"The contributed chapters in the book written by the faculties of science stream in the light of the recent thinking and developments in the field of science and education.- Science& Technology is now dominates almost every field of our activities.In summary , The faculties (Science stream) of GEMS Arts & Science college have made an excellent attempt to bring about this book Homo Scientia". covering almost all the important areas from biological sciences to artificial intelligence. Every article has its own merits in both academic and research fronts...I record my grateful appreciation and thanks to the contributors of this book for their untiring efforts."

Dr. Balagopalan Unni

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HOMO SCIENTIA

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Dr. K Gopalakrishnan,
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GEMS

HOMO SCIENTIA

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Brief Biography

Dr. B.G.Unni, (Balagopalan Unni) Ph.D
(Allahabad central University)
FRES (London), FIANSc , FISAgBc, FICCE

Former Chief Scientist and Area Coordinator (Biotechnology & Biological Sciences) DADD and Fulbright Fellow retired from CSIR service in 2015 after 38 years of research career at CSIR North East Institute of Science & Technology Jorhat Assam. Appointed at Assam down town University as Director-Research in March 2015 and continued up to June 2019 and then re-designated as Adviser Research in August 2019). Back in Kerala, Dr.Unni is appointed as Director Academic & Research at GEMS College of Arts & Science affiliated to University of Calicut from August 2019. Both the positions are on honorary basis to strengthen the institutions in research areas. He did his BSc Biology (1972-74, Ewing Christian College, Alld University), MSc in Biochemistry(1974-76)(Second Rank) and Ph.D in Biochemistry from Allahabad University(1976-80) and PDF in Molecular Biology from Texas A&M University, USA(1988-91). Dr. Unni is specialized in Biochemistry, Molecular Biology, and Biotechnology and well established in his area of research and completed more than 40 years of research in both basic and applied fields of research. Dr.Unni got more than 130 research papers, 190 abstracts, 35 papers in proceedings, 7 patents,1 technology.18 chapters in books, edited 3 books and 29 students

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received PhD degrees under his guidance and supervision. Dr. Unni had completed more than 20 projects sponsored by Commonwealth Science Council, London, Ministry of Non conventional Energy Sources, Department of Non conventional Energy Sources Govt of India, North Eastern Council Govt of India, Department of Science &Technology, Department of Biotechnology, Central Silk Board,GB Pant Institute of Himalayan Environment and Development, CSIR and DRDO, Ministry of Defense, Govt of India during his scientific tenure at CSIR NEIST. Dr Unni received- Fulbright Travel Award/ Fellowship (USA) Dr. B.M. Das Memorial Science award, Hebrew University Award , H.R. Cama Memorial Travel Award,COSTED Travel Award,. DAAD- fellowship-Germany, Well Mark International Scholarship (USA) & Technology award in life sciences by CSIR,Govt of India . Best Fulbright Alumni Chapter Leader-South Asia Selected by the United States Education Foundation In India (USIEF), New Delhi .Nominated to represent India at the International Fulbright Scholars meet at Marrakech, Morocco- Nominated by United States Education Foundation In India, New Delhi . Dr. Unni is in the editorial board of more than eight indexed journal in the country .Dr.Unni was nominated to various state and central committees such as High power committee for development of sericulture activities Muga, Eri,Tassar and Mulberry in Assam nominated by Governor of Assam, .Expert in the area of non mulberry sericulture, Ministry of Textiles, Advisory Board, Post graduate Biotechnology programme, Academic Council, Assam Agricultural University, Research Council, Central Silk Board, Ministry of Textiles , DBT's Nominee for Biosafety Committee ,Vice President SBC (India) Indian Institute of Science Bangalore, Vice President Indian Academy of Neuro-sciences, Member Fulbright Academy of Science & Technology, USA, Board of studies- Botany Nagaland University and Biotechnology Saugar University Madhya Pradesh., Fellow, Indian Academy of Neurosciences & Indian Society of Agricultural Biochemists, Fellow Royal Entomological Society, London UK and Scientific

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Advisor International Foundation of Science, Sweden, Member, Board of Studies Raiganj University (2017----), Member Research Review committee Tea Board of India (2016-2019), Member Advisory Committee Cancer Research Advisory Board, North East Cancer Hospital & Research Institute (2017--) President, Tea Improvement Consortium, Ltd, Tocklai Assam (2018-2020) .

Dr.Unni visited USA, Germany, Israel, Jordan, France, Morocco ,UK, Thailand ,Jordan, Singapore , China and UAE under various exchange program.

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Preface

I am very happy to learn that, the GEMS Arts & Science College is bringing out a series of books written by the faculty in this academic year. The college is occupying a very important position among the colleges in Kerala, the same way the college is having unique standing in both academic and research fronts too. This is because of the excellent management, faculties and the best performances of the students.. I have full confident that in the course of time, and with the sincere commitment and dedication of the faculties , students and with management , the college will attain high level perfection and excellence and became a model college in the state of Kerala

This book entitled " Homo Scientia" had comprehensive research topics in various aspects in the topics of cyber security, biotechnology, microbiology and geology.A brief description about the cybersecurity, the protection of computer set up such as hardware, software data from several threats have been described in the chapter The best practices for deploying and managing IPS network security tools have been explored. The integration of intrusion prevention system (IPS) solutions, adherence to security policies, regular updates, monitoring and the implementation of incident response procedures are considered to be the essential components of a comprehensive network security framework. The risk management in cyber security, various cyber-attack kinds, malware, and some strategies to tackle these attacks are also explained by the authors. A comprehensive overview of the evolution of computer graphics, exploring the advancements in hardware, software, algorithms, and techniques that have propelled the field from its early pixel-based beginnings to the current state of realism etc also described. Optical character recognition has been extensively investigated in the past few years, and has been proven that high recognition rates can be achieved in specific

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application scenarios using some standard and well-studied methods such as neural network, support vector machine (SVM), etc. The possibility of learning an appropriate set of features for designing optical character recognition (OCR) has been investigated

Biotechnology is an interdisciplinary science using modern technologies to construct biological processes in research, agriculture, formulation of pharmaceutical products and other related fields. The better understanding of advances in plant genetic resources, genome modifications, omics technologies to generate new solutions for food security under changing environmental scenarios etc have been discussed in this chapter. The increasing demand for food had a great impact on the agriculture sector to address the various challenges associated with crop productivity. The tremendous advancement in plant research helps in understanding plant biology for sustainable food security, functional ecosystems, crop improvement and human health. One of the sustainable farming techniques is the use of fertilizer at nano level. Nanomaterials that enhance plant nutrition could be considered as an alternative to the conventional chemical fertilizers. one chapter covered the importance of nano fertilizer to enhance metabolic processes in plants and reviewed the concerns in developing nanotechnological methods in the future. Metabolomics has now emerged as a powerful tool for the comprehensive analysis of metabolites within biological systems. One of the chapters provides a review on metabolomics, encompassing its methodologies, applications, potential impact on personalized medicine ,and discusses further the need for advancements in analytical technologies. The antifungal activity of mangroves, particularly Rhizophora species are one of the main sources for fungicidal compounds due to the presence of high concentration of phenols. The antifungal activity of Rhizophora species has been elucidated, and could be further utilized as biocontrol agents for fungal disease in agricultural crops. One of the chapters discussed the species identification and its impact on economical and ecological level in the species like Nutmeg, one of the important medicinal plants that had a greater attention ,however, it was very difficult to differentiate the sexual identity

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in the seedling stages. But the protein content screening among the studied plantlets had differentiated the sexes in the species as explained by the author.

AI (Artificial Intelligence) or machine intelligence enables farmers to enhance the quality and ensure a quick go-to market strategy for crops, and adoption of these algorithms to improve food industries. Artificial intelligence (AI) has also the potential to revolutionize education, from personalized learning to assessment and grading. Additionally, AI-powered tools can provide greater accessibility to students with disabilities, while also enabling more engaging and interactive content. AI continues to develop and become more prevalent in education, towards responsible and equitable implementation. However the negative and positive part of the AI may also be looked into.

The chapters related to microbiological aspects have also been incorporated in this book . Carbapenem-resistant A. baumannii (CRAb), bacteria that cause multi-infections in humans and resistant to multiple drugs too. The study attempted to isolate and characterize the bacterial species from the clinical specimens using biochemical techniques. The enzyme, carbapenemase produced by the bacteria was isolated and determined by different assays. Another study identified the antibacterial, antioxidant and anticancer activities of Ganoderma lucidum by various chromatographic techniques. Anticancer activity was also assessed on HeLa cell lines using MTT assay and DPPH assay. In one of the chapters,the author discussed L-asparaginase, one of the widely exploited enzymes for the treatment of acute lymphoblastic leukemia (ALL). Also attempted to isolate and characterize the enzyme from soil samples collected from different locations at Kerala. The study indicated that soils can provide a rich source for L-asparaginase which has got ample application in pharmaceutical industries.

The studies on various geological aspects with respect to different geographical areas in Kerala soil has been included in the book. The vertical geochemical variation and elemental mobility of the lateritic terrain in the Makkaraparamba of Malappuram District, Kerala has been very well investigated. Under extremely oxidizing and leaching conditions, laterite

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soil transformed into a variety of rocks and further developed into stable secondary product in the existing humid tropical and subtropical environments. The hydrogeological conditions in Kumbala- Kaliyar river basin, Kasaragod district, Kerala was assessed by means of Vertical Electrical Sounding (VES). The digital spatial data output of the present study would be much helpful for planning and management of surface and sub-surface water resources of Kasaragod River basin in which the Kasaragod township is centrally located

The contributed chapters in the book written by the faculties of science stream in the light of the recent thinking and developments in the field of science and education.Science& Technology is now dominates almost every field of our activities. In summary , The faculties (Science stream) of GEMS Arts & Science college have made a n excellent attempt to bring about this book Homo Scientia".covering almost all the important areas from biological sciences to artificial intelligence. Every article has its own merits in both academic and research fronts..I record my grateful appreciation and thanks to the contributors of this book for their untiring efforts.

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THE IMPACT OF TECHNOLOGY ON HUMAN VALUES: EXPLORING THE COMPLEXITIES

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Department of Computer Science

ABSTRACT

This paper explores the impact of technology on human values, examining the complexities involved and the implications for society. The rise of technology has transformed the way we interact with one another, work, and live our lives. While technology has brought numerous benefits, it has also challenged fundamental human values such as privacy, security, and equality. The use of algorithms and machine learning can lead to biased decision-making, and the rise of cybercrime has raised questions about the security of our digital lives. However, technology has also enhanced human values by providing greater access to information and enabling greater efficiency in areas such as healthcare and transportation. As we continue to develop and adopt new technologies, it is important to consider their potential consequences and strive to ensure that they align with our most fundamental values as human beings.

INTRODUCTION

Technology has had a profound impact on human life, changing the way we communicate, work, and interact with one another. While technology has brought numerous benefits to society, it has also had significant implications for our values as humans. The aim of this paper is to explore the impact of technology on human values, the complexities involved and the implications for society. Technology has revolutionized the way we live, work, and interact with one another. From smartphones

and social media to artificial intelligence and automation, technological advances have had a profound impact on almost every aspect of our lives. However, the impact of technology on human values is a complex and multifaceted issue that is subject to ongoing debate and analysis. The impact of technology on human values is a complex and multifaceted issue that is subject to ongoing debate and analysis. On the one hand, technology has the potential to enhance human values such as freedom, equality, and efficiency. On the other hand, technology can also have negative consequences that may undermine these same values.

Impact on Relationships: Technology has fundamentally changed the way we interact with one another. Social media has made it possible for people to connect with each other from all over the world, enabling the sharing of thoughts, opinions, and experiences. This has been positive in many ways, but it has also led to a rise in cyberbullying, harassment, and disinformation that can cause harm to individuals and society. It has also led to a decline in face-to-face communication and human interaction, leading to a sense of social isolation and loneliness. One of the most significant impacts of technology on human values is the way it has changed our relationships with one another. The widespread use of social media, for example, has brought people together in ways that were once impossible, allowing us to connect with individuals from all over the world and share our thoughts and experiences with one another. However, it has also contributed to a rise in cyberbullying, harassment, and disinformation that can cause harm to individuals and society as a whole.

Impact on Work: Technology has also had a profound impact on the way we work. The rise of remote work, video conferencing, and other forms of digital communication have made it possible for people to collaborate and share ideas across geographic boundaries. However, it has also contributed to a blurring of boundaries between work and personal life, leading to burnout and other negative consequences. There are concerns

that technology may eventually lead to job losses, particularly in industries such as manufacturing, where automation and robotics are rapidly advancing. Moreover, the excessive use of technology has significantly impacted our social lives. The increased use of smartphones and social media platforms has resulted in a decline in face-to-face communication and human interaction. People now prefer to communicate via social media, emails, or phone calls instead of meeting in person. This has contributed to a sense of social isolation and loneliness, which can have a negative impact on mental health and well-being.

Impact on Values: The use of algorithms and machine learning can lead to biased decision-making and reinforce existing inequalities in society. For example, facial recognition technology has been shown to have a higher error rate for individuals with darker skin tones, leading to concerns about racial bias. Similarly, the increasing use of automation and robotics in the workplace raises questions about the value of human labour and the role of work in our lives. Similarly, technology has had a profound impact on our ability to work and communicate. The rise of remote work, video conferencing, and other forms of digital communication have made it possible for people to collaborate and share ideas across geographic boundaries. However, it has also contributed to a blurring of boundaries between work and personal life, leading to burnout and other negative consequences. In addition, technology has the potential to impact our values in more suitable ways. For example, the use of algorithms and machine learning can lead to biased decision-making and reinforce existing inequalities in society. Similarly, the increasing use of automation and robotics in the workplace raises questions about the value of human labour and the role of work in our lives.

Privacy and Security: The use of personal data for targeted advertising, political campaigns, and other purposes has raised concerns about the protection of our personal information. The rise of cybercrime and hacking has also raised questions about the security of our digital lives and the measures we need to take

to protect ourselves. The impact of technology on human values also extends to our privacy and security. The widespread use of personal data for targeted advertising, political campaigns, and other purposes has raised concerns about the protection of our personal information. The rise of cybercrime and hacking has also raised questions about the security of our digital lives and the measures we need to take to protect ourselves.

Enhancement of Human Values: While technology has brought numerous challenges to human values, it has also brought numerous benefits. Technology has made it easier for people to access information and express themselves, allowing for greater freedom of expression and democratic participation. It has also enabled greater efficiency in areas such as healthcare, transportation, and energy, making it possible to do more with less and reduce our environmental impact. Despite these challenges, technology also has the potential to enhance human values such as freedom, equality, and efficiency. For example, technology has made it easier for people to access information and express themselves, allowing for greater freedom of expression and democratic participation. It has also enabled greater efficiency in areas such as healthcare, transportation, and energy, making it possible to do more with less and reduce our environmental impact.

Advantages of Technology on Human Values:

- Increased Access to Information: Technology has made it easier for people to access information from around the world. This has enabled greater freedom of expression, democratic participation and provided an opportunity to learn and grow.
- Enhanced Efficiency: Technology has enabled greater efficiency in areas such as healthcare, transportation, and energy, making it possible to do more with less and reduce our environmental impact.
- Improved Communication: The rise of social media and other forms of digital communication has made it easier for people to connect and communicate with one another, regardless of geographic boundaries.

- Greater Accessibility: Technology has made it possible for people with disabilities to access information, products, and services that would have been difficult or impossible to obtain in the past.

Disadvantages of Technology on Human Values:

- Social Isolation: The rise of digital communication has led to a decline in face-to-face communication and human interaction, leading to a sense of social isolation and loneliness.
- Loss of Privacy: The use of personal data for targeted advertising, political campaigns, and other purposes has raised concerns about the protection of our personal information.
- Bias and Inequality: The use of algorithms and machine learning can lead to biased decision-making and reinforce existing inequalities in society.
- Addiction: The use of technology can lead to addiction, particularly in the case of social media and online gaming, leading to a decline in productivity and quality of life.
- Job Losses: There are concerns that technology may eventually lead to job losses, particularly in industries such as manufacturing, where automation and robotics are rapidly advancing.

CONCLUSION

The impact of technology on human values is complex and multifaceted. While technology has brought numerous benefits to society, it has also had significant implications for our values as humans. The impact of technology on relationships, work, values, privacy, and security has been both positive and negative. Ultimately, the impact of technology on human values is a complex and ongoing conversation that requires ongoing analysis and reflection. By doing so, we can harness the power of technology to create a more just, equitable, and sustainable future for all.