingly used in Defence and Space Application as briefly summarised below: Wargaming, Training and Simulation.
  - Intelligent and autonomous unmanned systems.
  - AI-enabled data analysis, information processing and intelligence analysis.
  - Network centric and cyber operations including cyber security.
  - Decision Making that is generating options in battlefield decision-making; identifying perfect satellite launch windows and planetary movements.[10]
  - Monitoring and managing of space-based assets.

- ***Human Roles Likely to be Undertaken by AI.*** Based on the above, the human roles which are likely to be taken over by AI are as under:
  - Language Translator for embassies, universities, tourists and corporates.
  - Clerical/ Desk Jobs of book keeping, archives, inventory management at institutions, offices, libraries etc.
  - Office Assistant for managers, leaders in routine functioning.
  - Network, cyber security & data administrators for larger networks and big data.
  - For medical transcription, online handling of routine medical complaints, preventive medicines and health monitoring. AI enabled robotic hands are already assisting doctors for finer surgeries.[11]
  - AI robots can be trained as good artists, musicians, movie editors and many other creative fields.[12] A well-trained AI system will be able to compose songs, poetry and articles someday.[13]

- ***Comparison of Manual, Automated and AI & Machine Learning (ML) Based Systems.*** The differences in the capabilities of manual systems (process carried out only by human beings), automated systems (use of computers/ current IT systems) and AI based systems are given in succeeding paras. These play a major role in the functioning and decision-making aspects of leadership.

  - **Manual.** The manual systems are most time-tested ones owing to the application of experienced human minds; however, they have following key challenges:

    - Extremely time consuming and slow.

    - Prone to human errors vis. manipulation, ignorance and accidents.

- Data storage/ record keeping aspects which are bulky and difficult, as also prone to wear and tear.

- Excessive manpower requirements leading to HR management issues and cost effects.

- Quality assurance and upgradation issues.

- **Automated.** The automated systems have been in use for over three decades now. They have a major advantage of having the human-machine components embedded within the system, however, the major challenges they face are:

  - Difficulty in handling big data, data duplicity and its analytics.
  - Data storage including cloud systems are costly and require expert intervention.
  - Data access is a major challenge for the stake holders/ clients with due to inherent cyber security issues.
  - Frequent shifting of employees makes continuity difficult and facilitates lack of experience/ institutional memory.

- **AI & ML Based Systems.** In the era of 5G, AI and ML based systems have the ability to nullify the disadvantages of manual as well as automated systems. A well-trained AI enabled system can work on big data, control data duplicity and mitigate the need for human intervention in smooth functioning of the system considerably. The most important strength of AI based systems are their ability to work in an impartial manner as these lack emotions. However, the major challenges such systems pose are as under:

  - AI enabled systems are in a nascent stage and will take considerable number of years to mature.
  - A tiny flaw in learning at initial stage can be disastrous at a later stage.
  - Neural Network infrastructure is currently not available and will take time to integrate with respective systems.
  - Machines can only reproduce what is programmed into them; they lack subjectivity and are unable to produce ‘out of box’ solutions.
  - Very high installation and implementation cost.

- Unemployment issues especially in manpower intensive nations – like India.
- Ethical issues and intangibles.
- Leadership—the relation between the leader and the led.

Leadership and AI

"Once it becomes a teenager and believes it is smart than its parents; will AI rebel?"

—Dave Waters

The Apprehensions for AI

AI has been termed as the "biggest existential threat to humans" by Tesla and SpaceX CEO Elon Musk.[14] The late Stephen Hawking had also expressed apprehensions that future developments in AI "could spell the end of the human race"[15] or, as well-known author Yuval Noah Harari says, "AI will create a useless class of humans".[16] These apprehensions are fallout of the ground-breaking developments taking place in the field of machine learning —where technology is supplementing (even supplanting) human intelligence.[17] But, in essence, AI has the capability to augment human decision-making and impartial data analysis, while continuing to value human creativity and innovation.The behavioural, organisational and other associated issues with AI and leadership are discussed later.

AI in Efficiency and Human Decision Making

Recently, a PricewaterhouseCoopers (PwC) report found that "62 percent of executives anticipate predictive analytics will augment their business decisions, leading to greater efficacy in the years to come".[18] Further, one of the European companies appointed an AI bot which could participate in team meetings and had the authority to vote on business decisions. Therefore, AI does have the capability to augment human decision making. In a way, such changes bring inevitable concerns for leaders, however, it is important to focus on the possibilities, and understand how AI might be used to empower human decision making rather than rejecting it outrightly. There is a need to analyse 'both sides of the coin: personal and professional attributes of leaders in an AI environment' as also examine the possibilities/ capabilities of AI to take on leadership roles. The same are discussed in succeeding paragraphs.

Personal Attributes of Leaders in AI Environment

- **Wisdom.** Wise leaders do not create and capture vital economic values, they rather build a more sustainable and legitimate organisation. Leaders in AI integrated systems have eyes to see AI decisions and ears to hear subordinates' perspective. Leveraging AI means transforming key operational activities and collaborating beyond intra-organisational boundaries to form an ecosystem of common connections and practices. Professionalism is all about envisioning the unimaginable, innovating solutions, inspiring and mobilising people. Thus, wise leaders have the foresight to combine human power with artificial intelligence.
- **Adoptability.** The pace of technology has caught a rocket speed in the past few decades. The film roll made by Fuji was in great demand during the 80s and today, hardly any company uses these rolls. Even the use of SD drives has diminished and cameras have the ability to store the pictures directly on the servers. Hence, there is a need for the leaders to preach and practice dynamism for a better technological future.
- **Humility.** Humility too has a 'human aspect' attached to it. In the age of fast paced technology, there is a need to keep abreast with continuous technological evolution. More often than not, leaders are often shielded from learning about new developments by the sheer volume and variety of new information that is captured daily. Thus, leaders need to be willing to learn and open to seeking inputs, both from inside as well as outside their organisations. They should not mind even if the information is coming from someone quite younger or inexperienced to him in age and service. In fact, companies like Nestle have implemented extensive 'reverse mentoring programs. These are meant to institutionalise the process of learning that is to accept, welcome and leverage the knowledge of team members, peers and employees for the benefit of business.
- **Empathy.** Empathy is the ability to put oneself in others' shoes and see the world from their point of view. Leaders with greater empathy can establish trust with their employees and build positive relationship to ensure high productivity within the organisation and improve their job performance. This needs to be practiced with AI.
- **Innovation.** The faster, smoother and more accurate technology is, the more it will enable the leaders to further bring innovation in their respective fields in order to improve productivity, customer engagement, employee management, security including cyber and physical security, logistics supply chain management as well as various other aspects.

- **Judgement.** Judgement becomes extremely crucial while exercising leadership over machines & robots – to bring in the human factor. The AI algorithm— beauty.ai, used in assessing an international beauty contest, turned into an embarrassment as the algorithm picked up the winners solely on the basis of skin colour. Thus, a leader has to ensure that bias free data is used for machine learning and results are thoroughly validated before deploying the model.
- **Emotional Intelligence (EI).** The ability to recognise and manage the emotions of oneself and others for reducing conflict and better human interaction is the most valued skill of the leaders. People with high EI can connect with others and display empathy and understanding. Thus, the presence of humans and machines alike in the same organisation; coping with the follies of both, yet keeping the organisation dynamic and ticking will be of great help to the leader. As per a survey conducted by Capgemini, 74% executives found that EI is an essential skillset for the age of AI. Thus, leaders have to build up their respective organisational environments to create a dynamic bond between human-machine. This will not only improve the working culture but will also assist in avoiding human-machine conflict
- **Vision.** In the era of AI, rapid technology as well as business model disruption is bound to happen, thus, a clear vision is essential for the leader. The followers, subordinates and employees will definitely not be able to have such a vision. Organisational development in AI involves automating business processes using robotic technologies, gaining insight through data analysis and enhancement, cost-effective predictions based on algorithms and engagement with employees through natural language processing chatbots, intelligent agents and machine learning. Without a far-sighted leader, bringing all this to reality will be challenging. Thus, leadership's role in looking at the long- and short-term vision becomes essential as it will require making necessary organisational transformations including updating procedures. Companies like Amazon, Tesla, Facebook and Google have been successfully implementing their vision as per the needs of the market.
- **Courage.** The disruption that AI is set to bring can have systems going obsolete at a faster rate than most managers can keep up. Therefore, one of the core AI leadership skills is the ability to 'face what is unknown' and to be 'fast to unlearn and relearn new things. Therefore, leaders will have to quickly let go of old ways of doing things and embrace the new and sometimes risky procedures. They would also need the courage to recognise weaknesses within themselves and be open to learning and correcting them.

Professional/ Organisational Attributes

- **Cultural Intelligence.** Today's work environments have become diverse as people across the Nations and from diverse cultural backgrounds are working together. Thus, developing cultural intelligence is one of the essential AI leadership skills to manage highly diverse teams.
- **Critical and Creative Thinking.** AI based machines will certainly be able to generate options/ recommendations based on existing data faster than any humans, however, critical thinking would still remain important in the domain of leadership. Critical Thinking as a concept for AI would take number of years to mature, yet will still be unable to match the one possessed by human beings.
- **Engagement.** A leader must constantly remain engaged with the surrounding environment so that they can be attuned up and adapt to the signals rather than the noise – which will threaten (competitors/ disruptions) or support (potential partners) their vision. Thus, agile leaders need to keep themselves and their teams engaged. Engagement in AI can be accomplished by digital means— for example, German e-commerce giant Zalando implemented various digital tools for top management to capture and respond to topics of interest from all employees —a form of surveys to keep abreast about their current work experiences.
- **Data Vision.** The gigantic and voluminous data being generated on a daily basis, is further growing with the growth of IoT (Internet of Things). Faster and more accurate data analytics and processing will be possible with the help of AI. Thus, the leaders need to develop a data vision to discern signals from data using dashboards to carve out an effective business strategy, vision and mission for their respective organisations.
- **Ethical Judgement.** Another related issue for leadership is 'Ethical Judgement'—a skillset possessed by human beings. AI does not have the ethical burden of dealing with the consequences of its own results. Therefore, effective leaders must be well conversant with the regulations surrounding the technology and balance it with the rate at which it is developing.
- **Accountability.** With the inception of machines as substitutes of humans, organisational structures are bound to become flatter, more team work oriented and focused project-based partnerships. Thus, organisations will become more transparent and collaborative. The leaders will be required to become more transparent and accountable to the outcome of decisions taken by these teams, the

key issue being aligning themselves with the principles, goals and ethics of the organisation.

- **Vigilance on Fake Data.** Deep fake[19] - a branch of machine learning, applies a 'neural net simulation' to massive datasets to create a fake data. Jorden Peele, an American comedian, used some of the latest AI techniques to create a fake video of Barack Obama commenting on Trump to demonstrate the possibilities of misuse of AI.[20] Leaders need to keep themselves abreast with such 'fake' data which will further require new legal processes to keep them under check.
- **Data Privacy.** Data Privacy in terms of data mining/ theft are the other negative aspects which fall under the capability of AI based tools. Leaders have to remain sensitive to cyber security as also keep themselves abreast with latest technology.
- **Continuity in Learning and Education.** With fast evolving technology, leaders need to inculcate the habit of continuous learning, acquire new skills, and remain relevant. Thus, 'learning, unlearning and relearning' will be an inescapable personal skill-set for the futuristic leaders.
- **Human-Machine Resource Management.** It is possible that a large number of jobs will be lost to AI enabled machines especially those related to automation and data entry. However, there is no doubt that new jobs and roles will come up. Thus, the leaders need to create an enabling environment wherein humans and machines are able to work side by side as also compensate for each other's weaknesses. This will also require that System Operating Procedures (SOPs) at workplaces are kept dynamic and this human-machine companionship is encouraged and enabled with the help of technology and upskilling.
- **Ethical and Legal Challenges.**[21] One of the futuristic needs in AI-Human relationship will be to handle the ethical and legal challenges posed by AI and its associated fields. The current era is still struggling to identify international consensus on crimes related to Information Technology. The WikiLeaks founder Julian Assange is yet to be extradited to US[22]; large number of online scams and frauds too are yet to find a clear legal outcome. Hence, it is imperative for the organisations to prepare themselves with the upcoming legal and ethical challenges that can arise due to AI-human interface especially the crimes executed through AI which might be more lethal and detrimental to organisational interests.

Leadership 2050 and Beyond

"9 out of 10 senior management executives have reported positive and tangible business benefits from AI applications. 66% said that leveraging AI technologies for business process automation helped to deliver quick improvements".

– Infosys report on 'Leadership in the Age of AI[23]

Is the leadership of 21st Century going to be radically different in the AI age? The answer lies in the following arguments:

- Leaders' hard machines (made of steel and operated by humans) will continue to be eclipsed by smart machines, while their soft skills will become even more important.
- Timeless leadership traits like Integrity and Emotional Intelligence will undoubtedly remain important. Leaders in the AI age will need to be humble about others' contributions (even towards robots), adaptable to challenges that get thrown into their paths, steadfast in their vision of the ultimate destination on this path and constantly engage with the changing world around them.

Human AI Team vis-à-vis Replacing Human Beings

There are large numbers of opinions— whether AI should replace human beings; AI is not needed at all or a middle path should be adopted. Each of the options have their own advantages/ disadvantages; in the context of how the future would be. Thus, it is important that leaders consider the organisational context, culture and segment of society they operate within. AI should be considered collaborative and work alongside humans, rather than replacing them - whether it is in the armed forces or in the government or corporate. The strength of AI lies in its ability to crunch data and help us with solutions. We can look up to AI for making suggestions but the craving to put AI at a position to make decision should be curbed; to rule out any 'machine-driven' leadership in future. Does that mean that driverless cars are unlikely to have any takers? The answer is 'Yes' – for Nations with less population and with less people wanting to drive. But it would be a 'No' – for countries like India where driving is a source of livelihood for many.

- ***Handling the Transition.*** One of the crucial aspects of leadership is to keep abreast with the manner in which other organisations are handling the transition from automated to AI based systems. Templating one organisation over other or adapting ready-made/ off the shelf solutions might make things difficult, hence, any transitions into new/ improved systems should be specific to each. This is inescapable as the

structure, hierarchy and work interests of each system will be different. The SOPs so adopted will have to undergo rapid transformation with each technological transformation.

- ***Facets of AI Enabled Leader.*** Future 'cognitive work places will look very different to anything we know today. Humans, data, rather big data and machines are meaningless in context unless put together as a group. So, leaders of the AI era should facilitate innovation, embracing collaboration between human and AI, transforming operations, markets, industries and the workforce with new skills. The new breed of wise(r) leaders should envision a more meaningful future - show organisational stakeholders what it can look like, and guide & enable their organisation to pursue that goal. Thus, the leader needs to be a mobiliser - inspiring his team towards an envisioned future, society builder; humanist - valuing the creativity of people, mediator to human-machine in a common quest; navigator that is building bridges in AI ecosystem; explorer by using AI to sharpen the competitive edge; sense maker that is emphasising clarity in AI design and processes; architect and guardian of the futuristic work places, war rooms and may be Capt James T Kirk from Star Trek[24] at space stations in the outer space.

Conclusion

It is tempting to regard AI as a threat to human leadership just because its purpose is to augment, improve and/ or ultimately replace human intelligence — the core skill of human beings. Thus, leadership is more likely to be spared of the impact of AI — though will supplant many aspects of the 'hard' elements of leadership (data and fact processing). At the same time, AI will also lead to a greater emphasis on 'soft' elements of leadership — the personality traits, attitudes, and behaviours that will allow individuals to help others achieve a common goal or shared purpose.

Humans should stop believing that robots are soon going to take over the society; their jobs, their survival, their daily living. Leaders operating in the AI environment need to take responsibility to prove them wrong; the similar apprehensions at the onset of Information Technology revolution. AI is designed to work with humans, to reduce labour and increase intellectual skills where it is highly necessary. The future is to open floodgates of opportunities destined to take the human race into the infinite space with undefined boundaries. The leadership needs to stay firm and shape these transitions as AI & robotics pave way for a better world.

End Notes

[1] "A Quote from The Prince", Goodreads. Available at https://www.goodreads.com/quotes/241451-because-there-are-three-classes-of-intellects-one-which-comprehends. Accessed on 01 May 2022.

[2] Noel Sharkey, "Alan Turing: The Experiment That Shaped Artificial Intelligence," *BBC News*, 21 June 2012. AVailable at https://www.bbc.com/news/technology-18475646. Accessed on 01 May 2022.

[3] Liesbeth De Mol, "Turing Machines", *The Stanford Encyclopedia of Philosophy*, Winter 2021. Available at https://plato.stanford.edu/archives/win2021/entriesuring-machine/. Accessed on 01 May 2022.

[4] Andrew Erly, "The Original Chess Engine: Alan Turing's Turochamp", *Chess.com*. Available at https://www.chess.com/blog/the_real_greco/the-original-chess-engine-alan-turings-turochamp. Accessed on 01 May 2022.

[5] "Deep Blue - Chess Engines", *Chess.com*. Available at https://www.chess.com/terms/deep-blue-chess-computer. Accessed on 01 May 2022.

[6] Noam Chomsky, *Essential Classics in Politics: Noam Chomsky* , London: Pluto Press, 2001, ISBN 0745313450.

[7] "Understanding Automation & AI", *ComputerScience.org*, 01 March 2022. Available at https://www.computerscience.org/resources/learn-ai/. Accessed on 05 May 2022.

[8] "How Artificial Intelligence Is Transforming Business", *Business News Daily*. Available at https://www.businessnewsdaily.com/9402-artificial-intelligence-business-trends.html. Accessed on 05 May 2022.

[9] DK Gupta, "Military Applications of Artificial Intelligence", *Indian Defence Review*, 22 March 2018. Available at http://www.indiandefencereview.com/military-applications-of-artificial-intelligence/. Accessed on 05 May 2022.

[10] Shraddha Goled, "What Are The Scope and Challenges of Using AI in Military Operations", *Analytics India Magazine*, 01 November 2020. Available at https://analyticsindiamag.com/what-are-the-scope-and-challenges-of-using-ai-in-military-operations/. Accessed on 05 May 2022.

[11] "Artificial Intelligence in Surgery: Understanding the Role of AI in Surgical Practice , *Access Surgery*, *McGraw Hill Medical*. Available at https://accesssurgery.mhmedical.com/book.aspx?bookID=3033. Accessed on 10 May 2022.

[12] "Ohio State University: Artisan Robots with AI Smarts: Soon at a Factory near You", *India Education Dictionary,* 06 July 2021. Available at https://indiaeducationdiary.in/ohio-state-university-artisan-robots-with-ai-smarts-soon-at-a-factory-near-you/. Accessed on 10 May 2022.

[13] Matthew Hart, "Google's New AI Helps You Write Poetry Like Poe", *Nerdist* , 24 November 2020. Available at https://nerdist.com/article/google-ai-writes-poetry-like-legendary-poets/. Accessed on 10 May 2022.

[14] Samuel Gibbs, "Elon Musk: Artificial Intelligence Is Our Biggest Existential Threat", *The Guardian*, 27 October 2014. Available at https://www.theguardian.com/technology/2014/oct/27/elon-musk-artificial-intelligence-ai-biggest-existential-threat. Accessed on 11 May 2022.

[15] "'AI Could Spell End of Human Race", *BBC News*, 02 December 2014. Available at https://www.bbc.com/news/av/science-environment-30289705. Accessed on 11 May 2022.

[16] "AI Will Create 'useless Class' of Human, Predicts Bestselling Historian" *The Guardian*, 20 May 2016. Available at https://www.theguardian.com/technology/2016/may/20/silicon-assassins-condemn-humans-life-useless-artificial-intelligence. Accessed on 15 May 2022.

[17] Amit Kumar Jain and Surbhi Jain, "Leadership Mantra in the Age of AI", *The Hindu Business Line*, 29 July 2021. Available at https://www.thehindubusinessline.com/opinion/leadership-mantra-in-the-age-of-ai/article35611270.ece. Accessed on 15 May 2022.

[18] Michelle Senecal de Fonseca, "What the Rise of AI in Leadership Means for the Future of Work", *Citrix Blogs*, 10 January 2020. Available at https://www.citrix.com/blogs/2020/01/14/what-the-rise-of-ai-in-leadership-means-for-the-future-of-work/. Accessed on 16 May 2022.

[19] Ian Sample, "What Are Deepfakes : and How Can You Spot Them?", *The Guardian*, 13 January 2020. Available at https://www.theguardian.com/technology/2020/jan/13/what-are-deepfakes-and-how-can-you-spot-them. Accessed on 16 May 2022.

[20] "A Video That Appeared to Show Obama Calling Trump a 'Dipsh-t' Is a Warning about a Disturbing New Trend Called 'Deepfakes", *Business Insider*. Available at https://www.businessinsider.in/a-video-that-appeared-to-show-obama-calling-trump-a-dipsh-t-is-a-warning-about-a-disturbing-new-trend-called-deepfakes/articleshow/63807263.cms. Accessed on 16 May 2022.

[21] Forrest E Morgan et al., *Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World*, United States: Rand Corporation, 2020, ISBN 978-1-9774-0492-3.

[22] Chloe Taylor Clinch Matt, "WikiLeaks Founder Julian Assange Wins Right to Take Extradition Case to UK's Top Court", *CNBC*, 24 January 2022. Available at https://www.cnbc.com/2022/01/24/wikileaks-founder-julian-assange-wins-right-to-take-extradition-case-to-uks-top-court.html. Accessed on 16 May 2022.

[23] *"Leadership in the Age of AI", Infosys Research Study*. Available at https://www.infosys.com/age-of-ai.html. Accessed on 16 May 2022.

[24] "Star Trek: Cast, Characters, Synopsis, and Facts", *Britannica*. Available at https://www.britannica.com/topic/Star-Trek-series-1966-1969. Accessed on 16 May 2022.

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