KUSHAGRA AGRAWAL

Curriculum Vitae

Faculty of Science & Engineering
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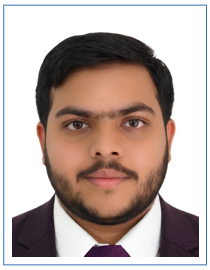

Education

2022–2026 **B.Tech. in Computer Science Engineering**, *KIIT Deemed to be University*, India.
GPA: 9.64/10 | Top 0.5% of the Cohort

2026–2028 **M.S. in Computer Science**, *Åbo Akademi University*, Turku, Finland.
Erasmus Mundus Joint Master's Programme (EDISS) | Erasmus Mundus Scholar

Research Experience

Jul 2025 – Aug 2025 ***Taipei Medical University & National Tsing Hua University (Taiwan)***.
AI for Biomedical Systems and Healthcare Innovation
Developed AI-driven solutions for biomedical applications, focusing on advancing healthcare innovation through data-driven methodologies. Contributed to the development of a battery-free pacemaker system and conducted research on prosthetic arm movement using Electromyography (EMG) signals.
Advisors : Dr. Yen Lin Sung, TMU & Dr. Ting Wei Wang, NTHU

May 2025 – Jul 2025 ***MIDAS Lab, IIIT Delhi (Remote)***.
Multi-Agent Systems for Automated Code Analysis and Repair
Developed the Faulty Patch Agent for hotspot detection and identification of bug-prone regions using Git history analysis. Designed and integrated six specialized agents into a unified multi-agent Python framework for automated repository analysis and LLM-driven patch generation.
Advisor : Dr. Rajiv Ratn Shah, IIIT Delhi

May 2025 – Jun 2025 ***Defence Research & Development Organisation (DRDO) – DYSL-AI (Bengaluru)***.
Large Language Model Systems for Defense Applications
Designed and optimized Large Language Model-based tools for defense-oriented applications under a confidential project, focusing on system efficiency, reliability, and domain-specific adaptation.
Advisor : Mr. Sunny Manchanda, DRDO:DYSL-AI

Jul 2024 – Oct 2024 ***Indian Statistical Institute (ISI), Kolkata***.
Predictive Maintenance using Machine Learning
Developed a predictive maintenance model using Random Forest classifiers and multi-output strategies to forecast equipment failures, achieving prediction accuracy up to 98%. Conducted extensive data analysis and modeling over 120+ hours, generating actionable insights for system reliability improvement.
Advisor : Mr. Sandip Bhattacharya, Aunwesha Knowledge Technologies Pvt. Ltd.

Jul 2024 – Aug 2024 ***IEEE Silchar Subsection***.
Deep Learning for CMOS Rectifier Design
Conducted deep learning-based experimentation for CMOS rectifier design, deriving insights to support advancements in semiconductor system design under guided research mentorship.
Advisor : Dr. Taimoor Khan, NIT Silchar

Publications

Journal Articles

2026 Pritam Chakraborty, Anjan Bandopadhyay, Kushagra Agrawal, Jin Zhang, and Man-Fai Leung. Indisegnet: Real-time semantic segmentation for unstructured road scenes in intelligent transportation systems. *Intelligent Systems with Applications*, page 200629. Elsevier, 2026. IF = 4.3.

2026 Kushagra Agrawal, Navneet Kumar, Anurag Singh, Chungui Lu, and Man-Fai Leung. Artificial intelligence in food and nutrition science: a paradigm-centric review of computational frameworks and system-level integration. *Food & Function*. Royal Society of Chemistry, 8 2026. IF = 6.3.

2025 Kushagra Agrawal, Polat Goktas, Navneet Kumar, and Man-Fai Leung. Artificial intelligence in personalized nutrition and food manufacturing: A comprehensive review of methods, applications, and future directions. *Frontiers in Nutrition*, volume 12, page 1636980. Frontiers, 2025. IF = 5.1.

2025 Kushagra Agrawal, Polat Goktas, Maike Holtkemper, Christian Beecks, and Navneet Kumar. Ai-driven transformation in food manufacturing: A pathway to sustainable efficiency and quality assurance. *Frontiers in Nutrition*, volume 12, page 1553942. Frontiers, 2025. IF = 5.1.

In Conference Proceedings

2026 Kushagra Agrawal, Nisharg Nargund, and Oishani Banerjee. Optimization of latent-space compression using game-theoretic techniques for transformer-based vector search. In *International Conference on Distributed Computing and Intelligent Technology*, pages 377–389. Springer Nature Switzerland Cham, 2026.

2026 Kushagra Agrawal and Nisharg Nargund. Neural orchestration for multi-agent systems: A deep learning framework for optimal agent selection in multi-domain task environments. In Sushmita Mitra, Sriparna Saha, Bijaya Ketan Panigrahi, Sudeep Sarkar, and Santanu Chaudhury, editors, *Pattern Recognition and Machine Intelligence (PReMI 2025)*, volume 16357 of *Lecture Notes in Computer Science*, pages 513–521. Springer, Cham, 2026.

2026 Kushagra Agrawal, Christian Beecks, and Man-Fai Leung. The token tax: Measuring the diminishing returns of test-time compute in agentic pipelines. In *Second Workshop on Agents in the Wild: Safety, Security, and Beyond*, 2026.

2025 Kushagra Agrawal, Anindita Basak, Abhishek Raj, and Aakarsh Singh. Quantitative evaluation of hazard mitigation strategies in a 5-stage risc-v pipeline: A benchmark-driven analysis using fibonacci and prime sieve. In *2025 IEEE 32nd International Conference on High Performance Computing, Data and Analytics Workshop (HiPCW)*, pages 82–89, 2025.

2025 Kushagra Agrawal, Oishani Banarjee, and Polat Goktas. Trust-aware game-theoretic allocation for secure and efficient iot-edge systems. In *2025 First International Conference on Intelligent Computing and Systems at the Edge (ICEdge)*, volume 1, pages 1–7. IEEE, 2025.

2024 Kushagra Agrawal, Amlana Panda, and Ashok Kumar Sahoo. Advancements in tool wear monitoring in turning operations: digital image processing and ai techniques. In *Journal of Physics: Conference Series*, volume 2818, page 012040. IOP Publishing, 2024.

2024 Kushagra Agrawal and Nisharg Nargund. Deep learning in industry 4.0: transforming manufacturing through data-driven innovation. In *International conference on distributed computing and intelligent technology*, pages 222–236. Springer Nature Switzerland Cham, 2024.

2024 Kushagra Agrawal, Polat Goktas, Biswajit Sahoo, Sujata Swain, and Anjan Bandyopadhyay. Iot-based service allocation in edge computing using game theory. In *International conference on distributed computing and intelligent technology*, pages 45–60. Springer Nature Switzerland Cham, 2024.

2024 Kushagra Agrawal and Anjan Bandopadhyay. Optimizing resource allocation in quantum networks through game theory. In *International Conference on Trends in Computational and Cognitive Engineering*, pages 229–243. Springer Nature Singapore Singapore, 2024.

2023 Kushagra Agrawal and Navneet Kumar. Artificial intelligence innovations: Inception of new horizons in food processing sector. In *2023 IEEE Silchar Subsection Conference (SILCON)*, pages 1–8. IEEE, 2023.

Book Chapters

2026 Kushagra Agrawal, Pracheeta Gupta, Kshitij Krishna, Seba Mohanty, and Sugyanta Priyadarshini. *Behavioural Analytics and Natural Language Processing for Data-Driven Business Insights*, pages 95–116. Bentham Science Publishers, 2026.

2026 Kushagra Agrawal and Navneet Kumar. Novel agricultural techniques: an artificial intelligence and machine learning approach. In *Dietary, Sensory and Gastronomic Applications*, pages 39–61. Elsevier, 2026.

2026 Kushagra Agrawal, Polat Goktas, and Navneet Kumar. From detection to decision: Applied ai and ml techniques in food quality monitoring and process optimization. In *Artificial Intelligence in Food Science*, pages 555–570. Elsevier, 2026.

2026 Kushagra Agrawal and Polat Goktas. Ai-driven demand forecasting in industry 4.0: Techniques, applications, and future trends. In *Engineering Applications of AI for Demand Forecasting*, pages 1–27. CRC Press, 2026.

2025 Kushagra Agrawal, Muhammet Anil Yagiz, and Polat Goktas. Ai/ml techniques for enhancing iot-based communication. *AI and ML Techniques in IoT-based Communication: A Path to Sustainable Development Goals*, pages 33–58. Wiley Online Library, 2025.

2025 Kushagra Agrawal and Navneet Kumar. Computer vision in agriculture: Object detection, recognition, and image segmentation techniques and advanced image analysis. *Computational Intelligence and Image Processing in Agriculture: Applications and Innovations*, pages 31–54. John Wiley & Sons, Inc. Hoboken, NJ, USA, 2025.

2025 Kushagra Agrawal and Navneet Kumar. Artificial intelligence and machine learning in agriculture: Novel techniques, implementation strategies, and application. *Computational Intelligence and Image Processing in Agriculture: Applications and Innovations*, pages 55–72. John Wiley & Sons, Inc. Hoboken, NJ, USA, 2025.

2025 Kushagra Agrawal and Navneet Kumar. Ai-ml applications in agriculture and food processing. In *Food and Industry 5.0: Transforming the Food System for a Sustainable Future*, pages 21–37. Springer Nature Switzerland Cham, 2025.

2025 Kushagra Agrawal and Polat Goktas. How large language models transform urban planning and shape tomorrow's cities. *Large Language Models for Sustainable Urban Development*, page 185. Springer Nature, 2025.

2025 Kushagra Agrawal, Cyrine Abid, Navneet Kumar, and Polat Goktas. Machine vision and deep learning in meat processing: Enhancing precision, safety, efficiency, and sustainability - a comprehensive survey. *Innovative Technologies for Meat Processing*, pages 170–210. CRC Press, 2025.

Accepted Papers

2026 Translating the Translator: Decomposing the Cost of English-Forced Inter-Agent Communication
Accepted at *REALM: The 2nd Workshop for Research on Agent Language Models* at *EMNLP*, 2026, and to appear in the *ACL Anthology*.

2026 AWRAF: An Energy-Aware Adaptive Weight-Based Resource Allocation Framework for IoT
Accepted at *International Joint Conference on Neural Networks (IJCNN)*, 2026 (A Category).

2026 Structured Hallucinations in Small Language Models: Repeatability, Attention Signatures, and Context Contagion
Accepted as an Oral Presentation at the *IEEE International Conference on Intelligent Systems and Technologies (ICIST)*, 2026.

Intellectual Property Rights

2025 Kushagra Agrawal, Methodological Framework for Equity-Focused Nutrition Recommendation System, Indian Patent (IN), Application No. 202531001573A, published in the Indian Patent Journal, Jan 17, 2025.

Projects

Oct 2024 – Dec 2024 **Personalized AI Nutrition Chatbot**.
Developed a healthcare-focused conversational AI system addressing access inequality by integrating socio-economic indicators (Gini index, per capita income) using K-Means clustering (92% accuracy). Generated personalized nutrition recommendations from a curated dataset of 100+ food items.

Jul 2024 – Oct 2024 **Predictive Maintenance Analytics**.
Designed a Random Forest-based machine learning model on the AI4I Predictive Maintenance dataset to forecast and interpret machine failures, improving fault detection with explainable insights.

Apr 2024 – Aug 2024 **Fine-Tuning LLMs on CPU (Intel Unnati Program)**.
Optimized a Large Language Model for story generation using Intel OneAPI toolkits, enabling efficient CPU-based inference for resource-constrained environments.

May 2023 – Sep 2023 **Medicinal Leaf Detection Model (Smart India Hackathon 2023)**.
Engineered a CNN-based image classification model for medicinal plant identification using advanced computer vision techniques, achieving high-precision detection.

Technical Skills

Programming	Python, C, Java, CUDA, MATLAB, Bash, JavaScript
Machine Learning	TensorFlow, Keras, PyTorch, Scikit-learn, Transformers, BERT, NLP Pipelines
Data & Analytics	Pandas, NumPy, SQL, PowerBI, Tableau, Excel
Cloud Platforms	AWS, Google Cloud Platform, Microsoft Azure, Oracle Cloud, IBM Cloud
Systems & Tools	Linux, Docker, Git, LaTeX, Verilog
Web Technologies	HTML, CSS, JavaScript

Fellowships & Awards

2026 **Erasmus Mundus Joint Masters Scholarships (EMJM)**, European Union – Awarded full scholarships for EDISS (Engineering of Data-Intensive Intelligent Systems) and CoDAS programs, and a DEAI partial scholarship; ultimately selected **EDISS**.

2026 **IEEE Computational Intelligence Society (CIS) Travel Grant**, IEEE CIS – Awarded a competitive travel grant of USD 1,200 to support participation in the IEEE World Congress on Computational Intelligence (WCCI 2026).

2025 **KIIT Student Achiever Award**, KIIT University – Recognized for outstanding academic and research contributions.

2025 **IIPP Internship Scholarship**, National Science and Technology Council (Taiwan) – Awarded international research funding (60,000 NTD) for internship at Taipei Medical University.

2025 **Best Paper Award (1st Position)**, Student Research Symposium, ICDCIT 2025 – Competitive international recognition.

2024 **Best Paper Award (1st Position)**, National Conclave on Viksit Bharat 2047 – Theme: Making AI for India.

2023 **Best Poster Award (3rd Position)**, National Conference on AI & IoT in Agriculture and Food Industry 4.0, NIT Rourkela.

2022 **KIITEE Merit Scholarship**, KIIT University – Awarded for academic excellence (INR 10,000/month).

Academic Service & Volunteering

2024 – Present **Peer Reviewer** — Reviewing manuscripts for international journals and conferences in artificial intelligence, machine learning, and applied systems.

Elsevier Intelligent Systems with Applications

Springer Complex & Intelligent Systems; Multimedia Tools and Applications; Journal of Food Science and Technology

Frontiers Frontiers in Nutrition; Frontiers in Sustainable Food Systems; Frontiers in Artificial Intelligence

IEEE IEEE Transactions on Computational Social Systems; IEEE Transactions on Intelligent Transportation Systems; International Joint Conference on Neural Networks (IJCNN)

Prestigious Conf. Second Workshop for Research on Agent Language Models- EMNLP 2026

Other PReMI 2025 – Pattern Recognition and Machine Intelligence (IIT Delhi)

Summer School / Training / Workshops / Certifications

Jul 2026 **Cambridge Ellis Unit Summer School on Probabilistic Machine Learning**, *ELLIS Cambridge Unit, **University of Cambridge**, United Kingdom*.
Selected participant.

Jul 2026 **CVIT Summer School on Artificial Intelligence**, *Centre for Visual Information Technology (CVIT), IIIT Hyderabad*.

Jul 2024 **CVIT Summer School on Artificial Intelligence**, *Centre for Visual Information Technology (CVIT), IIIT Hyderabad*.

Jun 2024 **Machine Learning for Biomedical Signal Processing**, *ABV-Indian Institute of Information Technology and Management*.

Jul 2024 **Machine Learning for Communication & Networking**, *ABV-Indian Institute of Information Technology and Management*.

Dec 2024 **Quantum Computing: Circuits, Algorithms, and Machine Learning (QuCAM)**, *National Institute of Technology, Rourkela*.

Jul 2025 **Oracle OCI AI Foundations Certification**, *Oracle Inc.*.

Jul 2024 **Oracle OCI Generative AI Certification**, *Oracle Inc.*.