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Department of Mechanical Engineering

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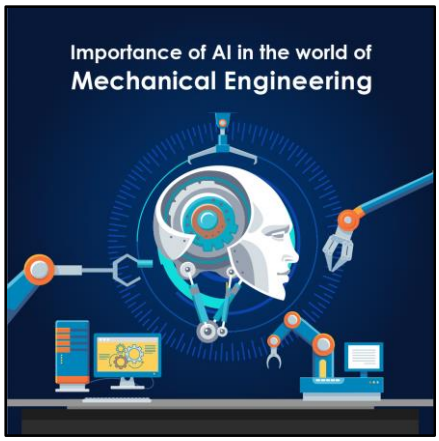
Contents

AI in Mechanical Engineering

Artificial intelligence (AI) is rapidly transforming the field of mechanical engineering. AI tools are being developed to automate tasks, optimize designs, and improve product performance. Here are some of the most common AI tools used in mechanical engineering:



Generative design: AI can be used to generate new design concepts based on a set of requirements and constraints. This can save engineers time and effort, and can lead to more innovative designs.

Finite element analysis (FEA): AI can be used to automate the process of FEA, which is a simulation technique used to predict the behavior of a design under stress. This can help engineers to identify potential problems early in the design process.

Predictive maintenance: AI can be used to analyze sensor data from machines in order to predict when they are likely to fail. This can help engineers to schedule maintenance downtime more effectively and prevent costly breakdowns.

Robot control: AI can be used to control robots that perform tasks such as welding, painting, and assembly. This can improve the efficiency and accuracy of these tasks.

AI-powered CAD tools: These are computer-aided design (CAD) programs that use AI to automate tasks and suggest improvements to designs.

Additive manufacturing (AM) optimization: AI can be used to optimize the design of parts for additive manufacturing, also known as 3D printing. This can help to improve the strength, weight, and cost of 3D printed parts.

These are just a few examples of how AI is being used in mechanical engineering. As AI technology continues to develop, we can expect to see even more innovative applications in the years to come.

Research Projects in Progress from Govt. Bodies

- AICTE project of Prof. V. Chittaranjan Das, and Dr. K. Praveen Kumar on 'Synthesis and Characterization of MWCNT/UHMWPE Nanocomposites for Orthopedic Applications' is in progress.
- A DST-AMT project of Dr. K. Sobha and Dr. S. Radhika on 'Wound Dressing Material Containing Copper Coated Cotton Fabrics and Piezoelectric Electrospun Biopolymer Nano-fibrous Composites' is in progress.

Industrial Research Projects in Progress

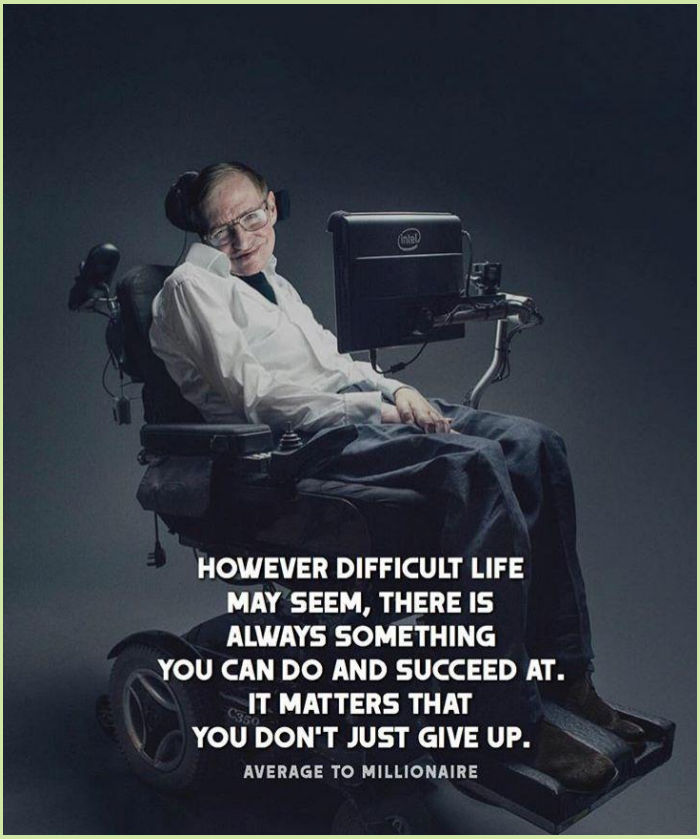
- Research project on 'Mechanical and Electrical Behaviour of Boron and Vanadium Doped Fe-6.5 (Wt. %) Si Soft Magnetic Alloy Ribbons Fabricated by Direct Powder Rolling' of Prof. K. Ravindra, Prof. V. Chittaranjan Das, Dr. K. Praveen Kumar, K.Snehita is in progress.
- Research project on 'Improvement of COP of air-conditioning systems by using different types of Insulations and nano-compressor oil' of Prof.N.V.V.S.Sudheer, Prof.B.Ramgopal Reddy, Dr.V.Tarachand, and Dr.Md.Hasheer is in progress.
- Research project on 'Investigation on performance improvement methods of the transformer using nanofluids in the perspective of cooling' of Prof.G.Srinivasarao, Prof.C.Srinivas, Dr.K.Balaprasad, Dr.N.Govind, Ms. Sneha.H.Dhoria is in progress.
- Research project on 'Evaluation and optimization of process parameters for agitation in concrete mixing' of Dr.C.Tarasasanka, Dr. S. Radhika, and J.P. Karthik is in progress.
- Research proposal on 'Development and characterization of Boron & amp; vanadium doped fe-6.5(wt.%) Si soft magnetic alloy ribbons with Tio2 coatings' by Prof.K.Srinivas, Prof.D.V.V.KrishnaPrasad, Dr.G.Chaitanya, Dr.V.RamaKoteswara Rao, J.Rangaraya Chowdary is in progress.
- Research proposal on 'Influence of Heat Treatment on the Characterization of Alumina reinforced AZ91 Mg Alloy Metal Matrix Composites' of Ch.Devaraj, Dr. M. Vijaya, Dr.A.Muddu, Dr.G. Kishore Chowdari and K.Hari Prasad is in progress.
- Research project on 'Optimization of selective laser melting (SLM) process parameters using Taguchi and super ranking concepts to produce Ti-6Al-4V alloy samples' of Dr.R.Sreenivasulu,Dr.D.Swapna,K.L.Chaitanya,Dr.D.Kondalarao,Y.N.V.Sairam, T.N.S.RamaKrishna is in progress

Internal Research Projects Completed

- Research project 'Performance evaluation of nickel coated alumina reinforced AZ91E magnesium composites for alloy wheel applications' of Ch.Devaraj is completed.
- Research project on 'Experimental Investigation of herbal based nano cutting fluids with MQL in optimization of turning' of Dr. D. Kondalarao and Prof. G. Srinivasarao was completed on March 2023.

Patents Published

- V. Praveena, Chowdam Sreedhar, S.Syed Enayathali, M.Anil, N.Govind, 'An artificially intelligent method for detailed estimation of road undulations using aerial images', Patent Application No. 202241048785 A, 2023.
- P.Suresh Kumar, Ramesh Kumar, 'Heat engine operated by solar energy', Application No.365734-001, Jan.9,2023.
- P. Suresh Kumar, Sarnanan, 'Incorporation of electric preheating and oil distribution in IC engine', Application No.202341027813 A, May, 5, 2023.
- P.Suresh Kumar, Polepogu Rajesh, Anumala Vijayasankar, Manda Rajarao, Prasanthi Kumari Nunna, Mallapuram Bala Chennaiah, V.Muralidhar, Saladi Durga Mahesh, Sompalli Vijay Kumar, Shaik Susan Kajal, 'A nanorobotic arm to operate in the endoscopy', Application No. 202341037699 A, May, 31, 2023.
- P.Suresh Kumar, Rongali Aneel Kumar, S. Sagar Imamhi 'A system and method for context-based simulation models using IOT for improved analysis', Application No. 202341025666 A, May, 26, 2023.
- Sivasubramanian, P.Santhosh Kumar, Prema Kumar, B.Sudheer Kumar, P.C.Krishnamachary, P.Suresh Kumar, M.Sudhakar, 'Ultra-lightweight natural fiber composites for aerospace applications' Application No. 202321032319 A, June,16, 2023.



Research Paper Publications

- K.Srividya, S.Pichi Reddy, K.Hari Prasad, T.N.S.Rama Krishna, K.Snehita, U.Sai Pranay, Y.N.V.Sairam, 'Optimization of process parameters for preparation of lanthanum hexa-aluminate powders using combinatorial approach of Taguchi-GRA and ACO methods', Annales de Chimie - Science des Matériaux, Vo;.47(1),43-50, Feb.2023, https://doi.org/10.18280/acsm.470106 (WOS,Scopus).
- C.Srinivas, D.Rognatha Rao, 'Influence of Nano-SiC reinforcement during laser cutting of magnesium AS21-Bimodal SiC composites', Advances in Materials and Processing Technologies, March 2023, https://doi.org/10.1080/2374068X.2023.2189678 (SCIE)
- M.Swetha, B.Ramgopal Reddy, 'Wear resistance of stellite-6/TiC coating on stainless steel 316L produced by laser cladding process', Annales de Chimie Science des Matériaux,Vol.47(2),75-80,April,2023. https://doi.org/10.18280/acsm.470203. (WOS)
- V. Kanchana, P. Manoj Kumar, P. Suresh Kumar, I. Kathir, R. Thirumalai, D. Priya, R. Puviarasi, M. Mohan Prasad, 'Investigating underground water salinity in the east coastline of Tamil Nadu, India and improving its quality through solar assisted desalination', Urban Climate, https://doi.org/10.1016/j.uclim.2023.101440. (SCIE).
- Yellapragada Naga Venkata Sai Ram, Venkata Sai Kumar Madala, Sameer Kumar Devarakonda, Raqheeb Sadiq Mahaboob Ali Shaik, Nageswara Rao Annamdasu, D.Kondala Rao, Hasheer Shaik Mohammad, 'Application of Taguchi–PCA/GRA Method to optimize the wear behaviour of polyester/carbon fibre composites', Journal of Composite & Advanced Materials/Revue des Composites et des Matériaux Avancés 33(2),65–73,April,2023. https://doi.org/10.18280/rcma.330201 (Scopus, WOS).
- G.Ravindiran, M.Raja, N.Govind, S.Satheesh Kumar, Nabil al-zaqri, Ahmed Boshaala, 'Prevention of groundwater contamination from pollutants released from dyeing industries using biochar produced from palm shell', Urban Climate, Vol.49, May,2023, https://doi.org/10.1016/j.uclim.2023.101515 (SCIE)
- J.Lakshmi Jayanthi, P.Rohinikumar, Sneha.H.Dhoria, J.Subbarao, M.Vijay, J.Gouthami, 'Efficient Removal of fluoride using sol-gel processed nano magnesium oxide', Chemical methodologies, June 2023. https://doi.org/10.22034/chemm.2023.393347.1671 (WOS)
- G.Chaitanya, Reddy Sreenivasulu, 'A review on magneto rheological fluids and their applications', Sigma Journal of Engineering and Natural Sciences, Vol. 41(3), 613–624, June, 2023, https://doi.org/10.14744/sigma.2023.00064 (Scopus)
- V.Lokesh, T.Basava, B.Ramgopal Reddy, Ch.Suneetha, N.Govind, M.Vijay, A.Chandrashekhar, Abdul razak, 'Glass fiber-epoxy composites with carbon nanotube fillers for enhancing properties in structure modeling and analysis using artificial intelligence technique',2023. https://doi.org/10.1021/acsomega.3c01067 (SCIE)
- P.Mastan Rao, Ch.Siva Sankara Babu, P.Nageswara Rao, M.Vijaya, Sneha. H. Dhoria, Ch.Deva Raj, J.Ranga Raya Chowdary, and K.Praveen Kumar, 'Effect of graphite on mechanical and tribological properties of Al6061/SiC hybrid composites', Annales de Chimie - Science des Matériaux,June,2023. https://doi.org/10.18280/acsm.470301 (WOS, Scopus)
- B.Purna Chandra Sekhar, K.Srinivas, B.Chandu, 'Green synthesis of graphene-hydroxyapatite nanocomposites with improved mechanical properties for bone implant materials', https://doi.org/10.1016/j.matchemphys.2023.127331. (SCIE)

Engineering is the closest thing to magic that exists in the world.

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- B.Purna Chandra Sekhar, K.Srinivas, Syed Akhil, B.Hari babu, B.Chandu, 'A Comprehensive review on novel graphene-hydroxyapatite nanocomposites for potential bioimplant applications', Chemistry select, https://doi.org/ doi.org/10.1002/slct.202204585 (SCIE)
- K.Srinivas, V.V.Bhaskar, and S.B.R.Devireddy, 'A computational micromechanical approach to predicting young's modulus of continuous banana and palmyra fiber-reinforced epoxy composites', International Journal of Computational Materials Science and Engineering, 12(2), 2023. (WOS, Scopus)
- K.Srinivas, K.L.Chaitanya, 'Evaluation of Mechanical Behaviour and Effect of Particle size on Lm26/Gr metal matrix composite', Suranaree Journal of Science and Technology, 30(1), 2023. (Scopus)
- Itha Veeranjaneyulu, V.Chittaranjan Das, K.Srikanth 'Investigation of mechanical properties and microstructure of AZ31-SiC-Graphite hybrid nanocomposites fabricated by bottom pouring-type stir casting machines', Advances in Materials Science and Engineering, Vol.2023, https://doi.org/10.1155/2023/3402348. (Scopus).

- C.Srinivas, Rognatha Rao, 'Influence of Process Parameters on Microstructure and Mechanical Properties of AS21-SiC Composites through two-step stir-casting', Silicon Vol.15(2), 813-827, 2023, https://doi.org/10.1007/s12633-022-02046-2 (SCIE).
- G.Srivalli, K.Ravindra, V.Tarachand, K.BalaPrasad, 'Investigation of regenerative gas turbine performance under the influence of dynamic atmospheric conditions in India using energy and exergy analysis', International Journal of Heat and Technology, Vol. 41(2), 369-375. https://doi.org/10.18280/ijht.410210 (WOS)
- Ganji, V. R, A.Chaparala, S.Radhika, 'Shuffled shepherd political optimization based deep learning method for credit card fraud detection', Concurrency and Computation: Practice and Experience, e7666. https://doi.org/10.1002/cpe.7666. (Scopus)
- Kiran Relangi, N.D.S.S, Chaparala, A.Sajja, 'Effective groundwater quality classification using enhanced whale optimization algorithm with ensemble classifier', International Journal of Intelligent Engineering and Systems,Vol.16(1),214–223,2023. https://doi.org/10.22266/ijies2023.0228.19 (Scopus)
- MuktiTomar, M.Sunitha, N.Hemalatha, V.Ramakoteswara Rao, M. Ravi Kumar, 'Design of PID, FLC and sliding mode controller for 2-DOF robotic manipulator: A Comparative Study', International Journal of Mathematical, Engineering and Management Sciences, https://doi.org/10.33889/IJMEMS.2023.8.1.006. (Scopus)
- J.P.Karthik, C.Raguraman, C.Tara Sasanka, 'Reliability-based design of propeller and Rushton impellers for maximizing the overall heat transfer coefficient in coal gasification', Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy, https://doi.org/10.1177/09576509231172817.(SCIE)

Book Chapters Published

- M.V.A.Ramakrishna, K.Srinivas, 'Analysis of thermal fields, weld strength and micro structural studies of friction stir dissimilar weldments of AA6082 and AA7075', Key engineering materials,934,139–151, https://doi.org/10.4028/p-e4uahg.
- Mahindra Guptha, S. Radhika, B. Sateesh, M. Pavan Aditya, J.Sai Lokesh, 'An intelligent garbage management system: An IoT based Application', Advanced Engineering Optimization through Intelligent Techniques. Lecture Notes in Mechanical Engineering. Singapore, April, 2023. https://doi.org/10.1007/978-981-19-9285-8_40.
- Sampath Boopathi, Praveen Kumar Siva Kumar, Radhey Shyam Meena, J.Samson Isaac, P.Suresh Kumar, M. Sudhakar, 'Sustainable developments of modern soil-less agro- cultivation systems', 2023. https://doi.org/10.4018/978-1-6684-4118-3.ch004

Webinar Organized

- Mr.S.S.Dileep Kumar, a technical Architect- Power steering Systems at Nissan motors Co Ltd, Tokyo, Japan delivered an online webinar on 'Upskilling : new product development from concept to market launch', as a part of Jan Bhagidari (G20) in collaboration with the Ministry of Skill Development & Entrepreneurship, APSSDC to the Mechanical engineering students on 15, June, 2023.

Student Activities/Chapters

- A team of 25 students won overall second prize with a cash prize of Rs.20,000/- in the Go-kart championship organized by stepcone 2023, conducted in GMRIT, 24,25 Jan. 2023. The team was coordinated by J.P. Karthik and G.R.N Chowdary.
- A team of 30 students from Mechanical, Electrical, Electrical and Electronics Engineering departments took part in the E-BAJA 2023, Chitkara University, Baddi, Himachal Pradesh in collaboration with SAE India, 05-09 April, 2023.The team was coordinated by J. Ranga Raya chowdary and J.P.Karthik.

Paper Presentations in Conferences

- V.Ramkoteswara Rao, 'Microstructure, mechanical and tribological properties of AA7075- Al2O3-SiC metal matrix composite', International Conference on Advances in Materials, Mechanics, Mechatronics and Manufacturing, April 15-16, 2023.
- K.Hari Prasad, 'Performance and emission analysis of single cylinder four-stroke engine using Diethyl Ether with n-Butanol blends and fish oil', National Conference on Engineering applications of alternate fuels, sustainable Energy and bio-materials, Annamalai university, April 27-28, 2023.
- D.Kondala Rao, 'Investigation into the combined influence of inclination and partial fins on phase change material melting in a rectangular enclosure utilizing computational fluid dynamics', International conference on Emerging trends in Mechanical Engineering and Industrial automation, Narasaraopet Engineering College, June 9-10, 2023.

Workshops/FDP's Attended

- Mohammad Hasheer Shaik, T.N.S.Ramakrishna, online FDP in the domain of 'AUTO (4 Wheeler)', APSSDC-SIEMENS Center, RVRJCCE, 30 Jan. - 11 Feb, 2023.
- Mohammad Hasheer Shaik, T.N.S.Ramakrishna, online FDP in the domain of 'AUTO (2 Wheeler)', APSSDC-SIEMENS Center, RVRJCCE, 3-5, Feb. 2023.
- N.Govind, one week online FDP, 'Challenges and advances in upstream oil and Gas Industry', Dept. of Petroleum Engineering, Amity University and Human resource development centre, Feb, 06-11, 2023.
- Sneha.H.Dhoria, one week online faculty development programme, 'Application of artificial intelligence & machine learning in Mechanical Engineering', Department of ME, Seshadri rao Gudlvalleru Engineering College,6-10 March, 2023.
- M.Vijaya, one day program, 'Aspire a self-programming into redefining Efficacy', Alumni Cell & NSS units, 10, March 2023.
- Sneha.H.Dhoria, one week online FDP, 'Process Modeling, Simulation, Control and optimization',Dr.B R Ambedkar NIT Jalandhar, Punjab, 23-27, March 2023.
- D.V.V.KrishnaPrasad, 7 day national level online FDP 'Outcome based education', Nirmala College, Kerala state higher education council, Muvattupuzha, May, 10-17, 2023.
- Sneha.H.Dhoria,'World Environment day', Institute for environment conservation Advocacy, June 2023.
- K.Balaprasad, one week FDP, 'Advancements in Mechanical Engineering', Department of Mechanical Engineering, LBRC, Mylavaram, 19-24,June,2023.
- K.Snehita, 2 weeks FDP, Karyashala High-End Research Training Programme under SERB accelerated vigyan program GOI – 'Material Science in Additive Manufacturing', Department of ME, NIT Warangal, 12 - 18, June 2023

Ph.D Awarded Under Faculty Guidance

- Under the guidance of Prof. Kolla Srinivas, Vennapusa Vijayabhaskar was awarded Ph.D on 7 Feb, 2023 by ANU. The title of the thesis was 'An Experimental and Micromechanical Study on Physical, Mechanical and Thermal properties of Banana- Palmyra fiber reinforced Polymer Composites'.
- Under the guidance of Prof. V.Chittaranjan Das, RVRJCCE, two Ph.D's were awarded

1. Gonda Siva Karuna, on 19, April, 2023 from ANU. The title of the thesis was 'Optimization of machining characteristics of age-hardened AA2024 hybrid composite reinforces with nano red mud and flyash'.
2. Karumuri Srikanth on May, 10, 2023 from ANU. The title of the thesis was 'Development and characterization of Zrb2 ceramic reinforced Aluminium- magnesium -Zinc (Al-mg-Zn) alloy composites'.

- Under the guidance of Prof. C. Srinivas, Jush kumar Siddani was awarded Ph.D on 8 Feb, 2023 by ANU. The title of the thesis was 'Experimental Investigation and Analytical Verification of Titanium 31 Characteristics by Using Micro Electric Discharge Machining Drilling'.

Faculty Retirement

- Faculty members and supporting staff of Mechanical Engineering are delighted to have Prof. V. Chittaranjan Das for support and goodwill for 36 years to the organization. His journey began as a lecturer on 10-08-1987 and concluded with his well-deserved retirement as a Professor on 31-05-2023.

Professor K. Ravindra retired as Principal of RVRJCCE in November 2022, and assumed charged as Director Academics and Research & Development, from January 1 2023.