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Journal Abstracts

November 2025

Sl.No	Article	Author	Source	Year
1	Yuri Ivanovich Manin -A Rare Mathematical Bird	*B. Sury*	Resonance Vol: 30, No: 5	2025

Abstract: Freeman Dyson famously classified mathematicians as birds or frogs. According to him, 'birds' fly high and survey a broad landscape of mathematics. They like to unify things by bring- ing diverse problems under a common lens. On the other hand, 'frogs' live in the mud below and find delight in the details of objects; they like to solve problems. While calling himself a frog and saying that mathematics needs both, he was particularly eloquent about Hermann Weyl and Yuri Manin, opining that both belonged to the bird category. Hermann Weyl was a universal scientist who is known as well among physi- cists as among mathematicians, and Yuri Manin would surely be a more modem version. In fact, both were remarkably poetic in their writings and musings.

Sl.No	Article	Author	Source	Year
2	Pedigree Analysis in Medical Genetics: History and Diagnostic Efficacy	*Rajiva Raman*	Resonance Vol: 30, No: 5	2025

Abstract: Pedigree is a more systematic and scientific record of family history which has proved to be an invaluable tool in the hands of human geneticists. In fact, even before human genetics was established as a proper science and the rules of inheritance were formulated, such recordings of familial traits were used across several generations to identify diseases running through generations within families. Pedigree analysis not only facilitates verification of the hereditary nature of feature but also enables interpretation of its genetic ethology. Pedigree also comes in handy in explaining the complexities of inheritance of features such as incomplete penetrance, genomic imprinting, and anticipation. It also has high predictive value regarding the recurrence of disease in the family. Pedigree analysis thus becomes the most economical, simple and elementary tool in the hands of the human geneticists.

Sl.No	Article	Author	Source	Year
3	Samuel Francis Boys: A Torchbearer of Ab Initio Quantum Chemistry	*Milind M Deshmukh, Shridhar R Gadre*	Resonance Vol: 30, No: 5	2025

Abstract: Dr. Samuel Francis Boys is chiefly remembered for introducing Gaussian orbitals in quantum chemistry. He pioneered the implementation of configuration interaction calculations and gave a method for treating basis set superposition errors. In this article, we sketch the life and work of Dr. S. F. Boys.

Sl.No	Article	Author	Source	Year
4	Henry Moseley: Exploration of the Legacy and Impact on Periodic Table	*Nandagopal Bar, Pranesh Chowdhury*	Resonance Vol: 30, No: 5	2025

Abstract: This brief biography explores the life and scientific achievements of Henry Moseley, one of the world's most inspiring scientists. His groundbreaking work using X-rays revealed fundamental relationship between the frequency of X-rays and the atomic number of elements. This led to a reorganization of the periodic table, a search for missing elements, and the prediction of many lanthanoids.

Sl.No	Article	Author	Source	Year
5	Nobel Prize in Chemistry 2024: Computational Protein Design and Structure Prediction	*Tarak Karmakar*	Resonance Vol: 30, No: 5	2025

Abstract: The 2024 Chemistry Nobel Prize was awarded to David Baker, Demis Hassabis, and John Jumper for developing computational tools, including artificial intelligence (AI)-powered approaches that can predict the three-dimensional structure of proteins and design new proteins. These computational tools can predict angstrom-level accurate structures of known proteins from primary amino acid sequences and provide new protein

structures that are yet to be solved by crystallographic techniques, thus opening up new frontiers in understanding complex biomolecular systems. This article discusses the history of protein structure determination and sequence-to-structure prediction, followed by a brief overview of the AI tools, including AlphaFold2, to determine 3D protein structures solely from protein primary sequences. Finally, the future perspective of this emerging area has been discussed along with some of the open questions in biomolecular systems and processes.

Sl.No	Article	Author	Source	Year
I	Quantum Matter: Resistance and Susceptibility Reveal Subtle Quantum Behaviour	*Indulekha Kavila*	Resonance Vol: 30, No: 6	2025

Abstract: Condensed matter physics presents many challenges. Important ones include phenomena and phases of matter that have very unusual characteristics, particularly those which manifest at temperatures approaching absolute zero. At low enough temperatures, the quantum nature of electron-lattice, electron-atom and electron-electron interactions become more evident. Myriam Sarachik distinguished herself in the carefully designed and insightful exploration of the behaviour of quantum matter, producing data of quality and character that was essential for distinguishing between competing models and theories. Her data permitted the zeroing in on the happenings at the electronic level, particularly so in the case of what is known as the Kondo effect, furthering the blooming of theoretical methods like the renormalization group method with applications ranging wide over a range of materials, including topological materials. Experiments that are the core of the scientific contributions of this month's featured scientist gave some decisive insights into matters pertaining to quantum condensed matter. The article-in-a-box on Myriam Sarachik in this issue, by a renowned low-temperature physicist, is an excellent and concise summary of her work. This general article is meant for readers who want a more detailed account of the areas in which Myriam Sarachik worked, and the underlying physics.

Sl.No	Article	Author	Source	Year
2	Operating Point of an Electric Circuit With an Incandescent Light Bulb and a Resistor	*Yuji Kajiyama*	Resonance Vol: 30, No: 6	2025

Abstract: In an electric circuit with an incandescent light bulb and are sector connected in series, the actual voltage across the bulb and the current through the circuit are often determined graphically by the intersection, the operating point of the I – V curves of the bulb and the resistor. This article presents an analytic form of the operating point by simplifying the function of the I – V curve for a light bulb in two cases: T/T0 =O(1) and T/T0 = O(10), where T0 is room temperature and T is the temperature of the tungsten filament. We show that the approximation formulae give the operating point with sufficient accuracy. It will be suitable for undergraduate students to understand electric circuits with a nonlinear resistor.

Sl.No	Article	Author	Source	Year
3	Serendipious Discovery of Warfarin: From a Cattle Disease to Rat Poison to Anticoagulant	*Santarupa Thakurta*	Resonance Vol: 30, No: 6	2025

Abstract: The journey of warfarin started way back in the 1920s from a haemorrhagic cattle disease caused by the consumption of moudy clover hay. After extensive research by Professor Link and his team to identify the substance responsible for the bleeding in cows, a compound named dicoumarol was isolated, eventually leading to the discovery of warfarin. Despite its initial popularity as a rat killer, it was proven to be effective in treating blood clots in human patients. Globally, it has been the most widely used oral anticoagulant since the 1950s.The fact that it inhibits the vitamin K-dependent clotting factor shas opened new opportunities in the field of cardiovascular drugs.

Sl.No	Article	Author	Source	Year
4	Area Bisector Lines of a Triangle	*Jyotirmoy Sarkar*	Resonance Vol: 30, No: 6	2025

Abstract: A line splitting a triangle into two polygons (either two triangles or a triangle and a quadrilateral) of equal areas is called an area bisector line or simply an area bisector.

Sl.No	Article	Author	Source	Year
5	Application of Nonlinear Taft Equation to the Partition Coefficients of Aliphatic Alcohols: A Chemical Education Perspective	*R Sanjeev, V Jagannadham*	Resonance Vol: 30, No: 6	2025

Abstract: Partition/distribution coefficient is a more than 150-year-oldknown physical constant with wide application in separating two compounds in an organic chemistry laboratory and a host of applications in biological membranes. The present study explores the simple and lucid possibility of making graduate physical-organic chemistry classrooms understand the hydrogen-bonded interactions between solute and solvent.

Sl.No	Article	Author	Source	Year
6	Evaluating Limits Related to the Riemann–Lebesgue Lemma Using the Digamma Function	*Himadri Lal Das*	Resonance Vol: 30, No: 6	2025

Abstract: We consider the limits of two integrals like those appearing in the Riemann–Lebesgue lemma. We then discuss the convergence of these limits by providing some examples. In one example, we consider a specific type of integral and demonstrate that it can be evaluated using the digamma function.

Sl.No	Article	Author	Source	Year
7	The Missing Piece in Zoology!	*Jaspreet Kaur*	Resonance Vol: 30, No: 6	2025

Abstract: Once upon a time, a zoology lab would be filled with dissection trays on workbenches with rats and frogs pinned on them. Students would be busy dissecting animals like leeches, cuttlefish, and earthworms to understand different biological systems. Those were the exciting times of zoology when animals were 'felt' with the touch of hands, and the intricate beauty of complex biological systems was admired and studied in fine detail.

Sl.No	Article	Author	Source	Year
8	Ground Roll Time for Aircrafts: A Quick Estimate	*Biman Nath*	Resonance Vol: 30, No: 6	2025

Abstract: The time taken by typical aircrafts to take off from runway, or more precisely, its ground roll time, is estimated, starting from simple estimates and then with details added.

Sl.No	Article	Author	Source	Year
9	Solution of Principal Quintic Equation	*Raghavendra G Kulkarni*	Resonance Vol: 30, No: 6	2025

Abstract: In this article, a method for solving a principal quintic equation is presented, wherein the principal quintic equation is transformed into two quartic equations in a novel fashion; the coefficients of the quartic equations are certain types of convergent infinite series functions in the coefficients of the principal quintic equation, and these functions are termed as ultraradicals. Solving the two quartic equations so obtained, we pick one real solution of the given principal quintic equation from the set of eight solutions.

Sl.No	Article	Author	Source	Year
1	A Scientist Who Created Institutions with a Lasting Culture	*K VijayRaghavan*	Resonance Vol: 30, No: 8	2025

Abstract: Obaid Siddiqi (1932–2013) was a pivotal figure in establishing modern molecular biology in India. His contributions started with fungal genetics, including the discovery of polarised 'negative interference,' then bacterial genetics, where he elucidated fundamental mechanisms of genetic suppression, DNA transfer, and conjugation. His research shift to Drosophila neurobiology was marked by collaborations with Seymour Benzer and Veronica Rodrigues, leading to insights into synaptic physiology and chemosensory pathways. Beyond his research, Siddiqi played a visionary role as an institution-builder, notably in founding the Molecular Biology Unit (MBU) at the Tata Institute of Fundamental Research (TIFR) and establishing the National Centre for Biological Sciences (NCBS) of TIFR. His mentorship philosophy, characterised by intellectual rigour, freedom, and personal care, cultivated generations of scientists. Siddiqi stands out as a figure whose approach to science and commitment to nurturing excellence had a national and global impact.

Sl.No	Article	Author	Source	Year
2	The Pioneering Legacy of Veronica Rodrigues in Drosophila Neurobiology	*K VijayRaghavan*	Resonance Vol: 30, No: 8	2025

Abstract: The fruit fly, Drosophila melanogaster, continues to power biology across scales from the molecular to complex behaviour. The journey of Drosophila into the realm of neurogenetics began in earnest in the early 1970s and was spearheaded mainly by Seymour Benzer. His work, and that of his collaborators and academic 'progeny', aimed to demonstrate the feasibility of linking specific genes to complex behaviours. This opened an entirely new frontier in neuroscience, whose outcomes were often very different from what was intended or expected, but transformed all of neurobiology as we know it today

Sl.No	Article	Author	Source	Year
3	Structural Colouration in Nature: Mechanism, Measurement, Biological Significance, and Industrial Applications	*Akshara Yagnik, Divya Uma, Proteep C V Mallik*	Resonance Vol: 30, No: 8	2025

Abstract: In this article, we briefly review the concept, mechanism, quantification, and functional significance of structural colours. The feathers of the peacock's tail are taken as an example to quantify iridescent structural colours. We review how structural colours can be measured in the Indian college lab setting and illustrate some simple interdisciplinary experiments that students of physics, biology, and chemistry can perform. This article aims to help readers understand the importance of non-pigmentary colours present in nature and their applications in industry.

Sl.No	Article	Author	Source	Year
4	Decoding the Cosmic Code: Inferring Temperature and Metallicity of Stars	*Aasfa Kaifi Patel, Anjanakrishna Nair*	Resonance Vol: 30, No: 8	2025

Abstract: This article explores the application of spectroscopy in solar and stellar physics, emphasizing its role in analysing stellar spectra to determine key physical and chemical properties of celestial bodies, such as their temperature, metallic composition, and intrinsic luminosity. Using archival data from the Sun and three other stars, we demonstrate how absorption lines reveal elemental composition and how Wien's displacement law can be used to estimate stellar temperatures. Ourresults highlight the significance of spectroscopy in probing stellar evolution and fundamental astrophysical processes.

Sl.No	Article	Author	Source	Year
1	The bare lives of New Delhi: Street dogs at bureaucratic crossroads	*Nivedita Ghosh*	Contributions to Indian Sociology Vol: 58, No: 3	2025

Abstract: This article delves into the complex bureaucratic processes involved in the administration of street dogs in New Delhi during the 2023 G20 summit in India. It applies Giorgio Agamben's concept of 'bare life' to examine the tensions between the legal rights of street dogs and their administrative management, as observed during a temporary dog-removal drive undertaken by the Municipal Corporation of Delhi (MCD) for the summit. This discussion is contextualised within the broader impact of hosting major international events on free-roaming city animals, contributing to the existing literature on human–animal relationships. The argument is premised on the view that in this situation the MCD produces a condition of 'too much law' or law in excess, leading to a paradoxical violation of the law itself. Street dogs are rendered as bare life, captured and sustained only by food and water during the event—not by the suspension of animal rights but by its excessive and abrupt implementation. Additionally, the article addresses the broader impact of this bureaucratic intervention on city life.

Sl.No	Article	Author	Source	Year
2	Siting the un-sitable: Conceptualising air through contamination across two remote field sites	*Vasundhara Bhojvaid, Annika Capelán*	Contributions to Indian Sociology Vol: 58, No: 3	2025

Abstract: This article explores how the atmosphere may allow for collaborative connections within and across two distant places, emerging as pollution in Delhi, India, and as wind in Chubut, Argentinian Patagonia. When ethnographically situated, these two versions of air remain incommensurable and yet coexist in a dynamic planetary atmosphere. In order to make sense of our individual field sites in relation to each other and the political ramifications of air in both, we lean on contamination as the conceptual tool of influential exchange. We argue that to observe the

contrasting manifestations of air, what they achieve and how they seep into each other through our work is to shed light on unequal enactments of the atmospheric.

Sl.No	Article	Author	Source	Year
3	Anganwadi as a social reproduction site: Dalit feminist resistance to gender, caste and class	*Preethi Krishnan*	Contributions to Indian Sociology Vol: 58, No: 3	2025

Abstract: Drawing on ethnographic data about the Integrated Child Development Services (ICDS), a welfare programme for children in Tamil Nadu, India, this article addresses the question: How do spaces providing social reproduction labour, embedded in social relations of gender, caste and class, become sites of Dalit feminist resistance? The article discusses how the Anganwadi became a site of Dalit feminist resistance where gendered and cattiest norms were contested vis-à-vis the state, community or sometimes among workers themselves. It describes three axes along which workers contested their exploitation—labour, gender and caste. First, as a labour movement, Anganwadi workers highlighted how the state expanded the job responsibilities of workers without adequate compensation and engaged in gendered exploitation of their care work. Second, Dalit union leaders used their influence to challenge casteism among workers. Dalit women also approached the courts to implement a caste-based affirmative action policy in worker recruitment. Finally, we see how Anganwadi workers supported each other to resist gendered norms around widowhood in rural Tamil Nadu. Theoretically, the article brings social reproduction theory in conversation with Dalit feminist theory to examine the Anganwadi as a site where devaluation of care labour and caste bias coexists with workers' resistance to such exploitation and discrimination.

Sl.No	Article	Author	Source	Year
4	The relevance of Imtiaz Ahmad's writings to contemporary debates on Indian Muslim identity	*Hilal Ahmed*	Contributions to Indian Sociology Vol: 58, No: 3	2025

Abstract: In 1972, Imtiaz Ahmad penned a column titled 'For a Sociology of India' in Contributions to Indian Sociology 6(1). He wrote here: 'We may have Hindu, Muslim, or Christian sociology, but hardly "a sociology of India"' (177). This piece revisits his discussion, more than 50 years later, with a view to recapitulating and highlighting the contemporary relevance of his position on Indian Muslim identity. It engages with three thematic concerns: the possibilities of locating Muslim studies in the realm of 'A sociology of India', the changing nature of social stratification among Muslims and the forms and trajectories of lived Islam(s) in the present.

Sl.No	Article	Author	Source	Year
5	The taste of turbulence: Memory and everyday resistance in Kashmiri foodways	*Gayatri Sapru*	Contributions to Indian Sociology Vol: 58, No: 3	2025

Abstract: This student report explores the tripartite violence—symbolic, visible and slow—which plays out across state control, ecological neglect and cultural erasure, reshaping the foodways of Jammu and Kashmir. At the same time, the Valley's food systems remain deeply relational and resilient, held together by interdependence, ritual and care. As Kashmiris navigate the layered crises of militarisation, climate change, unemployment and displacement, foodways offer a lens into suffering and survival. Based on 30 days of ethnographic fieldwork in June 2024 across farms, kitchens, markets and meadows, the research draws on the memories of farmers, bakers, fisherfolk, butchers, chefs and home chefs. From the silence that falls when a siren sounds mid-interview, to the warmth of neighbours sharing meat in winter, food emerges as both witness and anchor. By centring voices on the ground, this work invites readers to think beyond the headlines, asking what it means to eat, remember and endure in a place where nourishment itself has become political.

Sl.No	Article	Author	Source	Year
1	Regenerative agriculture and adaptive capacity of farmers	*Walter Mansfield, Richard J. Culas.*	Current Science Vol: 129, No: 4	2025

Abstract: Regenerative agriculture is a transformative approach to food and fibre production that has a strong emphasis on climate change mitigation and a host of environmental and sociological benefits. Hence, adaptive capacity is recognised as a crucial property for societies to adapt to and transform systems in response to changing conditions such as climate change. A key challenge in assessing adaptation strategies is balancing the environment, financial and social factors, and an assessment of the adaptive capacity determinants within regenerative agriculture is sparse. The present article explores resilience theory as a foundation for assessing the adaptive capacity determinants and analyses examples of regenerative agriculture practices. A conceptual model is therefore developed to highlight the circularity of regenerative agriculture with the environmental, financial and social benefits that the adaptation of regenerative agriculture can bring.

Sl.No	Article	Author	Source	Year
2	Nitrous oxide (N2O) – responsibility and action	*J. R. Bhatt*	Current Science Vol: 129, No: 4	2025

Abstract: India's nitrous oxide emissions in 2019 were pegged at 161.84 million tons CO2e, which amounts to only 5.17% of the total annual greenhouse gas emissions of India. The two predominant sources of nitrous oxide emissions in India are agricultural soils and manure management. The country's annual per capita N2O emissions are ~116.63 kg CO2e, ranking it 147th in the world. However, India ranks 15th if we consider the historical cumulative emissions of the livestock sector. The USA, European Union, China, Russia, and Brazil are the top five nitrous oxide emitters in absolute terms. India ranks sixth, and the nitrous oxide emissions gap between the USA and India is substantial, India's emissions being 86% less than the USA's. Despite its low N2O emissions on an annual, cumulative and per capita basis, India is making all efforts to reduce its nitrous

oxide emissions from fertiliser use by coating all agriculture-grade urea with neem oil and also subsidising it, leading to annual N2O savings of 7.529 MtCO2e. With India's emphasis on equity, its national circumstances, and its refusal to allow the conflation of mitigation with adaptation in the agriculture sector, India has not signed any international pledge to reduce N2O. For a better understanding of the historical responsibility for and future reductions of N2O emissions by various countries, the article argues for the development of global N2O budgets on the pattern of global carbon budgets as refined recently by the Intergovernmental Panel on Climate Change in its Sixth Assessment Report.

Sl.No	Article	Author	Source	Year
3	Optimising level of service scores for footpaths using multi-criteria decision-making approach	*Lalitha Sree Chintakayala, C. S. R. K. Prasad*	Current Science Vol: 129, No: 4	2025

Abstract: Existing methods for evaluating footpath quality often neglect user satisfaction and time-based variations, creating lacunae in comprehensive assessment models. The present study addressed these gaps by developing six-level optimised level of service scores to evaluate footpaths near transit stations. The present research integrated quantitative and qualitative attributes using the analytic hierarchy process and the technique for order preference by similarity to ideal solution. The results showed significant variations in footpath quality during peak and non-peak hours, revealing discrepancies between conventional grading systems and user perceptions. The findings support holistic planning for pedestrian infrastructure, enhancing last-mile connectivity and transit ridership.

Sl.No	Article	Author	Source	Year
4	Study of attitude and rotation period of scientific payload using stratospheric small balloon missions	*Rupnath Sikdar, Sandip K. Chakrabarti, Debashis Bhowmick*	Current Science Vol: 129, No: 4	2025

Abstract: The attitude and rotational frequency or period of a payload during a mission are usually measured by the time variation of the azimuth and elevation angles. So far, significant scientific results have been published using stratospheric balloon-borne experimental data of the Indian Centre for Space Physics, Kolkata. Measurements of ground radioactivity, secondary cosmic rays, detection of astronomical sources (Sun, Crab Pulsar, Cygnus X-1, etc.), and weather parameters such as temperature, pressure, wind velocity, etc., have been done. However, the dynamics of the payloads of these 'Dignity missions' have not been studied. In the present study, we analyse data from some of the flights to obtain the payload's attitude and rotational period at each instant of time. We present how to determine the payload attitude from an attitude and heading reference system using micro-electronic modules, and also show the payload's directional stability from the rotational period analysis of the scientific payload in the stratosphere for single balloon (rubber and plastic) missions. Our analysis suggests that though double balloon configurations often float the payloads for a longer duration, the period of rotation of the payload is lower, and as a result, pointing to any object is poorer. In the absence of a pointing device, a single balloon is preferred for receiving useful data.

Sl.No	Article	Author	Source	Year
5	Digital mapping of the ancient port city of Kaverippumpattinam and its trade routes	*R. Neelakantan, V. Selvakumar , S. Rajavelu , S. Thamarai Kannan, M. Don Wesley*	Current Science Vol: 129, No: 4	2025

Abstract: Kaverippumpattinam is one of the celebrated ports of ancient India and was active around the early centuries of the Common Era. According to the texts, the port was destroyed by marine incursions. The cultural activities of the port that were connected with the regions of the Indian Ocean, Buddhism and the activities of the early historic Cholas (the Chozhas) have been documented in the early Tamil texts of Pattinappalai and other Sangam Tamil compositions, and the early medieval texts of Cilappatikaram and Manimekalai. Archaeological surveys, excavations and

underwater explorations have exposed some of the vestiges of the ancient city. We explored the region and studied the textual and archaeological sources of the ancient city of Kaverippumpattinam and the associated landscapes and trade routes, and have mapped them using geospatial technology. The present article presents the results of the study (part of PUHARETAR project) that sought to map the city and its links.

Sl.No	Article	Author	Source	Year
6	Incidence of pregnant endangered devil rays (Elasmobranchii: Mobulidae) from the Gulf of Mannar and Palk Bay, southeast coast of India	*L. Remya, Sujitha Thomas, M. Muktha, Shoba Joe Kizhakudan*	Current Science Vol: 129, No: 4	2025

Abstract: Out of the nine valid extant mobulid species confirmed globally, seven have been reported in India. All mobulids are vulnerable due to anthropogenic pressure, i.e. commercial fisheries, for their gill plates, which are traded on the international market. Information on their reproductive biology including, the seasons of mating, pupping, and nursery grounds are still largely unknown from Indian waters. The present study reports the occurrence of pregnant endangered devil rays, longhorned pygmy devil ray Mobula eregoodoo, oceanic manta ray Mobula birostris and Bentfin devil ray Mobula thurstoni in Indian waters, off the southeast coast. All three species were observed to have a single pup each. Our observations of mobulid catch from 2020 to 2022 indicates a predictable occurrence of pregnant devil rays either for feeding or for pupping (July to November), with a peak during November in the Gulf of Mannar and Palk Bay. The size-atbirth was in the order of 33.3 cm disc width (DW), 125.8 cm DW and 40.5–60.5 cm DW for M. eregoodoo, M. birostris and M. thurstoni respectively. Mobula thurstoni chiefly consumed needle squid and Acetes spp., while the gut contents of the other two species were completely digested. The observations on M. thurstoni suggests a pupping/nursery/feeding ground off the Gulf of Mannar, probably assist to develop area-based management interventions.

Sl.No	Article	Author	Source	Year
1	Simulation study on efficient decarbonisation of coal-fired power plant flue gas using ionic liquid to capture CO2	*Pengjin Liu, Hongwei Mu, Jiafa Du, Jianfei Sun, Yongliang Zhang, Bin Liu ,Wentao Fan*	Current Science Vol: 128, No: 12	2025

Abstract: The carbon dioxide (CO2) emission reduction technology has the limitation of high energy consumption, and the development of new and efficient capture media is a new way to achieve green and high-value utilisation of CO2. However, ionic liquids (ILs) have attracted the attention of researchers as a novel capture medium. In this study, Aspen Plus software was used to examine the process of capturing CO2 from flue gas of coal-fired power plants using ILs. The physical properties of 1-butyl-3-methylimidazolium tetrafluoroborate ([Bmim][BF4]) were analysed using known experimental data, and a process flow for physical absorption of CO2 was established. Based on the established full process model, a sensitivity analysis was conducted on the absorption tower and flash tank. The process simulation results showed that increasing the number of absorption tower plates and the lean liquid flow rate benefits CO2 absorption. The optimised absorption pressure is 3.0 MPa, the number of trays is 15, the lean liquid absorbent flow rate is 500 kmol/hr, the lean liquid feed temperature is 50°C, and the optimal operating conditions for the flash evaporation tank are a recovery pressure of 0.3 MPa and a recovery temperature of 150°C. The calculation of direct equipment investment cost in the process shows that with the increase of lean liquid load, the investment cost of all equipment except for the reboiler increases.

Sl.No	Article	Author	Source	Year
2	Basmati rice varietal differentiates using Sentinel-I and Sentinel-2 data in Google Earth Engine	*Dharmesh Verma, Manik H. Kalubarme A. N. Singh, Brajendra, Ritesh Sharma*	Current Science Vol: 128, No: 12	2025

Abstract: A study on Basmati rice variety differentiation was carried out in two districts of Haryana, using Sentinel-1 SAR and Sentinel-2 MSI time series data and a Random Forest (RF) classifier on the Google Earth Engine cloud computing platform. The fortnightly composite stack of VH-VV difference and Sentinel-2 multispectral bands and their Red-edge indices, Chlorophyll Index (CIgreen and CIred-edge), was analysed. Basmati

varieties could be distinguished into long- and shortduration and early Basmati. The accuracy of the RF classifier model was validated by computing the AUC and receiver operating characteristic curves. AUC was > 0.9, ensuring the best model fitting and high accuracy. The results revealed that long-duration Basmati varieties are being replaced by shorter-duration varieties.

Sl.No	Article	Author	Source	Year
3	Association of RANK gene variants with its circulatory level and bone mineral density in postmenopausal women with and without osteoporosis	*Priya Dixit, Israr Ahmad Shah Waliullah, Tabrez Jafar*	Current Science Vol: 128, No: 12	2025

Abstract: The present study aims to explore the possible association pattern of receptor activator of nuclear factor kappa B (RANK) gene variants (rs 35211496 and rs 1805034) with its circulatory level and bone mineral density (BMD) in North Indian postmenopausal women. In this case-control study, we recruited 165 postmenopausal osteoporotic women as cases (age 54.44 ± 6.00) and 165 healthy postmenopausal women as controls (age 54.47 ± 6.46). BMDs were taken in all subjects using dual energy X-ray absorptiometry at different skeletal sites, and genotyping was carried out using polymerase chain reaction and the restriction fragment length polymorphism method. RANK serum levels were also assessed in all enrolled subjects by enzyme-linked immunosorbent assay. Findings from the present study indicated that subjects with homozygous mutant TT genotype of rs35211496 (NC_000018.10 : g.62354528C > T) and rs1805034 (NC_000018.10 : g.62360008C > T) showed significantly low BMD at forearm, lumbar spine, hip and femoral neck and increased RANK level as compared to CC and CT genotypes. Furthermore, at rs1805034, a significant difference was noted in the frequency of RANK genotypes and alleles among osteoporotic cases and controls (P = 0.021; 0.005) respectively.

Sl.No	Article	Author	Source	Year
4	Authentication and trade of true cinnamon: need for regulation and promotion of sustainable cultivation	*V. Sundaresan*	Current Science Vol: 128, No: 12	2025

Abstract: Humans have been incorporating spices into their diets for centuries. Initially, spices served to mask unpleasant flavours and odours in food, but over time, they became essential for enhancing taste and aroma. Cinnamon has been one of the most coveted spices globally for thousands of years, following black pepper. True cinnamon comes from the bark of Cinnamomum verum, a species native to Sri Lanka and often referred to as 'Ceylon cinnamon'. Due to the limited availability and ever-growing demand for Ceylon cinnamon, many similar-looking species from the Cinnamomum genus are falsely marketed as genuine cinnamon. This practice raises health concerns because these substitutes often contain coumarin, a potentially harmful compound. Consequently, there is a pressing need to ensure proper identification and regulation of cinnamon in trade to protect consumers and uphold quality standards.

Sl.No	Article	Author	Source	Year
5	Inhibition of PKM2 promotes chemosensitivity of DOX in ABC-DLBCL via imbalance of GSH/ROS and inhibition of the NF-κB pathway	*Yutian Yang, Minglang Zhan, Qiongqiong Su, Zihan Xu, Hanzhen Zhang, Linjing Cai, Ao Li1 Qiaoxi Kang, Yongqiang Wei1 Xiaolei Wei, Ru Feng*	Current Science Vol: 128, No: 12	2025

Abstract: Some patients with activated B-cell-like diffuse large B-cell lymphoma (ABC-DLBCL) remain insensitive to R-CHOP. Doxorubicin (DOX), a core agent of RCHOP, induces reactive oxygen species (ROS) accumulation in ABC-DLBCL. PKM2 is key in glycolysis and tumour development. The present study demonstrated that PKM2 targeting attenuated cell proliferation, triggered cell apoptosis and synergised with DOX chemotoxicity.

Mechanistically, PKM2 inhibition and knockdown inhibited glycolysis, disrupted glutathione (GSH)/ROS balance and activated oxidative stress-related pathways. And PKM2i synergised DOX to suppression of the nuclear factor κB (NF-κB) signalling pathway. In summary, PKM2 targeting promotes DOX chemosensitivity via metabolic (glycolysis) and non-metabolic (NF-κB modulation) pathways, positioning PKM2 as a therapeutic lever to boost R-CHOP efficacy in ABC-DLBCL.

Sl.No	Article	Author	Source	Year
6	Key hydrogeological aspects of landslides in Western Ghats of Maharashtra	*Vaibhav Belhekar, Himanshu Kulkarni*	Current Science Vol: 128, No: 12	2025

Abstract: The frequency and intensity of landslides in the Western Ghats of Maharashtra, India, have increased. The present study examines the unprecedented series of landslides in the Choravane watershed in July 2021, where 94 landslides were triggered by prolonged and intense rainfall. Many occurred in undisturbed forested areas, indicating that the landslides are not always associated with human-modified slopes. Our findings highlight the role of extended rainfall, distinctive lithology of the Deccan Volcanic Province and groundwater dynamics, particularly subsurface saturation and pore pressure, in landslide initiation. These insights have implications for hazard prediction and mitigation.

Sl.No	Article	Author	Source	Year
7	Bridgeoporus kanadii, a new colossal species of Bridgeoporus (Basidiomycota, Fungi) from Arunachal Pradesh, India	*Arvind Parihar, Manoj Emanuel Hembrom, Arijit Ghosh*	Current Science Vol: 128, No: 12	2025

Abstract: The hidden realm of fungi in India's biodiversity hotspots continues to yield fascinating discoveries. Arunachal Pradesh, a treasure trove of natural wonders, has recently surprised scientists with the unearthing of a giant, unique wood-decaying species of macrofungi. But the intrigue

does not stop with scientists! To spark curiosity and interest for mycology among the common people, reference specimens of this giant fungus will be showcased at the Industrial Section Indian Museum (ISIM), Kolkata. This species is described in the present article with morphology and molecular phylogeny. This new species is also the initial generic record of the macrofungal genus Bridgeoporus from India.

Sl.No	Article	Author	Source	Year
I	Seasonal Histomorphological Study of the Gills of Common Carp (Cyprinus carpio) in the Tigris River, Iraq	*Suhaib A. H. Al-Taai*	Asian Journal of Science and Applied Technology Vol: 14, No: I	2025

Abstract: The present study aims to describe the morphological and histological characteristics of the gills in male Common Carp (Cyprinus carpio) across four seasons and to highlight the seasonal effects on gill structures under varying temperature conditions. For this purpose, 52 specimens were collected from a rearing aquarium in the Tigris River, within the Taji region of Baghdad, over the course of a year. The fish were sacrificed, and the specimens were fixed in a 10% neutral buffered formalin solution. Routine histological techniques were applied, and the samples were stained using Hematoxylin and Eosin (H&E), Periodic Acid-Schiff (PAS), and Van Gieson (VG) stains. Morphological analysis revealed that the gills of C. carpio consisted of four pairs of gill arches located inside the branchial chamber, equipped with gill rakers and secondary lamellae, all covered by the operculum. The epithelium of the primary lamellae comprised several cell types, including chloride cells (ionocytes), which were rarely observed in the secondary lamellae, as well as pavement cells, non-differentiated supporting cells, and primary epithelial cells. The secondary lamellar epithelium contained all these cell types except for non-differentiated cells and additionally featured pillar cells. Histologically, the gill raker epithelium was identified as a non-keratinized stratified squamous type containing goblet (mucous) cells and two types of taste buds: elongated superficial and spherical. The gill arches' blood supply was provided by afferent branchial arteries (ABAs) and efferent branchial arteries (EBAs), while afferent filament arteries (AFAs) and efferent filament arteries (EFAs) supplied the primary lamellae. The secondary lamellae were vascularized by afferent and efferent lamellar arterioles. The results demonstrated significant differences ($P < 0.05$ and $P < 0.01$) in gill epithelium characteristics

across the four seasons. Statistical analyses revealed that inter-lamellar distance varied significantly ($P < 0.01$) between seasons, which was attributed to temperature fluctuations. The study concluded that carp could adapt to a limited temperature range (23–30°C). However, when water temperatures dropped below the lower threshold (8°C) during winter, the carp's ability to adapt diminished, leading to increased histological changes compared to other seasons.

Sl.No	Article	Author	Source	Year
2	Efficiency of the Combined Use of Cow Dung and Tea Waste on Seed Germination and Seedling Growth of Coriander (Coriandrum sativum L.) in Sandy Regosol	*U. B. K. U. Kumari, T. H. Seran, K. N. D. Lakmali.*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: This study aimed to evaluate the use of cow dung and tea waste as organic fertilizers for seed germination and seedling growth of coriander. The experiment followed a completely randomized design with four replications and seven treatments (T1-T7), representing different ratios of cow dung to tea waste: 0:0 (T1, control), 5:0 (T2), 4:1 (T3), 3:2 (T4), 2:3 (T5), 1:4 (T6), and 0:5 (T7). The results indicated that the application of cow dung and tea waste significantly affected ($P < 0.05$) seed germination and most seedling growth parameters. However, leaf number and shoot length were not significantly influenced. Furthermore, treatments T2 (5:0), T3 (4:1), and T4 (3:2) showed considerable improvements in certain seedling parameters compared to the control (T1). Notably, the T4 treatment exhibited the highest values for seed germination percentage (75%), leaf area (10.15 cm^2), fresh leaf weight (115.95 mg), fresh stem weight (153.25 mg), fresh shoot weight (269.70 mg), dry stem weight (18.60 mg), and dry shoot weight (81.10 mg), surpassing the control. Overall, the combined application of cow dung and tea waste at a 3:2 ratio (T4) enhanced seed germination and seedling growth, making it a viable organic amendment for coriander cultivation in sandy regosol soil conditions.

Sl.No	Article	Author	Source	Year
3	Evaluation of Coconut Water as a Natural Biostimulant for Enhancing Root and Shoot Development in Acerola Cherry (Malpighia emarginata L.) Stem Cuttings	*Sarufudeen F. Shifka, Thayamini H. Seran*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: An experiment was conducted in a home garden in the North Central Province of Sri Lanka to evaluate the response of coconut water (CW) on the growth of stem cuttings of acerola cherry and to determine the optimal CW concentration for improved root and shoot formation. Acerola cuttings with three nodes were treated with various CW concentrations, while water was used as a control. These cuttings were planted in polybags containing a mixture of topsoil, red soil, and cow dung in a ratio of 1:1:1 (v/v/v). The experiment was laid out in a completely randomized design with eight replications. The treatments included five CW concentrations (2%, 4%, 6%, 8%, and 10%) along with a control. Cuttings soaked in CW showed superior growth parameters compared to the control. At 60 days after planting, the cuttings treated with 10% (v/v) CW concentration exhibited significantly higher values in the measured growth parameters, including newly formed shoot length (7.29 cm), root number (5.25), longest root length (5.64 cm), rooting percentage (93.75%), fresh shoot weight (15.19 g), fresh root weight (2.5 g), dry shoot weight (8.85 g), and dry root weight (1.31 g). Lower values were recorded in the control for these parameters. The results demonstrated that CW had a positive impact on the growth of acerola cherry stem cuttings, with a 10% (v/v) CW concentration being the most effective for root and shoot formation among the tested treatments.

Sl.No	Article	Author	Source	Year
4	Economic Efficiency of Small-Scale Sunflower Farmers in Tanzania: A Stochastic Profit Frontier Approach	*Mary Richard, Damas Philip, Hamad Ngaiza*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: Globally, the demand for sunflower vegetable oil has been increasing annually. Smallholder farmers, who represent a relatively large proportion of sunflower seed production, continue to face challenges of low productivity. Although several studies have examined factors contributing to this low productivity, rigorous empirical evidence on the economic efficiency of sunflower farmers remains limited. Understanding economic efficiency is crucial for designing appropriate interventions to increase sunflower seed productivity. An increase in productivity is expected to improve farmers' income and ensure a sustainable supply of sunflower seeds in the country. This study investigates the factors influencing economic efficiency in sunflower production by employing stochastic profit frontier analysis. Secondary data from the NSCA 2019/20 survey, covering a total of 632 households, were used for analysis. The findings indicate that the average economic efficiency score of sunflower producers is 45.31%, implying that farmers are economically inefficient and have significant potential to improve resource use. The results further show increasing returns to scale (0.1196), suggesting that scaling up input use could enhance productivity. Key determinants of economic efficiency include farm size (1.0485), family labor (0.2000), and seed cost (0.1662). This study concludes that sunflower smallholder farmers have scope to improve efficiency through increased farm size and greater utilization of family labor in the production process.

Sl.No	Article	Author	Source	Year
5	Advancements in MIMO Technology for 5G and 6G: A Review of Challenges, Solutions, and Performance	*Zahraa M. Baqir*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: The function of Multiple-Input Multiple-Output (MIMO) technology in contemporary wireless networks is reviewed in this research, with an emphasis on performance evaluation and simulation. MIMO enhances data rates, spectrum efficiency, and link stability, and has become a crucial component of wireless protocols such as 4G LTE, 5G, and the emerging 6G. In addition to evaluating various modeling tools and performance metrics such as Bit Error Rate (BER), throughput, and channel capacity, the study discusses fundamental MIMO concepts, including Single-User, Multi-User, and Massive MIMO. Furthermore, recent developments such as AI/ML integration, terahertz (THz) communication, and Reconfigurable Intelligent Surfaces (RIS) in future wireless systems are examined. The study also addresses challenges associated with MIMO adoption, including hardware constraints and power consumption. It concludes by outlining important areas for future research and providing recommendations for optimizing MIMO systems in next-generation wireless networks.

Sl.No	Article	Author	Source	Year
6	Empirical Assessment of Artificial Intelligence in 6G Technology: Applications and Challenges	*Arush Mishra*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: The rapid evolution of wireless communication systems is driving the development of sixth-generation (6G) technology, which promises to revolutionize autonomous systems by integrating emerging technologies with intelligent decision-making capabilities. This paper presents a broad review of 6G applications powered by artificial intelligence (AI), focusing on their transformative role in enhancing the performance and autonomy of next-generation networks. Emphasizing AI platforms as the core enablers, the study explores key 6G application domains, including autonomous vehicles, unmanned aerial vehicles (UAVs), smart factories, and holographic communications, and assesses their performance through critical

parameters such as latency, reliability, scalability, and energy efficiency. To validate the proposed hypotheses, the paper implements and analyzes a range of AI-based path planning algorithms in dynamic 6G environments. The results underscore the synergistic potential of AI and 6G in enabling self-optimization, low-latency, and context-aware communication systems. Ultimately, the paper concludes that 6G, when integrated with advanced AI techniques, is poised to redefine the landscape of autonomous systems, ushering in a new era of smart, efficient, and adaptive wireless networks.

Sl.No	Article	Author	Source	Year
7	Petrogeochemical Assessment of the Erelu-Oyo Dolerite Dyke and Associated Older Granites, Southwestern Nigeria	*Joseph Ayofe Aderogbin*	Asian Journal of Science and Applied Technology Vol: 14, No: 1	2025

Abstract: The petrochemical studies of the medium- to fine-grained discordant dolerite dyke of Erelu, located within latitude 07°52′N to 07°54′N and longitude 003°52′E to 003°57′E, were carried out to characterize the rock, infer the petrogenesis in relation to the host rocks in the area, and advance the present knowledge on the dolerite dykes of the basement complex of southwestern Nigeria. The study involved fieldwork and random sample collection, where four dolerite, four granite, and six banded gneiss samples were collected and labeled. Thin sections of representative samples of the rocks were prepared following standard procedures, while the remaining rock samples were pulverized for major oxides and trace element determination using the Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) method at Activation Laboratory, Ontario, Canada. The modal analysis results show that the dolerite is composed of olivine (40%), pyroxene (30%), plagioclase (10%), biotite (5%), and quartz (15%). Geochemical results revealed the average major elemental composition (%) as SiO_2 (48.62), Al_2O_3 (15.27), Fe_2O_3 (11.48), MgO (8.00), CaO (8.28), Na_2O (3.11), K_2O (0.82), TiO_2 (1.51), P_2O_5 (0.24), MnO (0.16), Cr_2O_3 (0.03), and LOI (1.85). The average trace element concentrations (ppm) are Ba (285.75), Ce (10), Co (51), Cu (54.5), Nb (7.75), Ni (162.25), Sc (19.75), Sr (436.75), Y (15.25), Zn (98), and Zr (111.25). The occurrence of pyroxene and olivine classifies the rock as olivine-dolerite and pyroxene-dolerite, while geochemical evidence suggests a tholeiitic

origin for the dolerite. The petrochemistry of the rocks shows that the dolerite dyke is peraluminous with moderately high Al, Fe, Mg, and Ca contents compared to other rocks in the same area.

Sl.No	Article	Author	Source	Year
I	Measuring Similarity, Credibility and Value of Information Content of Google and Generative AI Platforms	*Preethi Pichappan, Pit Pichappan*	Journal of Digital Information Management Vol: 23, No: 3	2025

Abstract: This study examines the similarity, credibility, and value of information content generated by Google and various Generative AI (GAI) platforms, such as ChatGPT, Qwen, Perplexity, and Poe. Using the Jaccard Similarity Index, the study measures content overlap between Google search results and AI-generated responses, resulting in two clusters. The first one is the low correlation between the Google and AI outputs. Second is the consistency among AI-based models in terms of similarity. Thus, AI platforms reflect higher internal similarity, suggesting a high degree of homogeneity among them. The research also evaluates credibility, finding Google to have higher average credibility scores (0.82) compared to Perplexity (0.59) in reference analysis, with GAI platforms often lacking reliable citations and traceability. Content credibility scores, assessed using criteria such as source credibility, content accuracy, completeness, objectivity, and verifiability, indicate that Google excels the AI platforms. Google scored 6.54, whereas Perplexity, Qwen, ChatGPT, and Poe scored 4.72, 3.75, 2.81, and 2.26, respectively, in user evaluation. In terms of credibility, Google surpasses generative AI platforms; while AI tools provide useful summaries, they lack the depth, evidence base, and scholarly context found in Google search results. The study concludes that while AI enhances communication efficiency, it raises concerns about reliability, knowledge foraging, and scientific integrity. Future research aims to analyze content volume and length as measures of value, emphasizing the need for transparency and human-centered AI development.

Sl.No	Article	Author	Source	Year
2	Fuzzy Ontology-based Identification and Interpretation of Uncertain and Imprecise Novice User Requests Approach	*Omri Mohamed Nazih*	Journal of Digital Information Management Vol: 23, No: 3	2025

Abstract: Assistance with the use of technical devices is required as soon as the tasks become complex. This assistance is also needed as soon as we provide users with solutions to incidents that occur during the application of unsuitable procedures. The goal of this work is then to provide a knowledge extraction approach that can interpret and identify user requests as valid system requests, thereby responding appropriately to novice user requests. This approach is based on a fuzzy semantic network for modelling imprecise and uncertain knowledge and the automatic construction of a temporary fuzzy ontology for identifying and interpreting user requests. The proposed approach has the advantage of integrating the notion of uncertain and imprecise knowledge into the representation of system objects and procedures. The experimental results show the feasibility, efficiency and effectiveness of our approach.

Sl.No	Article	Author	Source	Year
3	Adaptive and Enhanced Retrieval Augmented Generation (RAG) Systems: A Summarised Survey	*Pit Pichappan*	Journal of Digital Information Management Vol: 23, No: 3	2025

Abstract: This brief review examines adaptive and enhanced Retrieval-Augmented Generation (RAG) systems, focusing on overcoming the limitations of standard RAG models, such as inefficiency, excessive resource utilisation, and rigid retrieve-then-generate workflows. It highlights advancements like Dynamic RAG and Parametric RAG, which enable context-aware retrieval and parameter-level knowledge integration. The paper emphasises adaptive mechanisms that intelligently decide when and how much to retrieve, improving efficiency and relevance. It also discusses query rewriting, verification, and multimodal extensions to enhance precision. Furthermore, the integration of forecasting latent retrieval methods is introduced, where

deep latent dynamics models extract predictable, interpretable components from limited time series data, improving forecasting accuracy. Applications in education, edge computing, and domain-specific contexts are explored, showing reduced hallucinations and better scalability. The review outlines the evolution of RAG toward intelligent, responsive systems using reinforcement learning and hybrid architectures. We identified several potential future research directions, including agentic workflows, multi-modal adaptation, and domainspecific RAG models, which promise more reliable, scalable, and context-aware generative AI applications across various fields.

Sl.No	Article	Author	Source	Year
I	Developing a Personality Based Song Recommendation System	*VaibhavBaladhare, Sujata Wankhede, Vaibhav Baladhare, Riya Walde, Vedant Dhande, Isha Gothwad,Rugved Deshmukh*	I-Manager's Journal on Software Engineering Vol: 19, No: 4	2025

Abstract: This paper presents an Emotion-Based Music Recommendation System that utilizes facial expression analysis to provide personalized music suggestions based on a user's real-time emotional state. By integrating computer vision, deep learning, and the YouTube Data API, the system detects emotions such as happiness, sadness, anger, and neutrality, mapping them to appropriate music moods. It further refines recommendations based on user preferences like genre and language, ensuring a customized experience. The system also offers a mood adjustment feature, allowing users to either embrace or alter their emotional state through music. With a secure authentication system and an intuitive user interface, this approach enhances emotional well-being by combining artificial intelligence and music, making recommendations more dynamic, adaptive, and engaging.

Sl.No	Article	Author	Source	Year
2	Machine Learning for Habitable Exoplanet Exploration	*Rohan Kumar*	I-Manager's Journal on Software Engineering Vol: 19, No: 4	2025

Abstract: This research explores the discovery and habitability assessment of exoplanets using advanced computational techniques. A combination of machine learning algorithms, Generative Adversarial Networks (GANs), and MongoDB is employed to process and manage extensive datasets related to exoplanet characteristics. Detection methods such as direct imaging, transit photometry, and radial velocity are integrated, with a particular focus on radial velocity, which identifies exoplanets by measuring Doppler shifts in stellar light and analyzing flux luminosity from space-based signals. Through spectral analysis of these signals, the study forecasts biosignatures—chemical markers vital for evaluating the potential for life. The GAN model generates spectral images that enable predictions of current atmospheric compositions, supporting the estimation of environmental conditions conducive to habitability. A user-friendly web interface presents these findings in an accessible graphical format, making the system both intuitive and informative for researchers and general users. The trained classification model achieved an accuracy of 93.7% in distinguishing habitable from non-habitable exoplanets, while ExoGAN exhibited high fidelity in synthesizing biosignature images across diverse atmospheric profiles. This approach offers a scalable, instrument-agnostic framework suitable for application in upcoming space missions, aiding in the prioritization of potentially Earth-like worlds. The framework also supports real-time updates as new observational data becomes available. Moreover, its modular design allows integration with future astronomical databases and APIs. The methodology ensures adaptability across telescopic platforms and observational conditions. Ultimately, this study bridges the gap between AI-driven modeling and astrobiological discovery, pushing the frontier of life detection beyond the solar system.

Sl.No	Article	Author	Source	Year
3	Leveraging Deep Learning and Grad-CAM for AI-Based Detection and Mitigation of Botnet Attacks in Software-Defined Networks	*Uppe Nanaji , Srivalli Cherukupalli, Ashok Kumar N. V., Uppe Nanaji.*	I-Manager's Journal on Software Engineering Vol: 19, No: 4	2025

Abstract: In recent years, Software-Defined Networks (SDNs) have emerged as a revolutionary approach to network management, offering centralized control and enhanced flexibility. However, this centralized architecture also introduces new security challenges, particularly in detecting and mitigating botnet attacks. Botnets, which consist of compromised devices controlled by malicious actors, can cause significant damage by launching Distributed Denial of Service (DDoS) attacks and other forms of network disruptions. Traditional detection methods frequently fall short in handling the evolving complexity of botnet tactics. This paper presents a novel AI-driven approach for the detection and mitigation of botnet attacks in SDNs using Deep Learning (DL) and Grad-CAM (Gradient-weighted Class Activation Mapping). The proposed method leverages deep learning algorithms to detect botnet traffic patterns, while Grad-CAM is employed to visualize and interpret the decision-making process of the model, improving transparency and enabling better insights into attack behaviors. The integration of these technologies enhances the accuracy and interpretability of botnet detection, allowing for more efficient attack mitigation strategies. Experimental results demonstrate that the AI- driven system significantly outperforms traditional detection methods, providing a scalable, real-time solution for securing SDNs against evolving botnet threats.

Sl.No	Article	Author	Source	Year
4	Access Control Mechanisms for Securing Data during Transmissions	*Manoj, M. Rajya Lakshmi, K. Venkata Srinivasa Bhargav, K. Karthikeya.*	I-Manager's Journal on Software Engineering Vol: 19, No: 4	2025

Abstract: Access control is a critical component of modern information security systems, ensuring the protection of sensitive resources in increasingly complex organizational environments. This study presents the design and implementation of a scalable, flexible, and security-centric access control

system based on Role-Based Access Control (RBAC). The proposed system integrates essential features such as user registration, authentication, RBAC-driven authorization, and secure data handling. To enhance protection, the design employs multiple security layers, including Django's built-in safeguards against SQL injection, CSRF, and XSS, as well as Fernet encryption for sensitive data and OTP-based authentication for strengthened login security. The solution demonstrates strong compliance with web security best practices while maintaining usability and performance. Furthermore, it provides a foundation for future enhancements such as activity tracking, fine-grained authorization, and machine learning integration for access pattern analysis. The results highlight RBAC's effectiveness in managing user permissions, reducing insider threats, and supporting regulatory compliance, making the system suitable for diverse organizational contexts.

Sl.No	Article	Author	Source	Year
5	Advancements and Applications of Artificial Intelligence in Python Programming: Trends, Challenges, and Future Directions	*Anu Thind*	I-Manager's Journal on Software Engineering Vol: 19, No: 4	2025

Abstract: Artificial Intelligence (AI) has rapidly evolved into a cornerstone of technological innovation in the 21st century, transforming sectors such as healthcare, education, finance, transportation, and manufacturing. Simultaneously, Python has emerged as the de facto programming language for AI development, owing to its ease of learning, syntax simplicity, extensive support libraries, and active global community. This paper explores the synergy between AI and Python programming by tracing historical developments, reviewing a variety of practical applications, and analyzing key challenges faced by developers and researchers. The discussion extends to state-of-the-art areas such as explainable AI (XAI), edge AI, federated learning, and the integration of AI with quantum computing. Ethical considerations, computational limitations, and the demand for model transparency are also examined. This comprehensive analysis aims to guide future research and application development in AI using Python, ensuring scalable, inclusive, and responsible innovation.

Sl.No	Article	Author	Source	Year
I	Edge AI-Enabled Dynamic Power Factor Correction using TinyML, Blockchain and IoT for Real-Time Smart Grid Optimization and Industrial Applications	*Krishna Sarker , Prakash Ch. Gochhayat, Md Afam, Sk Md Tanvir Alam, Gaurav K. Mallick, Krishna Sarker, Sayan Paramanik*	I-Manager's Journal on Electrical Engineering Vol: 18, No: 4	2025

Abstract: This work presents a comprehensive design and implementation of an AI-enabled Smart Power Factor Correction (PFC) System that integrates advanced technologies such as Machine Learning (ML), Deep Learning, IoT, Edge Computing, and Blockchain with conventional PFC hardware. The proposed system intelligently compensates reactive power and improves power factor in real time by dynamically switching capacitor banks based on load predictions and power quality analysis. At the hardware level, the system utilizes components such as Arduino Uno, ACS712 current sensor, LM358 op-amp, single-channel relays, and ceiling fan capacitors, while more advanced processing is supported through ESP8266/ESP32 modules for connectivity and Jetson Nano or Raspberry Pi for edge AI inference. The ML algorithms, trained using historical load data and power quality parameters, run either on embedded microcontrollers (TinyML) or edge devices for low-latency decision-making. Additionally, a smart capacitor bank is used to provide fine-grained control over reactive power compensation, and system logs are securely recorded through a lightweight blockchain node to ensure transparency in smart grid environments. The integrated ThingsBoard and Node-RED dashboard enables remote monitoring and real-time analytics for system adaptation and performance tracking. Simulation and hardware results demonstrate a significant improvement in power factor correction accuracy and response time compared to conventional fixed or manually switched capacitor systems. The proposed AI-driven model not only adapts to dynamic and nonlinear load conditions but also reduces over- or under-compensation through predictive switching. Comparative analysis confirms enhanced Total Harmonic Distortion (THD) reduction, power factor stabilization, and improved system resilience under varying load profiles. The integration of AI and smart technologies thus marks a promising advancement toward intelligent, autonomous, and transparent power quality enhancement in next-generation smart grids.

Sl.No	Article	Author	Source	Year
2	Comparative Analysis of MPC and PID Controller for Liquid Level Maintenance in a Coupled Tank System	*Abhishek Vishnoi*	I-Manager's Journal on Electrical Engineering Vol: 18, No: 4	2025

Abstract: In process industries, liquid level control in tanks and flow regulation between interconnected tanks are fundamental yet challenging tasks due to the complexity and dynamic nature of such systems. This paper addresses the need for effective control strategies by comparing the performance of a Model Predictive Controller (MPC) with that of a conventional Proportional-Integral-Derivative (PID) controller in a coupled tank system. MPC has gained significant attention over the past two decades, particularly in the chemical, petrochemical, and metallurgical sectors, due to its ability to handle multivariable systems and incorporate system constraints. In this study, both controllers are implemented to maintain the desired liquid level, and their performances are evaluated using key time-domain metrics, including overshoot and settling time, as well as various performance indices. Simulation results demonstrate that MPC significantly outperforms the PID controller, offering superior dynamic response and robustness under varying operating conditions.

Sl.No	Article	Author	Source	Year
3	Design and Implementation of a Smart Renewable-Powered Electric Vehicle with Intelligent Parking Integration for Sustainable Urban Mobility	*Debaditya Palodhi , Titas Das, Pratipol Mondal, Pushpen Pailan, Achintya Kole, Krishna Sarker, Koustuv Sarkar.*	I-Manager's Journal on Electrical Engineering Vol: 18, No: 4	2025

Abstract: The rapid growth of urbanization and the pressing need for sustainable transportation solutions have led to a surge in innovations around electric vehicles (EVs) and smart infrastructure. This paper presents a novel and integrated prototype of a Smart Solar Electric Vehicle (EV) combined with an Intelligent Parking Management System aimed at transforming urban mobility into a cleaner, safer, and more efficient ecosystem.

The Smart Solar EV utilizes photovoltaic panels to harness renewable energy, supporting an eco-friendly and zero-emission drive. It features advanced microcontroller- based control through Arduino Uno, motor driver modules, ultrasonic and temperature sensors, and wireless connectivity through Bluetooth. A real-time OLED display offers system diagnostics, including battery level, obstacle detection, and thermal conditions. The Smart Parking System is equipped with IR sensors, an LCD interface with I2C communication, and a servo-controlled automated gate, offering real-time vehicle detection, slot availability, and congestion-free operation. This dual-prototype solution not only promotes pollution-free commuting but also provides a robust foundation for smart city integration. The hardware system is designed to be compatible with various energy inputs (solar, battery, and grid), making it versatile and scalable. As a first-of-its-kind integration with low-cost yet high-efficiency components, this work stands as a benchmark in green mobility and intelligent urban planning.

Sl.No	Article	Author	Source	Year
4	Speed Control of BLDC Motor using Microcontroller	*Guruvulu Naidu P., Jyothi M., Sai K., Manikanta B.*	I-Manager's Journal on Electrical Engineering Vol: 18, No: 4	2025

Abstract: Brushless DC motors (BLDC) are becoming increasingly attractive in a large number of applications due to performance advantages such as reduced size and cost, reduced torque ripples, increased torque-current ratio, low noises high efficiency, reduced maintenance and good control characteristics over a wide range in torque–speed plan and precise speed control. This paper focuses on the design and implementation of a BLDC motor speed control system using a microcontroller. The microcontroller generates Pulse Width Modulation (PWM) signals to regulate motor speed, which are supplied to the motor driver to ensure smooth operation and efficient performance. Additionally, motor protection was addressed using temperature sensors, and fire sensors were implemented for safety. This paper involves controlling a BLDC motor's speed using a potentiometer, Raspberry Pi Pico, and a motor driver. The Raspberry Pi Pico generates a Pulse Width Modulation (PWM) signal based on potentiometer input. That signal is given to the motor driver; the motor driver provides a variable voltage to the BLDC motor depending on the PWM duty cycle. The

motor's speed increases/decreases based on the potentiometer's position. The temperature sensor is used for monitoring of overheating in the motor driver and motor.

Sl.No	Article	Author	Source	Year
5	Simulation of Fuzzy Logic Based Single Phase Matrix Converter as an Universal Converter	*Shiek Ruksana , Pavan Kumar Karedla.*	I-Manager's Journal on Electrical Engineering Vol: 18, No: 4	2025

Abstract: The single-phase matrix converter is introduced in this paper as a general-purpose converter for fuzzy logic high- frequency step-down operation. This study introduces a matrix converter that can be utilized as a rectifier, chopper, inverter, or cyclo-converter. Therefore, fewer new or extra converters will be required. The proposed topology was implemented using the fuzzy logic methodology. This work confirms the four conversion procedures of a single-phase matrix converter alone: AC-DC, DC-DC, DC-AC, and AC-AC. The results of the filter and the four converters are shown in this study.

Sl.No	Article	Author	Source	Year
I	Generalized entropy increase verification and corporate earnings management based on decision tree model-	Lijuan Zhang	Journal Of Networking Technology Vol: 16, No: I	2025

Abstract: With the increasing requirements of the financial market, the approval standards for listing on the stock market have become higher, leading to many private enterprises being excluded. As a result, a method called “backdoor listing” has become popular in the financial market for entry. To demonstrate their strength, many companies choose to sign performance commitments before listing, with all employees committing to performance, and then report the final performance commitment to relevant authorities for approval. However, this approach has exposed several

issues, primarily arising from the misalignment between performance commitments and final corporate earnings. Therefore, it is essential to evaluate the performance commitments made by employees scientifically, avoid corporate earnings management, and thereby mitigate the risk of “performance plunge” and “performance cliff” after listing. This study collects large data using data mining and applies cluster analysis to divide performance commitments. Finally, the relationship between employee performance commitments and corporate earnings management impact is identified based on the decision tree model algorithm. The results indicate that unreasonable performance commitments are one of the main reasons for improper corporate earnings management. Using the decision tree model algorithm can make correct decisions to reduce the risks caused by employee performance commitments. The study takes the employee performance commitments and corporate earnings management under the state of mergers and acquisitions as an example to elaborate on this conclusion using the algorithm.

Sl.No	Article	Author	Source	Year
2	Analysis of the legalization and structure construction of muti-modal green Industry Development	*Bing Gao*	Journal Of Networking Technology Vol: 16, No: 1	2025

Abstract: The legalization and structure construction of multi-modal green industry development is a crucial issue in the current context of environmental protection and sustainable development. In this context, this paper explores how to promote the development of green industries by establishing sound legal and institutional systems. Measures such as formulating relevant regulations, strengthening environmental supervision, promoting environmental certification, enhancing talent cultivation, and advancing green procurement are proposed. By improving relevant policies and regulations and strengthening the regulation of various green industries, this approach effectively incentivizes their healthy, stable, and efficient operation, thus achieving dual sustainability in the economic, social, and environmental domains. Additionally, it contributes to enhancing China’s competitiveness and influence in the global environmental protection field.

Sl.No	Article	Author	Source	Year
3	Application of artificial intelligence Neural network technology in the evaluation in universities	*Yexin Shao*	Journal Of Networking Technology Vol: 16, No: 1	2025

Abstract: This paper explores the application of artificial intelligence neural network technology in evaluating university education. Reviewing the latest domestic and foreign research progress shows that traditional evaluation methods suffer from subjectivity and lack of objective data support. The basic principles and successful application cases of neural network technology are elaborated to lay the foundation for its application in evaluating the effectiveness of education in universities. The paper provides a detailed introduction to the application of technologies such as deep learning, natural language processing, and data mining, as well as how to accurately assess the effectiveness of education in universities by constructing models. An experimental design is presented, and the use of data validates the feasibility and effectiveness of the proposed method. This approach is expected to promote education development and improve the quality and level of education in universities.

Sl.No	Article	Author	Source	Year
4	Site analysis of knee joint injuries in games based on deep learning and Fusion networks	*Lixin Wei*	Journal Of Networking Technology Vol: 16, No: 1	2025

Abstract: By applying deep learning, we can better understand knee joint injuries that may occur in ball sports. This method can help us prevent these injuries more effectively and provide better protection for our athletes. This study developed a deep learning technique based on multiple modalities to identify common, major, and meniscus tear injuries, achieving rapid and accurate diagnosis. Additionally, it effectively categorizes the affected organs into different lesions based on their shape, size, and function. Experimental results demonstrated that the model accurately reflects

the changes in the ROC curve, with an AUC change rate of 97.89% in normal anterior cruciate ligament tear or meniscus tear situations, significantly outperforming other methods and providing high accuracy.

Sl.No	Article	Author	Source	Year
I	Navigating scholarly literature with research rabbit: A comprehensive analysis	*MT Basavaraja, S N Rajashekara*	Journal Of Networking Technology Vol: 16, No: 2	2025

Abstract: This paper explores the functionality and effectiveness of Research Rabbit, focusing on personalised citation- based recommendations, interactive visualisations, collaboration tools, and integration with reference management software. Through a detailed analysis, this study evaluates how Research Rabbit streamlines the literature review process, enhancing the efficiency and quality of research. The paper highlights its unique advantages and potential limitations by comparing Research Rabbit to traditional literature search methods and other contemporary tools. The findings suggest that Research Rabbit significantly reduces the time and effort required for literature reviews, enabling researchers to uncover relevant publications that might be overlooked through conventional methods. The personalised and interactive approach of Research Rabbit not only aids in discovering pertinent literature but also fosters collaborative research efforts. This paper concludes with recommendations for researchers and potential directions for future development of literature mapping tools, emphasising the transformative impact of Research Rabbit on academic research workflows.

Sl.No	Article	Author	Source	Year
2	The impact of the Russia-Ukraine war on scientific circles	*Ulle Must*	Journal Of Networking Technology Vol: 16, No: 2	2025

Abstract: What happens thousands of kilometres away from us today affects our daily lives and has global consequences much faster and more acutely than it did, for instance, 100 years ago. Ukraine and Russia have been in a military conflict since February 2014, which escalated into a full-scale Russian aggression war on February 24, 2022. In this paper, we examine the trends in how and to what extent aspects of the Russo-Ukrainian War have been disseminated in scientific circles. Who are the authors in the circle dealing with this topic? Have the different geographical locations affected the focus of research? What fields of research and topics does it cover, and what is the scope of the war's impact?

Sl.No	Article	Author	Source	Year
3	Scientometric mapping of the research productivity of top NIRF-Ranked universities in Delhi	*Gnanasekaran, Vineeta Jain M. Panduranga Swamy, Muruli N*	Journal Of Networking Technology Vol: 16, No: 2	2025

Abstract: Universities worldwide have established ranking programs to evaluate their institutions, making it crucial to study their research productivity. This study aims to map the research productivity of Delhi-based universities that rank among the top in the National Institutional Ranking Framework (NIRF) 2023. Scientometric and bibliometric methods are widely used to study research growth, publication patterns, collaborative performance, citations, etc. Published literature from Delhi technological University, Jamia Hamdard, Jamia Millia Islamia, Jawaharlal Nehru University, and the University of Delhi was collected from the Scopus database covering the last five completed years (2019-2023). The collected data were analyzed using Microsoft Excel and visualized using VOSviewer software. Delhi Technological University leads in publication growth with a 26.02% compound annual growth rate (CAGR) but ranks lowest in citations per paper. Jamia Millia Islamia is in the fourth positing in growth rate but leads in citations per paper (CPP 13.31) and h-index (111). Collaborative works dominate, with 98% of publications from Delhi Technological University and Jamia

Hamdard, 94% from Jamia Millia Islamia, 89.53% from the University of Delhi, and 80% from Jawaharlal Nehru University being collaborative. Preferences for open- access journals vary, with Jamia Hamdard (36.53%), University of Delhi (31.92%), Jamia Millia Islamia (31.59%), and Jawaharlal Nehru University (29.85%) showing higher preferences compared to Delhi technological University (16.35%). The University of Delhi and Delhi Technological University could focus on strategies to improve their citations per paper despite their high publication growth. Encouraging open-access publishing could enhance visibility and impact for institutions like Delhi Technological University. Continued emphasis on collaborative research is recommended to enhance research output and impact further, as demonstrated by the high collaboration

Sl.No	Article	Author	Source	Year
I	Science journalism in the digital Bharat: Envisioning libraries as vanguard in empowering science knowledge among the masses	*Rajesh Singh*	Journal Of Science & Technology Metrics Vol: 6, No: 2	2025

Abstract: In India's rapidly expanding digital landscape, science journalism plays a vital role in connecting scientific advancements with the general public. This study examines the evolving role of libraries in enhancing science journalism within Digital Bharat, highlighting their potential to empower communities with scientific knowledge. Utilizing a qualitative approach, including literature reviews and analyses of both historical and current science journalism practices, the research identifies a significant gap: science journalism constitutes only 3% of content across print, TV, and radio. The findings indicate that despite Indiaâ€™s impressive scientific and technological progress, there is a notable deficiency in effective science communication. Libraries emerge as crucial institutions that can address this shortfall by leveraging their resources and digital capabilities to broaden the dissemination of science content. The study highlights librariesâ€™ role in combating misinformation and promoting accurate science journalism across various digital platforms, and advocates for their involvement in science education by providing accessible and reliable content. This research is original in its focus on the intersection of libraries and science journalism within Digital Bharat, proposing a model for libraries to enhance science

communication. It advocates for a collaborative approach, where libraries, supported by digital media, play a key role in advancing science journalism and supporting a scientifically informed society

Sl.No	Article	Author	Source	Year
2	Microbiology research in India: A Scientometric analysis of research output during 2010-2020	*R. Shyamala, M. Sivamani, M.*	Journal Of Science & Technology Metrics Vol: 6, No: 2	2025

Abstract: The investigation examines the academic output from India between 2010 and 2020, emphasizing the in- crease in research activity, prolific institutions, sub-disciplines, and the leading journals in microbiology. Data for this analysis were collected from Scopus-Expanded using the search terms “Microbiology in India,” “Molecular Biology in India,” and “Immunology and Microbiology in India” for the specified years of 2010-2020. A total of 14,616 records were gathered for this research. The All-India Institute of Medical Sciences in Chandigarh ranked first with the highest publication count (339). Medicine emerged as the leading sub- discipline, followed by Biochemistry, Genetics and Molecular Biology, Immunology, and Microbiology. The Council of Scientific and Industrial Research, India, was responsible for funding the most publications in this area, taking the top spot among funding bodies. The Journal of PLOS ONE was identified as the most favoured journal for researchers in this domain, with Scientific Reports following closely.

Sl.No	Article	Author	Source	Year
3	The Impact of academic degrees on scientific indicators	*F.F Mustafayev, S.H. Jabarov*	Journal Of Science & Technology Metrics Vol: 6, No: 2	2025

Abstract: This study analyzed the impact of degree requirements on academic performance, specifically looking at the requirements for obtaining a scientific degree in the Republic of Azerbaijan and how these requirements affected scientific indicators. The study used data from the "Web of Science," "Scopus," and "Sc imago Journal & Country Rank" databases to analyze statistical data by year and field of science. The findings showed that publishing articles is crucial in improving the country's scientific performance.

Sl.No	Article	Author	Source	Year
I	An analysis of geoscience research papers to identify reproducibility	*Frank O. Ostermann, Daniel Nust, Carlos Granell, Barbara Hofer, Markus Konkol*	Journal Of Information Organization Vol: 15, No: 2	2025

Abstract: Authors and researchers in GIScience encounter computational reproducibility issues similar to those in other fields that utilize computers for data analysis. In this study we evaluate the reproducibility of GIScience research by applying a rubric to assess 75 conference papers presented at the GIScience conference series from 2012 to 2018. Since this rubric and procedure were previously utilized for the AGILE conference series, this paper tries to replicate that analysis while expanding on it by examining and discussing suggested measures to enhance reproducibility specifically within the GIScience conference context. The findings from our assessment of GIScience papers align with earlier results. While the explanations of workflows and the availability of data and software are adequate for clarifying the research, they often fall short of enabling a third party to reproduce the results and conclusions without significant effort. We summarize and modify earlier recommendations to address this issue and urge the GIScience community to intiate a comprehensive dialogue regarding its research's reusability, quality and transparency. Additionally, we offer a critical reflection on evaluating paper reproducibility and present ideas for enhancing future assessments.

Sl.No	Article	Author	Source	Year
2	Data-Driven travel analysis for mobility tracking	*Ye Hong, Yanan Xin, Henry Martin, Dominik, Martin Raubal*	Journal Of Information Organization Vol: 15, No: 2	2025

Abstract: The rise of continuously and passively collected movement data presents fresh opportunities to examine the long-term evolution of personal travel habits from a data -driven standpoint. This research introduces a framework based on clustering to pinpoint travel behavior patterns and identify possible periods of change at the individual level. Initially, we isolate key trips that illustrate distinctive individual movements. Next by considering trip mode, distance and duration dimensions of travel behavior, we assess the similarities among trips and categorize them into clusters through hierarchical clustering techniques. These trip clusters symbolize different aspects of travel behaviours, and the variations in their relative proportions over time indicate shifts in travel preferences. We employ two methods to identify changes in travel behaviour patterns: one based on the Herfindahl-Hirschman index and another utilising a sliding window approach. The framework is validated with data from a comprehensive longitudinal GPS tracking study where participants were offered mobility as a service. The methods effectively reveal notable changes in travel behaviour among users. Additionally, we examine how the Maas offering influences individual travel behaviours based on the detected changes. The Suggested framework for detecting behavioual changes offers significant insights for managing travel demand and assessing individuals' response to sustainable mobility solutions.

Sl.No	Article	Author	Source	Year
3	The role of open access initiatives in shaping the future of Librarianship	*MR Ramesh*	Journal Of Information Organization Vol: 15, No: 2	2025

Abstract: The transformation of the academic landscape through open access (OA) initiatives is redefining the role of librarians. This paper examines the critical importance of OA in enhancing the accessibility and dissemination of scholarly information, and how it reshapes the duties and responsibilities of future librarians. With the proliferation of digital content and the push for democratized knowledge, librarians are transitioning from traditional gatekeepers of information to active facilitators and advocates of OA. This involves developing new skills in digital curation, metadata management, and copyright literacy, as well as fostering collaborations across academic, governmental, and commercial sectors. The integration of OA resources also demands that librarians become proficient in managing institutional repositories and guiding researchers in navigating OA policies and funding mandates. The study underscores that the evolving landscape of OA necessitates a proactive adaptation in ibrarianship, emphasizing continuous professional development and strategic involvement in scholarly communication. Ultimately, this evolution enhances the role of librarians as pivotal agents in promoting equitable access to knowledge, thereby aligning with the core mission of libraries in the digital age.

Sl.No	Article	Author	Source	Year
I	Area of any Quadrilateral from side lengths	*Alan Michael, Gomez Calderon*	I-Managers Journal on Mathematics Vol: 14, No: I	2025

Abstract: In this paper we show that the area of any quadrilateral can be estimated from the four lengths sides. With the Triangle Inequality Theorem and a novel provided diagonal's formula, the boundaries of quadrilateral diagonals are found. Finally, Bretschneider's formula can be applied to find a set of possible areas.

Sl.No	Article	Author	Source	Year
2	A perishable inventory model with variable cycle length having Weibull decay and selling price dependent demand	*C.S.K. Umasankar, Kalesha Vali S., V. Ravindranat*	I-Managers Journal on Mathematics Vol: 14, No: 1	2025

Abstract: An inventory model is presented for deteriorating items with selling price dependent demand having different cycle lengths through assuming the lifetime commodity is random and follows Weibull distribution. In this inventory model, demand is considered as a function of selling price and cycle length of successive replenishment in a planning period. It is also considered that the cycle length in each cycle reduces by arithmetic progression, and shortages are completely backlogged and allowed with feasible cost consideration. The instantaneous state of inventory and total cost function is derived. The optimal ordering and pricing policies of this model are also obtained. In this work, numerical illustrations and sensitive analysis are utilized to observe the sensitivity of optimal values of the ordering and pricing with respect to deterioration parameters and cost. This model also includes several earlier inventory models as specific cases.

Sl.No	Article	Author	Source	Year
3	Design and analysis of LMI for stability and static output feedback control of discrete-time matrix Sylvester system	*Charyulu Romplachaira, Venkata Sundarananda Putcha G.V.S.R Deekshitulu*	I-Managers Journal on Mathematics Vol: 14, No: 1	2025

Abstract: This paper deals with the design of static output feedback (SOF) control for the discrete matrix sylvester system. The design principles of SOF formulation based on the linear matrix inequality (LMI) are expressed in terms of Bilinear Matrix Inequalities (BMIs). Non-convex stability conditions that emerge in the design of SOF control are to be transferred into convex stability conditions by using suitable techniques. This paper presents the results that are necessary to address the convexity problem. This paper also presents a novel approach for the transformation of BMI constraints into LMIs. The developed theory and established results are verified and validated by numerical simulations.

Sl.No	Article	Author	Source	Year
4	Hewer controllability and Kalman controllability of Lyapunov Matrix	*MSVD Sudarsan, Venkata Sundaranand Putcha G.V.S.R Deekshitulu*	I-Managers Journal on Mathematics Vol: 14, No: 1	2025

Abstract: This paper explores the relationship between Kalman Controllability (K-Controllability) and Hewer Controllability (HControllability) of Lyapunov Matrix periodic systems, which have extensive applications in cyber physical systems, power systems, robotics and the analysis and design of control systems. This paper establishes the equivalence of Controllability and H-Controllability of Lyapunov matrix periodic systems through the period of the system and degree of the minimal polynomial of the monodromy matrix of the system.

Sl.No	Article	Author	Source	Year
1	Wolfgang Haken	*Siddhartha Gadgil*	Resonance Vol: 30, No: 1	2025

Abstract: Wolfgang Haken (1928-–2022) was a German American mathematician who made pathbreaking contributions to topology and graph theory, most notably the discovery of an algorithm to recognize the unknot and (with Kenneth Appel) the solution to the four-colour problem. In this article, we outline some of Haken's ideas and results, mainly focusing on his contributions to topology.

Sl.No	Article	Author	Source	Year
2	Interference with (_Pseudo) thermal light: The Hanbury Brown and Twiss Effect	*Km Nitu Rai, Soumen Basak, Subrata Sarangi and Prasenjit Saha*	Resonance Vol: 30, No: I	2025

Abstract: The correlation of light from two sources leads to an interference pattern if they belong to a specific time interval known as the coherence time, denoted as. The relationship governing this phenomenon is, where represents the bandwidth of the light. This requirement is not satisfied, and hence, interference fringes are not observable in the case of ordinary (thermal) light. In the 1950s, Robert Hanbury Brown and Richard Q. Twiss explored interference phenomena using a narrow bandwidth of thermal light. This investigation led to the discovery of the Hanbury-Brown and Twiss effect (or the HBT effect in short), which has since found applications in various fields, particularly stellar observations and quantum optics. This article briefly traces the history of the HBT effect and its applications in various fields, including stellar observations. More importantly, it outlines the basic theoretical framework of this effect, followed by the design and results of the correlation in intensity fluctuation of a pseudo-thermal light in a college laboratory setting (Michelson interferometer).

Sl.No	Article	Author	Source	Year
3	Quantum Tunnelling-What, Where and whatnot	*Vishamittar*	Resonance Vol: 30, No: I	2025

Abstract: In part1 of this two-part article, we present a brief discussion of different aspects of quantum tunnelling through one dimensional rectangular potential barrier, as well as general continuous potential barrier and a summary of some of its applications in chemistry and biology.

Sl.No	Article	Author	Source	Year
4	Tracing the roots of molecular biology: Mendel's laws and chromosomes	*Subhash C Lakhotia*	Resonance Vol: 30, No: I	2025

Abstract: Continuing the examination of the roots of molecular biology, this second article discusses how the cell theory prompted studies on cell division, gamete formation, and embryonic development. It further explores why Mendel's findings on the laws of inheritance in 1865 remained unknown for 35 years, what led to their rediscovery, and how the chromosomes and Mendel's factors got finally connected following a cross-disciplinary understanding of Mendel's laws and chromosome behavior during meiosis. This connection heralded the birth of genetics and cytogenetics.

Sl.No	Article	Author	Source	Year
5	Chemistry behind the mystery of colours of different objects	*Udita Das, Ankita Das, Monirul Islam, Ruhi Dasand Asim K Das*	Resonance Vol: 30, No: I	2025

Abstract: Colors observed are due to various reasons: absorption, emission, reflection, refraction, black body radiation (incandescence), scattering, and nanotechnology (tunable fluorescence emission by the semiconductor quantum dots, iridescent color due to Bragg's diffraction by the photonic crystals, surface plasmon resonance of the plasmonic nanoparticles). These various reasons for the observed color are not illustrated and discussed in a single source, and the nanotechnology-based color is unknown to most undergraduate students. The tutorial review in two parts summarizes and explains all these with suitable examples. Part 1 of this series discussed phenomena like absorption, emission, reflection, and refraction, with examples to explain the reasons behind the observed color in many cases. In part II we will discuss other phenomena like black body radiation, Scattering and nanotechnology of color.

Sl.No	Article	Author	Source	Year
1	Identity and belonging in ADIB KHANS seasonal adjustments	*Sharmistha Saha*	I-Manager's Journal on Humanities & Social Sciences Vol: 5, No: 1	2025

Abstract: Seasonal Adjustments is the debut novel of the Bangladeshi Australian writer Adib Khan. The novel introduces a migrant, Iqbal Chowdhury, who returns his homeland after eighteen years of living in Australia and encapsulates the journey from the moment of his returning home to final resolution to go back to Australia. However, while sketching the journey Khan concentrates on the multilayered conflicts that Iqbal faces following his absence for a long time and shows how belonging to two states simultaneously results in no belonging at all. He also points out how the protagonist fails to anchor his identity in both home and abroad. Being a diaspora writer himself, the author achieves a new perspective through which he plunges into the mental landscape of Iqbal and portrays the internal crisis that continuously battled within his mind. Through examining the dilemmas and confusion that Iqbal goes through in his homeland, this paper attempts to shed light on the identity crisis and lack of belonging that a migrant faces while visiting home.

Sl.No	Article	Author	Source	Year
2	Kerala's model: How female education on drives fertility reduction	*Ismail Thamarasseri*	I-Manager's Journal on Humanities & Social Sciences Vol: 5, No: 1	2025

Abstract: This paper examines the relationship between female education and fertility in Kerala, a state in southern India known for its high literacy rates and significant socio-economic development. It explores the historical context of Kerala's emphasis on education, tracing the contributions of Christian missionaries, princely states, and social reform movements. With a focus on government policies and programmes that have promoted female education, the study delves into how educational attainment among women has influenced fertility rates, particularly through mechanisms like delayed marriage, improved contraceptive use, increased employment opportunities, and empowerment in decision-making. Kerala's Total

Fertility Rate (TFR) of 1.8, below the national average, serves as a case study in demonstrating how education can drive demographic shifts. The socio-economic implications of reduced fertility—ranging from enhanced economic growth and improved maternal and child health outcomes to greater gender equality—are also discussed. Despite these achievements, challenges persist, including socio-economic inequalities and rural-urban divides. The paper concludes by offering policy recommendations to sustain progress in female education and fertility reduction.

Sl.No	Article	Author	Source	Year
3	Analyzing the impact of interactive radio instructions on the national early childhood curriculum in Malawi	*Mugundharajan*	I-Manager's Journal on Humanities & Social Sciences Vol: 5, No: I	2025

Abstract: The educational aspect is centered on the conventional methods of imparting knowledge and various academics. Early Childhood Development (ECD) programmes aim to help children in their early years of life acquire the skills they need to reach their full potential. There is a lot of hope that SSA will reap the rewards of high-quality ECD programmes. Literacy rates, school enrollment, and academic performance all rise in tandem with high-quality Early Childhood Development (ECD) programmes. Although 80% of the world's disabled children reside in developing nations, there are currently limited culturally appropriate developmental assessment tools that can be used in these contexts to promote inclusion, and this study adds to the existing literature by examining how Malawian education standards might be improved through the use of diverse methodologies in Early Childhood Development (ECD) and first grade classrooms.

Sl.No	Article	Author	Source	Year
4	(UN)Imagining incest: Depictions of familial sexual Trauma in select Malayalam films	*Anagha A, Yosaph A. K*	I-Manager's Journal on Humanities & Social Sciences Vol: 5, No: I	2025

Abstract: The stigma associated with intra-familial sexual assault has been so enormous that such issues are largely unrepresented in artistic creations. There have been only a handful of films in the Malayalam movie industry that break the silence surrounding abuse within the family context. The present paper analyses the depictions of incestuous abuse in select Malayalam films. It focuses on representations of father-daughter incest, the stark reality of intra-familial sexual abuse, and the trauma that ensues from such incidents that have not been dealt with the seriousness that it deserves. The young victims of such abuse in society hardly find characters in films with whom they can identify, who share their painful stories of shame and insecurity, furthering their feelings of isolation as they believe that the situation they en-counter has no counterparts. Films, a widely popular entertainment medium, play a crucial role in the value formation of a society. Hence, it is imperative to criticize and counter the misogynistic patterns inherent in depictions of sexual abuse. Realistic and positive portrayals of survivors, their trauma, and agency can significantly alter the societal perceptions of such issues.

Sl.No	Article	Author	Source	Year
5	Health awareness and pracrtices among women: A study on Habits, Health Care, and Challenges	*. Rani, Vijayalakshmi Balasubramanian*	I-Manager's Journal on Humanities & Social Sciences Vol: 5, No: I	2025

Abstract: Health awareness is a crucial determinant of individual and community well-being, influencing behaviours related to personal care, disease prevention, and health-seeking practices. This study examines women's health awareness, habits, and prevalent health challenges, focusing on their self-care practices, awareness of preventive health measures, and lifestyle choices. Utilizing survey data from women across various age groups and occupational backgrounds, this research identifies key factors influencing their health behaviours, including the reliance on traditional

remedies, barriers to professional healthcare, and the impact of cultural norms. Findings highlight that while many women engage in health management practices, inconsistent self-care and delayed medical visits are still common, often due to cultural and financial constraints. This paper suggests tailored strategies for enhancing health education and integrating traditional and modern practices to address specific barriers women face, ultimately aiming to foster more consistent and effective health behaviours.

Sl.No	Article	Author	Source	Year
I	Dorothy Hodgkin's wizardry with crystals and molecules	*Sofia A Khan and Sajesh P. Thomas*	Resonance Vol: 30, No: 2	2025

Abstract: Dorothy Crowfoot Hodgkin's groundbreaking contributions revolutionized structural chemistry and crystallography while reshaping the societal perception of women in science. Her pioneering work in X-ray crystallography decoded some of the most precious secrets of the biomolecular and medicinal world, including the structures of insulin, penicillin, and vitamin B12, for which she was awarded the Nobel Prize in Chemistry in 1964. Her journey—from a young girl fascinated by patterns of symmetry in ancient mosaic floors to becoming one of the most iconic scientific figures of the 20th century—provides an enduring source of inspiration. Glimpses into Dorothy Hodgkin's contributions also underscore the major developments in X-ray crystallography over the last century.

Sl.No	Article	Author	Source	Year
2	Derivation of Planck's Law of radiation by Satyendranath Bose: A brief history of the Orgin of Radiation Formula	*Subha Samanta*	Resonance Vol: 30, No: 2	2025

Abstract: Satyendranath Bose was one of the founding fathers of quantum mechanics, and his pioneering work on the derivation of Planck's law of blackbody radiation completed 100 years in July 2024. In honour of his scientific contributions, this article revisits Bose's work on Planck's law. For complete- ness, a brief history of the origin of Planck's radiation formula is presented here. First, we look at Planck's hypothesis regarding blackbody radiation, followed by Einstein's hypotheses on the emission and absorption of radiation by molecules in the context of the origin of Planck's law. Finally, we present Bose's derivation of Planck's law and its far-reaching consequences. The standard presentation of Bose-Einstein statistics is based on the ideas from Bose's work, which are usually presented as assumptions in most textbooks. The author believes that a presentation of Bose's work in the context of its connection with the prerequisites for Bose- Einstein statistics would be of interest to undergraduate students.

Sl.No	Article	Author	Source	Year
3	Nucleic Acid Therapeutics; Redefining treatment possibilities in modern medicine	*Deo Prakash Chaturvedi, Rajesh Ghangal, Neha Bansal, Sumita Kumari, Kamakshi Chaithri*	Resonance Vol: 30, No: 2	2025

Abstract: Nucleic acid therapeutics has emerged as a transformative approach in modern medicine, leveraging DNA, RNA, and their analogs to modulate gene expression and treat genetic, infectious, and malignant diseases. Major therapeutic strategies include antisense oligonucleotides (ASOs), small interfering RNAs (siRNAs), messenger RNA (mRNA), gene-editing tools, aptamers, and decoy nucleic acids, each employing distinct molecular mechanisms such as gene silencing, RNA stabilization, or epigenetic modifications. Efficient delivery remainsa key challenge, with lipid nanoparticles (LNPs), viralvectors, and conjugate systems being actively explored. This review explores various nucleic acid therapeutics, their

mechanisms, and delivery strategies. Additionally, we have discussed the challenges related to immunogenicity, off-target effects, and ethical considerations that must be addressed to maximize therapeutic impact.

Sl.No	Article	Author	Source	Year
4	Quantum Tunnelling –what, where and whatnot	*Vishwamittar*	Resonance Vol: 30, No: 2	2025

Abstract: In this part of the article, we give a comprehensive review of applications of quantum tunnelling in physics and electronics. Also included is a miscellany of some pertinent remarks.

Sl.No	Article	Author	Source	Year
I	Some Scientific works of Jayant Narlikar	*Ajit Kembhavi*	Resonance Vol: 30, No: 7	2025

Abstract: Jayant Narlikar was a person of many talents. He was a great scientist, author, administrator, institution builder and public communicator. Much has been written about many of the other sides of him, but not so much in recent times about his scientific work, especially from his days in Cambridge when he made seminal contributions over a period of several years. The younger generation, especially, is quite unaware of the work, and it is important for them to become acquainted with it. Much of the work may appear to be dated now, but the sheer brilliance of the ideas and their impact on cosmology and gravitation theory made at that time can be very inspiring.

Sl.No	Article	Author	Source	Year
2	Prof: Narlikar's contribution to Marathi Literature	*Ashish Mahabal*	Resonance Vol: 30, No: 7	2025

Abstract: Jayant Narlikar was a person of many talents. He was a great scientist, author, administrator, institution builder and public communicator. Much has been written about many of the other sides of him, but not so much in recent times about his scientific work, especially from his days in Cambridge when he made seminal contributions over a period of several years. The younger generation, especially, is quite unaware of the work, and it is important for them to become acquainted with it. Much of the work may appear to be dated now, but the sheer brilliance of the ideas and their impact on cosmology and gravitation theory made at that time can be very inspiring.

Sl.No	Article	Author	Source	Year
3	Block-paper –wrappers: A Constrained Optimization problem	*Jyotirmoy Sarkar*	Resonance Vol: 30, No: 7	2025

Abstract: What is the largest-volume rectangular cuboid (henceforth, called a block in this article) that can be completely wrapped with a given rectangular sheet of paper, whose one edge must align with an edge of the cube, without cutting the paper and without leaving any part of the block visible? On the one hand, to make the solution intelligible to younger students, we solve the problem without using calculus. On the other hand, to motivate them to learn calculus, we exhibit how much easier the solution is if one knows calculus.

Sl.No	Article	Author	Source	Year
4	Finding Optimal solutions using direct-adjoint-looping	*Harshit Joshi and Rama Govindarajan*	Resonance Vol: 30, No: 7	2025

Abstract: This article presents 'direct-adjoint-looping' (DAL), showcasing its effectiveness in optimizing nonlinear dynamical systems. It also tries to demystify the oft-heard term: 'singular value decomposition'. The need for optimization in dynamical systems and the use of DAL in achieving it is illustrated through a simple example inspired by fluid dynamics. Given the prevalence of dynamical systems, DAL has universal application across various fields. It is hoped that the reader will try this technique to solve problems that they define for themselves.

Sl.No	Article	Author	Source	Year
5	Human Karyotype	*Rajiva Raman*	Resonance Vol: 30, No: 7	2025

Abstract: An essential requirement of human/medical cytogenetics is the unequivocal identification of each chromosome and its nomenclature. A karyotype is the standard arrangement of the diploid chromosomes of a species. In the Denver Conference in 1956, a standard human karyotype was agreed upon, which classified human chromosomes in 7 groups (A–G) of metacentric, submetacentric, sub telocentric, and acrocentric chromosomes. However, it was soon realized that there was some overlapping of chromosome size and morphology to distinguish one chromosome pair from another, especially in the B, C, and D groups of chromosomes. development of chromosome banding techniques (e.g., G-banding), which differentially stained chromosomes through their length, made it possible to identify each chromosome from all others. Differential staining of the bands led to the development of an International System of Human Cytogenetic Nomenclature (ISCN), which enabled the identification of even small structural changes in the chromosomes. Now that more efficient, electronically based, newer, and more rapid techniques of preparing karyotypes are available, their utility in medical cytogenetics is going to enhance even further.

Sl.No	Article	Author	Source	Year
6	Efficiency of Carnot engine for various representations of Carnot cycles	*Jeet Bhattacharjee, Joy dip Mitra and Satadal Bhattacharyya*	Resonance Vol: 30, No: 7	2025

Abstract: To mark 200 years of Carnot's cycle, we present calculations of the efficiency of Carnot engines for various representations of Carnot cycles drawn with different thermodynamic parameters. We have also mentioned a few possible representations from which the determination of efficiency is inconvenient

Sl.No	Article	Author	Source	Year
7	A Revisit to some of the basic aspects of the reaction rates of thermal chemical reactions and activated complexes	*Anil A Bhalekar and Vijay M. Tangde*	Resonance Vol: 30, No: 7	2025

Abstract: In this article, we illustrate the limitations of expressing rates of reaction in terms of chemical activities instead of concentrations of reactants using the observed effect of the ionic strength on the rates of chemical reaction. We find that the proposal by J. N. Brønsted of including activity coefficients of not only those of reactants but also that of the union of them played a crucial role in the development. The discussion also sheds light on a few basic aspects of activated complexes, which also illustrates the intuitive capacity of Brønsted. We show that the rate constants, corresponding to when rates are expressed in terms of activities, depend on the medium's ionic strength. However, the thermodynamic equilibrium constant, even when expressed as the ratio of the activities-based rate constants of forward and reverse reaction, remains independent of the ionic strength of the medium as it should be. Also, in nonequilibrium thermodynamics, when a chemically reacting system is close to equilibrium, it is shown that the reaction rate is linearly related to its chemical affinity in conformity with the Onsager theory. However, a practicing chemical kineticist generally asserts that the reaction rate does not depend on its chemical affinity but is determined by its Gibbs free energy of activation. We discuss the truth of both these assertions.