COMPUTER VISION RESEARCH LAB (CORL)

About the Centre:

The Computer Vision Research Lab is envisioned to be one of the best Center of Excellence Computer Vision Research and Developments. Over the last few of years, Artificial Intelligence (AI) and Computer Vision (CV) have changed from a technology with potential to a capability of national importance across the world. While CV has the potential to transform a wide range of sectors, adoption till date has been driven primarily from various sector. The real power of CV with AI, though, lies in its transformative potential to address massive societal challenges and provides a global leadership opportunity for India in creating human-centric, foundational technologies and digital infrastructure that reimagines implementation and delivery in 21st century. SVECW-CoRL is giving utmost importance to develop the research facility focused towards various research activities in the areas related to Computer Vision and Intelligence Systems Technologies. CoRL is a core research facility focused towards various research activities in the areas related to Image Processing, Video Processing, Artificial Intelligence, Machine Learning, Deep Learning, 5G/6G Communications and Language Technologies.

Vision:

To establish a global research facility dedicated to solving complex challenges in computer vision through advanced AI approaches, with a strong focus on sustainable development. The center aims to drive innovation and empower student-led incubations to build intelligent systems that contribute to real-world impact.

Mission:

- To conduct cutting-edge research in computer vision and artificial intelligence, addressing real-world challenges across sectors such as healthcare, agriculture, education, and smart mobility.
- To nurture innovation and entrepreneurship by supporting student-led projects and incubations that translates research into sustainable and scalable intelligent solutions.
- To foster interdisciplinary collaboration and global partnerships that accelerates the development and application of AI-driven computer vision technologies in alignment with the Sustainable Development Goals.

- To build a vibrant learning ecosystem that equips students and researchers with the skills, tools, and mindset needed to lead advancements in AI and create meaningful societal impact.

Objectives:

- ✓ To cultivate a culture of academic excellence and innovation through strategic collaborations with industry, research institutions, and international universities.
- ✓ To investigate and develop novel algorithms, models, and frameworks for solving complex problems in computer vision, with a focus on real-world applications.
- ✓ To support students in transforming research ideas into working prototypes or products and startups through mentorship, technical guidance, and incubation support.
- ✓ To attract external research grants and publishes in reputed journals and conferences to contribute to the global AI and computer vision community.

Research Areas*:*

- Precision Agriculture and Aquaculture
- Speech Processing
- 5G/6G Communications
- Health Care and Medicine
- Industrial Automation
- Intelligent Smart Cities

Center Members

Dr. K. Padma Vasavi	Research Faculty
Dr. M. Venkata Subbarao	Research Faculty
Dr. M. Prema Kumar	Research Faculty

Student Achievements

India Mobile Congress 2024

- Name of the Student: Ms. V. Sushmitha

- **Award:** Best Idea Award at Indian Mobile Congress 2024
- **Prize:** ₹50,000
- **Presented by:** Dr. Pemmasani Chandrasekhar, Hon'ble Minister of State for Rural Development & Communications

5G/6G Hackathon Organized by Department of Telecommunication

- Name of the Student: Ms. V. Sushmitha
- **Award:** 3rd Prize at IIIT Hyderabad
- **Project Focus:** AI-driven Predictive Maintenance for Automotive Industry

DST-GDC I-Ncubate Program – IIT Madras

- **Name of the student:** Y. Harsha Sri (Co-Founder, EdgeYentra AI Tech Solutions)
- **Program Duration:** 8 Weeks (Dec 2024 to Feb 2025)
- **Focus:** Deep-tech product validation and business development under DST and GDC, IIT Madras

IEEE YESIST12 – 2025 Global Finals (Malaysia)

 Team 1: AI-Based Fire Detection

- **Members:** Puja Tripura Vutukuri, Satya Sreeja Mirthipati, Dakshayani Pedasingu, Leena Pasupuleti
- **Achievement:** Selected as one of the few Indian teams for the global finale
- **Venue:** IEEE UKM Student Branch, **Malaysia** | **Date:** August 23–24, 2025

 Team 2: AI-Based Early Mental Health Detection

- **Members:** Thuvvapati Venkata Naga Sri Harika, Tadi Pravallika, Yarabolu Malleswari, Pecheti Kumari
- **Achievement:** Selected under Special Track – Direct Entry for global finals

ShrimpX – Selected for SELCO Foundation Catalyse Tech 2025 (Incubation Presentation Round)

- **Project:** AI-powered precision aquaculture system with underwater cameras and smart aeration
- **Team Members:** Sindhu Yesilanka, Sravya Valluri, Rohitha Bolla, Aasritha Penumatsa
- **Impact:** Targets 50% reduction in shrimp mortality and resource optimization
- **Selection:** Presentation round for incubation under SELCO's sustainability-driven innovation program

L&T Techgium 2023 – National Finals

- **Project Title:** *AI-Enhanced Road Image Annotation for Semantic Segmentation and Scenario Labelling*
- **Team Members:** T. Navya Yasaswini, P. Jaswini, Md. Neha Taslim, S. Gowthami
- **Mentor:** Dr. M. Venkata Subbarao
- **Achievement:** Top 32 out of 4400+ teams nationwide | Only team from Andhra Pradesh
- **Venue:** L&T TechPark, Bangalore | **Date:** 8–9 May 2024

L&T Techgium 2023 – Semi-Finals (POC Round)

- **Selected Teams & Projects:**
  - *Intelligent Radiologist Assistant (Knee MRI)* – Rishitha L., Sai Girija G., Pravallika G., Joswitha P.
  - *Vehicle & Passenger Safety from Confined Waterlogging* – J.T.S. Sindhu, A.D.S. Nanditha, G. Loshmi, Ch. Harshita
  - *Image Semantic Segmentation* – S. Gowthami, Md. Neha Taslim, P. Jaswini, T. Navya Yasaswini

AT Makeathon – January 2024

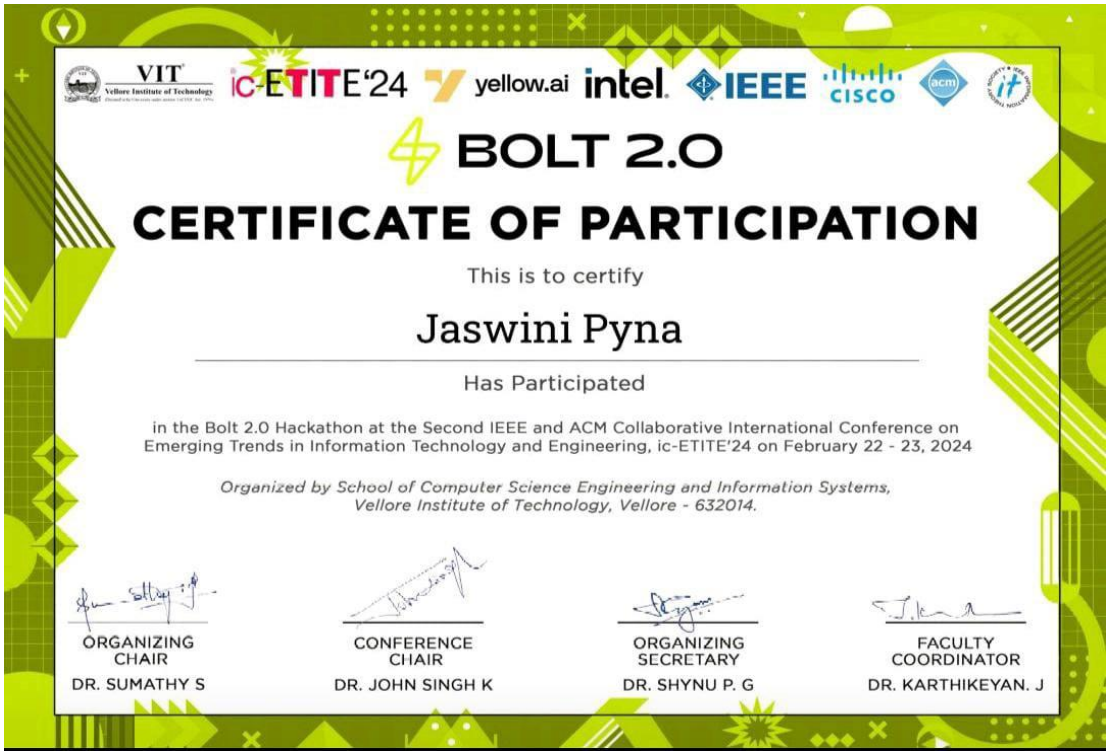
- **Name of the Student:** Ms. Sri Satyasai Himasri Penmetsa
- **Focus:** AI based Assistive Technology Innovation
- **Recognition:** Finalist in national-level hardware design challenge organized by IITM

PALS InnoWAH 2023 – Finals

- **Project:** *AI-Based Fault detection in Civil and Mechanical Structures*
- **Team Members:** Medicherla Shravani, Narukula Harika Satya Sindhu, Patnala Sai Sneha and P. Shravani
- **Achievement:** Finalists of PALS InnoWAH Innovation Challenge 2023 organized by IITM

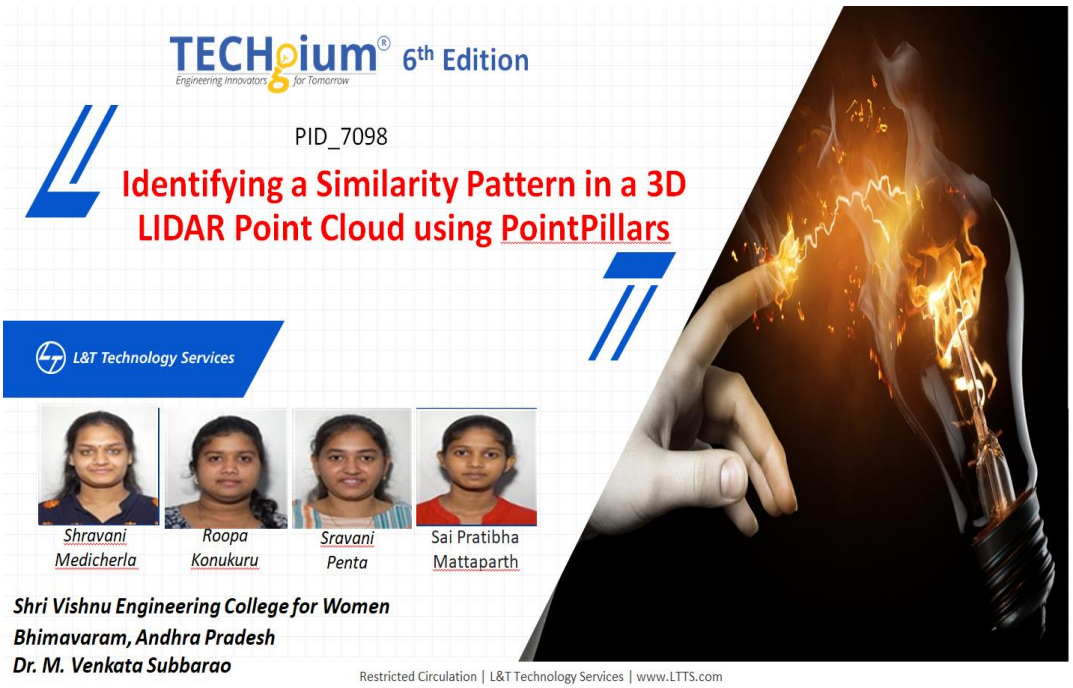
Bolt 2.0 Hackathon – VIT Vellore (IEEE & ACM ic-ETITE'24)

- **Team Members:** T. Navya Yasaswini, P. Jaswini, Md. Neha Taslim
- **Theme:** Real-time AI-enabled solutions for patient health monitoring
- **Event Date:** February 22–23, 2024
- **Achievement:** Finalists of Bolt 2.0 Hackathon organized by VIT Vellore



L&T Techgium 2022 – Semi-Finals (6th Edition)

- **Project Title:** *Identifying a Similarity Pattern in a 3D LIDAR Point Cloud using PointPillars*
- **Team Members:** Shravani Medicherla, Roopa Konukuru, Sravani Penta, Sai Pratibha Mattaparthi
- **Achievement:** Selected for the POC (Proof-of-Concept) Round under **L&T Techgium 6th Edition**, demonstrating advanced AI applications in 3D perception and autonomous systems using **PointPillars on LIDAR point cloud data**.



Research Publications:

[1] Girish Kumar, D., Joseph, C., & Venkata Subbarao, M. (2024). Transformer-based adaptive 3D residual CNN with sparse representation for PAN-sharpening of multispectral images. International Journal of Remote Sensing, 46(3), 1053–1085. https://doi.org/10.1080/01431161.2024.2424508 (**SCI, IF:3**)

[2] G. Challa Ram, M. Venkata Subbarao, N. K. Maurya, and S. Yuvaraj, "Tunable graphene-based terahertz sensor for biochemical sensing with ML-driven refractive index prediction," *Physica Scripta*, vol. 100, no. 2, p. 025531, Jan. 2025, doi: 10.1088/1402-4896/adac12. (**SCI, IF:2.1**)

[3] G. Challa Ram, M. V. Subbarao, N. K. Maurya, and S. Yuvaraj, "A dual functional SSPP based microwave sensor for detecting volumetric concentration of alcohol mixtures and paper thickness," *AEU Int. J. Electron. Commun.*, vol. 196, p. 155796, 2025, doi: 10.1016/j.aeue.2025.155796. (**SCI, IF:3**)

[4] Kumar, D.G., Joseph, C. & Subbarao, M.V. Constrained Optimization Guided Approach for Multispectral and Panchromatic Image Fusion. J Indian Soc Remote

Sens 52, 1259–1267 (2024). https://doi.org/10.1007/s12524-024-01876-4 (**SCI, IF: 2.2**)

[5] M. Venkata Subbarao, G. Challa Ram, et.al, "Machine Learning Algorithms For Erythemato-Squamous Disease Classification: Feature Rankings And Performance Analysis", Proceedings on Engineering Sciences, Vol. 06, No. 4 (2024) 1741-1750, doi: 10.24874/PES.SI.24.03.009. **(Scopus)**

[6] G. Challa Ram, M. Venkata Subbarao, et.al, "Novel Microwave Sensor For Enhanced Biochemical Detection And Prediction Through Machine Learning For Industrial Applications", Proceedings on Engineering Sciences, Vol. 06, No. 4 (2024) 1711-1718, doi: 10.24874/PES.SI.24.03.001. **(Scopus)**

[7] M. Venkata Subbarao, G. Challa Ram, D. Ramesh Varma, D. Girish Kumar, M. Prem Kumar,"Automatic Fault Detection in Industrial Smart Grids Using KNN and Ensemble Classifiers," El-Cezerî Journal of Science and Engineering (ECJSE), vol. 10, no. 2, pp. 240–252, 2023. **(Scopus)**

[8] Kumar, M.P., Krishnammal, N., Gupta, M. et al. Sustainable Agriculture in Food Security Integrating Satellite Data Risk Assessment by Cyberattack Detection: AI Applications. Remote Sens Earth Syst Sci 8, 435–443 (2025). https://doi.org/10.1007/s41976-025-00194-8 **(Scopus)**

[9] Kumar, M.P, et al. Remote Sensing–Based UAV Imaging in Heat Pattern Analysis Impact on Climate Change Detection Using Fuzzy Stacked Lasso Elastic-Net Model. Remote Sens Earth Syst Sci 7, 699–708 (2024). https://doi.org/10.1007/s41976-024-00158-4 **(Scopus)**

[10] M. P. Kumar et al. Smart Agriculture-Based Food Quality Analysis with Healthcare Security System Using Cloud Machine Learning Model. Remote Sens Earth Syst Sci 7, 389–398 (2024). https://doi.org/10.1007/s41976-024-00131-1.

[11] M. P. Kumar et al., "Industrial IoT Smart Manufacturing Systems based on Cloud Computing Energy Efficiency Analysis using Machine Learning Algorithms," 2025 International Conference on Electronics and Renewable Systems (ICEARS), Tuticorin, India, 2025, pp. 634-638, doi: 10.1109/ICEARS64219.2025.10940573. **(Scopus)**

[12] M. Venkata Subbarao, et al.,. (2025). Prediction of Attention Deficient Hyperactivity Disorder from Multi-dimensionality Dataset Using Machine Learning Techniques. In: Simic, M., Bhateja, V., Azar, A.T., Lydia, E.L. (eds) Smart Computing Paradigms: Advanced Data Mining and Analytics. SCI 2024. Lecture Notes in Networks and Systems, vol 1262. Springer, Singapore. https://doi.org/10.1007/978-981-96-1981-8_44.

[13] M. Venkata Subbarao, et al., "Integrated Deep Learning Approach for Parkinson's Disease Detection using MRI and Handwriting Analysis", Algorithms in Advanced Artificial Intelligence, CRC Press, 2025. DOI: 10.1201/9781003641537-79.

[14] G. Kumar D, R. Varma D, V. S. M and C. Ram G, "Real-Time Object Detection in High-Resolution Videos using Pan-Sharpening and CNNs*," 2024 International Conference on Emerging Research in Computational Science (ICERCS), Coimbatore, India, 2024, pp. 1-5, doi: 10.1109/ICERCS63125.2024.10895463.

[15] D. R. Varma, M. Venkata Subbarao, G. Challa Ram, D. Girish Kumar, N. Madhu and T. Naga Sharmila, "Deep Learning Architectures for Accurate Target Detection in Synthetic Aperture RADAR," 2024 International Conference on Integrated Intelligence and Communication Systems (ICIIICS), Kalaburagi, India, 2024, pp. 1-7, doi: 10.1109/ICIIICS63763.2024.10860058.

[16] D. G. Kumar, G. Harish, M. V. Subbarao, G. C. Ram, D. R. Varma and E. R. P. Kumar, "A Compact CNN Architecture for Detection and Classification of Cotton Leaf Diseases," 2024 International Conference on Integrated Intelligence and Communication Systems (ICIIICS), Kalaburagi, India, 2024, pp. 1-6, doi: 10.1109/ICIIICS63763.2024.10859957.

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[18] M. V. Subbarao, et al., "CaptionCraft: VGG with LSTM for Image Insights," 2024 1st International Conference on Trends in Engineering Systems and Technologies (ICTEST), Kochi, India, 2024, pp. 1-6, doi: 10.1109/ICTEST60614.2024.10576172.

[19] Venkata Subbarao, M. et al., (2024). Detection of Leaf Black Sigatoka Disease in Enset Using Convolutional Neural Network. In: Zen, H., Dasari, N.M., Latha, Y.M., Rao, S.S. (eds) Soft Computing and Signal Processing. ICSCSP 2023. Lecture Notes in Networks and Systems, vol 840. Springer, Singapore. https://doi.org/10.1007/978-981-99-8451-0_26.

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[21] D. G. Kumar, C. Joseph and M. V. Subbarao, "Pansharpening of Multispectral Images using Deep Learning Architectures: Trends & Future Directions," 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), Salem, India, 2023, pp. 411-417, doi: 10.1109/ICAAIC56838.2023.10140431.

[22] G. C. Ram, M. V. Subbarao, D. R. Varma and A. S. Krishna, "Enhanced Deep Convolutional Neural Network for Identifying and Classification of Silicon Wafer Faults in IC Fabrication Industries," 2023 International Conference on Wireless Communications Signal Processing and Networking (WiSPNET), Chennai, India, 2023, pp. 1-6, doi: 10.1109/WiSPNET57748.2023.10133996.

[23] V. Ravuri, M. V. Subbarao, T. S. Kumar, T. S. Kavitha, D. R. Sandeep and L. Dangeti, "Multi-Cancer Early Detection And Classification Using Machine Learning Based Approaches," 2023 Third International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT), Bhilai, India, 2023, pp. 1-7, doi: 10.1109/ICAECT57570.2023.10117816.

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[29] G. C. Ram, S. Yuvaraj, M. V. Subbarao and P. S. Sneha, "CSRR Integrated Microwave Sensor for Analyte Dielectric Sensing," 2023 3rd International Conference on Mobile Networks and Wireless Communications (ICMNWC), Tumkur, India, 2023, pp. 1-5, doi: 10.1109/ICMNWC60182.2023.10435882.

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[32] Venkata Subbarao, M., et al., (2023). Performance Analysis of 5G Micro-Cell Coverage with 3D Ray Tracing. In: Bhateja, V., Mohanty, J.R., Flores Fuentes, W., Maharatna, K. (eds) Communication, Software and Networks. Lecture Notes in Networks and Systems, vol 493. Springer, Singapore. https://doi.org/10.1007/978-981-19-4990-6_35.

[33] Venkata Subbarao, M., Terlapu, S.K., Geethika, N., Harika, K.D. (2022). Speech Emotion Recognition Using K-Nearest Neighbor Classifiers. In: Shetty D., P., Shetty, S. (eds) Recent Advances in Artificial Intelligence and Data Engineering. Advances in Intelligent Systems and Computing, vol 1386. Springer, Singapore. https://doi.org/10.1007/978-981-16-3342-3_10

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[35] Venkata Subbarao, M., Pravallika, C., Ramesh Varma, D., Prema Kumar, M. (2022). Power Quality Event Classification Using Wavelets, Decision Trees and SVM Classifiers. In: Saini, H.S., Singh, R.K., Tariq Beg, M., Mulaveesala, R., Mahmood, M.R. (eds) Innovations in Electronics and Communication Engineering. Lecture Notes in Networks and Systems, vol 355. Springer, Singapore. https://doi.org/10.1007/978-981-16-8512-5_27.

[36] Venkata Subbarao, M., Sudheer Kumar, T., Chowdary, P.S.R., Chakravarthy, V.V.S.S.S. (2022). Brain Tumor Classification Using Decision Tree and Neural Network Classifiers. In: Bhateja, V., Khin Wee, L., Lin, J.CW., Satapathy, S.C., Rajesh, T.M. (eds) Data Engineering and Intelligent Computing. Lecture Notes in Networks and Systems, vol 446. Springer, Singapore. https://doi.org/10.1007/978-981-19-1559-8_41.

[37] Prema Kumar, M., Veer Raju, V., Venkata Subbarao, M., Rajesh Kumar, P. (2022). Weighted Averaging PSO-Based SWT Method of Image Fusion for X-Ray Mammograms . In: Satapathy, S.C., Bhateja, V., Favorskaya, M.N., Adilakshmi, T. (eds) Smart Intelligent Computing and Applications, Volume 2. Smart Innovation, Systems and Technologies, vol 283. Springer, Singapore. https://doi.org/10.1007/978-981-16-9705-0_53.

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[39] M. P. Kumar et al., "Deep learning for diabetic retinopathy detection and classification Using Long Short-Term Memory (LSTM)," 2024 4th International Conference on Data Engineering and Communication Systems (ICDECS), Bangalore, India, 2024, pp. 1-7, doi: 10.1109/ICDECS59733.2023.10502810.

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Emerging Technology (INCET), Belgaum, India, 2024, pp. 1-4, doi: 10.1109/INCET61516.2024.10593400.

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Images using Deep Neural Networks," 2023 Second International Conference on Electronics and Renewable Systems (ICEARS), Tuticorin, India, 2023, pp. 955-960, doi: 10.1109/ICEARS56392.2023.10085273.

Major Equipment in the Lab:

1. High Performance Computing systems 3 Units

- ✓ Specifications: Lenovo M70S Desktop
- ✓ Processor: Intel i7, 12th Gen
- ✓ Memory: 32 GB RAM
- ✓ Storage: 512GB SSD + 1TB HDD
- ✓ Graphics: NVIDIA 2 GB Graphic card
- ✓ Operating System: Windows 11 Pro

2. NVIDIA Jetson Nano Developer Kits & Accessories

- ✓ NVIDIA Jetson Nano Developer Kits (Standard + Starter Bundle) – 3 Units
- ✓ JetBot AI Kit (Based on NVIDIA Jetson Nano)
- ✓ Vision & Camera Modules
  - Sony IMX219-200 Camera – 200° FOV, 8 MP – 2 Units
  - Stereo Camera (Sony IMX219-83, 8MP Binocular) – 2 Units
  - Barcode Scanner Module (1D/2D USB) – 2 Units
- ✓ Accessories & Interfaces
  - 10.1" Capacitive Touch LCD Screen
  - Nextion NX1060P101 10.1" HMI Display

3. Raspberry Pi Boards & Accessories

- ✓ Raspberry Pi 4 Model B – 8GB - 14 Units
- ✓ Arducam 5MP RPi Compatible Cameras - 14 Units
- ✓ Raspberry Pi Accessories Kits (64GB Card, HDMI, Power, Casing) - 14 Units
- ✓ Aurdino Uno & Nanos - 20 Units
- ✓ ESP 32 Module - 20 Units
- ✓ Various Sensors & Accessories

Events Organized:

Ac. Year	Name of the Value-Added Course	Duration	Number of Students Participated	Key Topics Covered
2023–24	Machine Learning for Real-World Problems: From Algorithms to Applications	July 2023 – Sep 2023	25	- Data Preprocessing & Feature Engineering - Supervised Learning: Predictive Modeling - Unsupervised Learning

				& Clustering - Model Evaluation Techniques
2023-24	Deep Learning and Its Applications & Edge Computing	Dec 2023-Feb 202	25	- Introduction to Neural Networks - Convolutional Neural Networks (CNN) - Deep Learning Frameworks - Model Deployment Strategies -Edge Computing
2024–25	Machine Learning for Real-World Problems: From Algorithms to Applications	13 June – 30 August 2024	20	- Data Preprocessing & Feature Engineering - Supervised Learning: Predictive Modeling - Unsupervised Learning & Clustering - Machine Learning Deployment & Real-World Applications