**Department of Computer Engineering**

Project Achievements (2022–2025)

1. Year-wise Publications and Patents (2022–23, 2023–24, 2024–25)

| Academic Year	Journal Publications	Conference Publications	Patents
2022-2023	6	10	1
2023-2024	4	6	0
2024-2025	5	5	2
Total	**15**	**21**	**3**
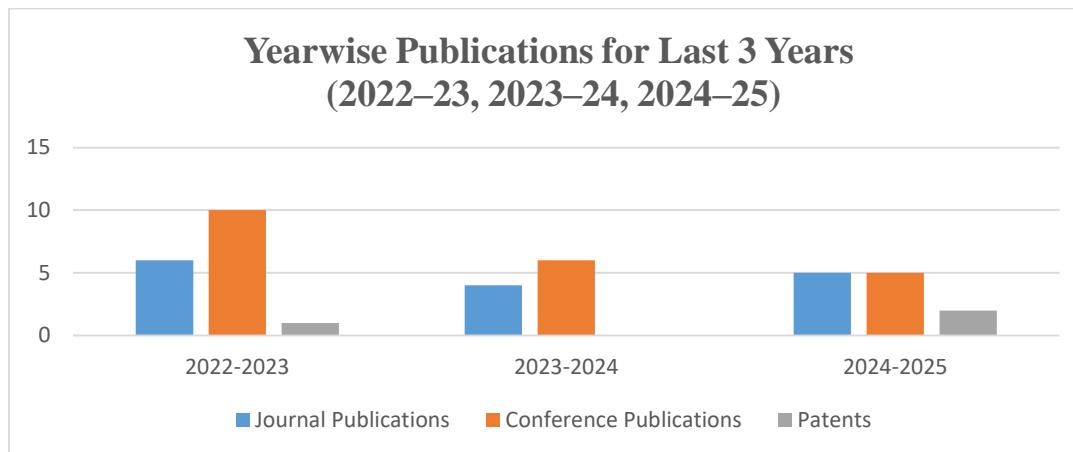
2. Cumulative Research Output (Last 3 Academic Years)
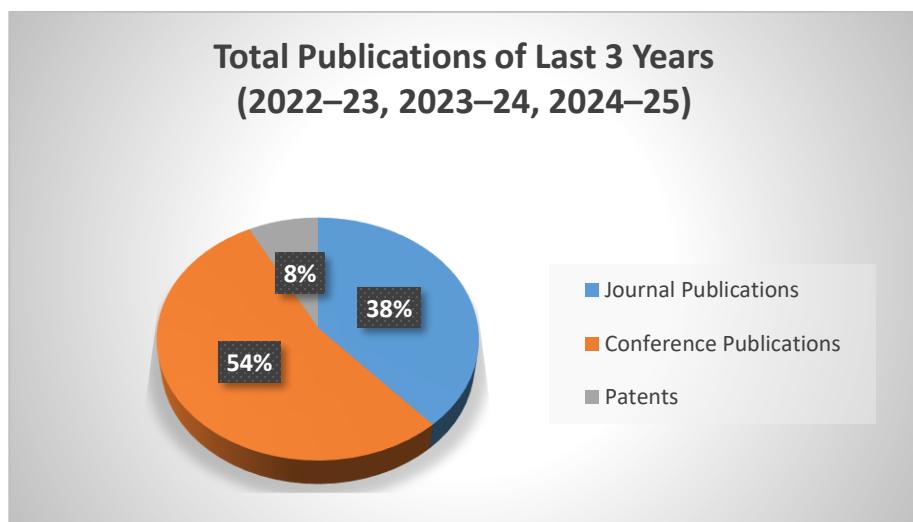
3. National vs. International Publications

Academic Year	National	International
2022-2023	2	14
2023-2024	1	9
2024-2025	1	9
Total	**4**	**32**

National Vs. Intenational Publications for Last 3 Years (2022–23, 2023–24, 2024–25)

	2022-2023	2023-2024	2024-2025	Total
National	2	1	1	4
International	14	9	9	32
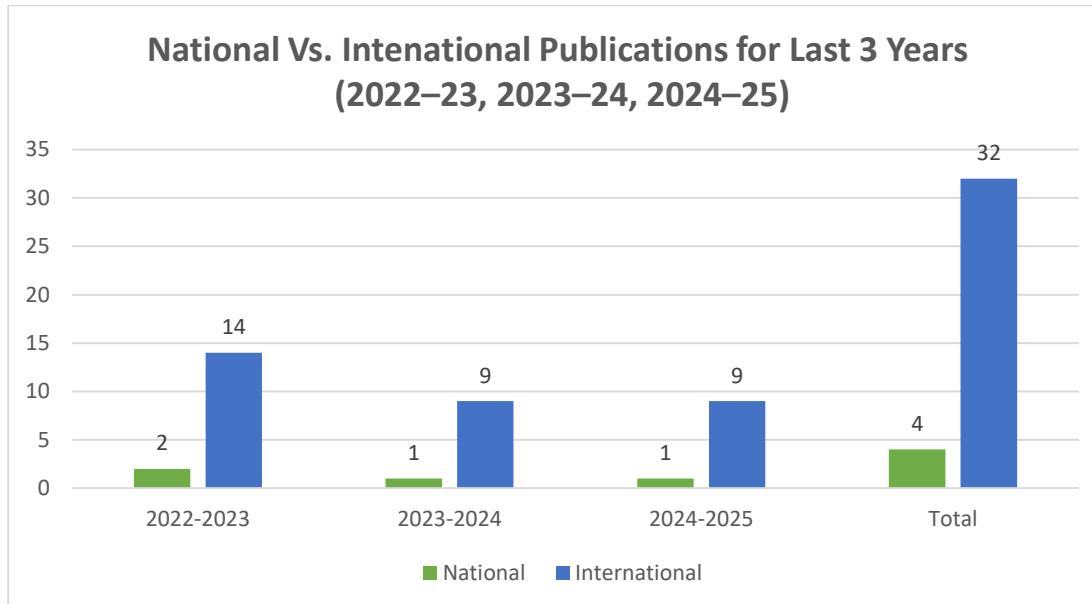
4. Indexed Publications (Quality Indicators)

Academic Year	Indexing			
	Scopus	Web of Science	UGC	Others
2022-2023	10	2	1	1
2023-2024	5	0	1	3
2024-2025	4	0	1	0
Total	19	2	3	4

Indexed Publications for Last 3 Years (2022–23, 2023–24, 2024–25)
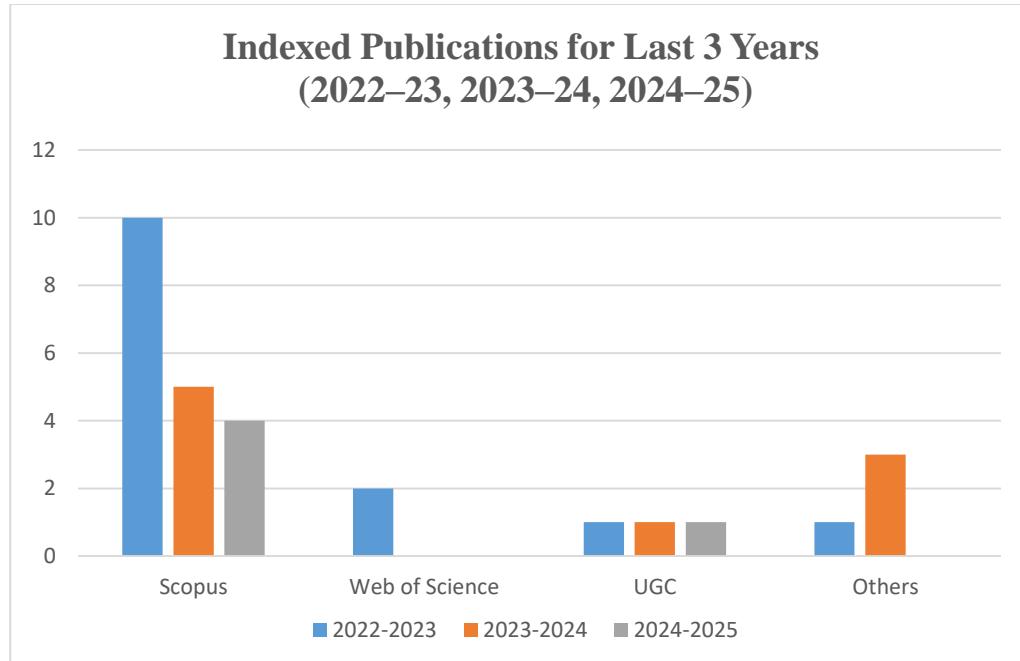
Flagship Major Projects (2022–2025)

Title: Aquomist: Water Demand Forecasting

➢ **Domain:** Time Series Forecasting, CV

➢ **Description:**

  o Utilizes Long Short-Term Memory (LSTM) networks for demand prediction

  o Preprocessing includes Min-Max Normalization and outlier handling

  o Implements MAPE and RMSE for performance evaluation

➢ **Impact, Sustainability, and Industry Relevance**: SDG 8 (Decent Work & Economic Growth), Smart Forecasting

➢ **Outcome:** Patent Filed

Title: Haptic Feedback Sports Training Assistant

➢ **Domain:** IoT, Human-Computer Interaction (HCI)

➢ **Description:**

  o ESP32-based wearable with vibration motor array

  o Real-time feedback logic based on IMU and GPS data

  o Adaptive haptic pattern generation for skill correction

➢ **Impact, Sustainability, and Industry Relevance:** SDG 8 (Decent Work & Economic Growth), IoT-enabled Skill Enhancement, Adaptive Human-Computer Interaction Systems

➢ **Outcome:** Patent Filed

Title: Federated Transfer Learning for Lung Disease Prediction

- ➢ **Domain:** AI, Federated Learning, Medical Imaging
- ➢ **Description:**
  - o Combines Federated Learning with Transfer Learning
  - o Uses pretrained CNNs (ResNet-50, VGG16, AlexNet) on chest X-rays
  - o Compares performance with centralized ML models
  - o Maintains data privacy across clients (hospitals)
- ➢ **Impact, Sustainability, and Industry Relevance**: SDG 3 (Good health & Well-being), Medical & Ethical AI
- ➢ **Outcome:** SCOPUS & SCIE (Q2) Journal Paper Publication

Title: Interview Analyzer

- ➢ **Domain:** AI, CV, NLP
- ➢ **Description:**
  - o Uses CNN-LSTM for facial emotion recognition (fear, anger, happy, neutral)
  - o KNN and SVR models for confidence scoring using speech prosody
  - o Employs BERT and BiLSTM for politeness analysis from transcripts
  - o Outputs continuous politeness (0–1) and confidence scores (0–7)
- ➢ **Impact, Sustainability, and Industry Relevance:** SDG 8 (Decent Work & Economic Growth), Ethical AI in Recruitment, HR Tech Innovation
- ➢ **Outcome:** Scopus (Q2) Journal Paper Publication

Title: IoT-Based Hydroponic System for Indoor Farming

- **Domain:** IoT, DA, Smart Agriculture

- **Description:**
  - Integrates Total dissolved salts (TDS) and pH sensors
  - Predictive analytics using regression models and rule-based ML
  - Visual disease detection via Gemini Pro 1.5 API

- **Impact, Sustainability, and Industry Relevance**: SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption & Production), Smart Farming

- **Outcome:**
  - 1st Runner-up in DJASCII 2024 National Level Project Competition
  - Participated in Aavishkar: Inter-Collegiate / Institute / Department Research Convention 2024-25, Mumbai University
  - Paper under review in Scopus indexed Journal

Title: Smart Leakage Detection Robot

- **Domain:** IoT, Robotics, AI

- **Description:**
  - Navigation using magnet-based locomotion with fidget spinner wheels
  - Equipped with MQ-series gas sensors, DHT11, ultrasonic module
  - Data processed using onboard ML model
  - Real-time alert via Twilio + Wi-Fi-based dashboard

- **Impact, Sustainability, and Industry Relevance:** SDG 9 (Industry, Innovation & Infrastructure), SDG 11 (Sustainable Cities & Communities), Oil and Gas Industry

- **Outcome:** Patent Filed

Title: FARMWISE: Crop Cultivation Analysis

- **Domain**: Artificial Intelligence (AI), Computer Vision (CV)
- **Description**:
    - Uses rule-based decision logic and CV to assess crop suitability
    - Analyzes soil health, climate data, and water availability
    - Focuses on risk modeling for crop productivity using predictive analytics
- **Impact, Sustainability, and Industry Relevance:** SDG 2 (Zero Hunger), Climate-Smart Agriculture
- **Outcome**: IEEE Conference Paper

Title: Data Extraction & Analysis of Generative NFT Art Collections

- **Domain**: AI, Computer Vision, Blockchain Analytics
- **Description**:
    - Extracts on-chain metadata from Ethereum using blockchain APIs
    - Applies feature engineering and ML algorithms for rarity analysis
    - Utilizes clustering and regression to predict NFT valuation
- **Impact, Sustainability, and Industry Relevance:** SDG 9 (Industry, Innovation & Infrastructure), Ethical Digital Economy
- **Outcome**: IEEE Conference Paper

Title: Online Examination Monitoring Device

➢ **Domain**: IoT, CV, AI

➢ **Description**:

    o USB-based proctoring camera with proximity sensors

    o Object detection using YOLOv5 or similar DNNs for cheat detection

    o Voice activity detection (VAD) with keyword spotting for whispering

    o Sends real-time alerts via event-based messaging

➢ **Impact, Sustainability, and Industry Relevance:** SDG 4 (Quality Education), Secure & Fair Assessment

➢ **Outcome**: Patent Filed

Title: Gesture-Controlled Wheelchair with EEG Integration

➢ **Domain**: IoT, BCI, Computer Vision

➢ **Description**:

    o Hand gesture recognition using Mediapipe and OpenCV

    o EEG signals acquired from headset sensors.

    o Integrated on microcontroller for real-time control

➢ **Impact, Sustainability, and Industry Relevance:** SDG 9 (Industry, Innovation & Infrastructure), Neuro-AI for Assistive Tech

➢ **Outcome**: Proof-of-Concept Completed

Title: Alzheimer's Guardian (AzGuardian)

- **Domain**: AI, IoT, Edge Computing
- **Description**:
  - Facial Recognition using FaceNet and dlib-based embeddings
  - ReactJS front-end with FastAPI back-end integration
  - Voice feedback through embedded microcontroller
- **Impact, Sustainability, and Industry Relevance:** SDG 9 (Industry, Innovation & Infrastructure), Medical AI
- •**Outcome**: Patentability being explored

Title: Phantom Limb Pain Management using VR

- **Domain**: Virtual Reality, Neurophysiology
- **Description**:
  - Unity3D VR environment with personalized exercises
  - Targets brain neuroplasticity for PLP relief
  - Remote monitoring enabled via RESTful APIs
  - **Impact, Sustainability, and Industry Relevance:** SDG 3 (Good Health & Well-being), Neurorehabilitation through VR
- **Outcome**: Springer Conference Paper (Scopus)

Title: AI Diagnostic Tool for Retinal Diseases

- **Domain**: Computer Vision, Vision Transformers (ViT)
- **Description**:
  - Dual ViT encoders for multimodal image fusion
  - Cross-attention for fundus and infrared image processing
  - Grad-CAM for interpretability of classification results
- **Impact, Sustainability, and Industry Relevance:** SDG 3 (Good Health & Well-being), AI-powered Medical Imaging, Explainable Vision AI for Ophthalmology
- **Outcome**: System tested in prototype phase

Title: Advanced Healthcare: Parkinson's Detection via Eye Images

- •**Domain**: Computer Vision, Medical Diagnosis
- •**Description**:
  - Applies image classification on Spiral Test and DaTscan images
  - Uses pretrained models like InceptionV3 and VGG19
  - Achieved >85% accuracy on early-stage Parkinson detection
- **Impact, Sustainability, and Industry Relevance:** SDG 3 (Good Health &Well-being), AI for Early Diagnosis
- **Outcome**: Research ongoing; publication in pipeline

Title: CityWatch: Emergency Response Wearable System

- **Domain**: IoT, ML, Wearable Technology
- **Description**:
  - Biometric sensor fusion (PPG, accelerometer) for anomaly detection
  - ML classifier (Random Forest/SVM) for distress prediction
  - App + web dashboard for emergency visualization and escalation
- **Impact, Sustainability, and Industry Relevance:** SDG 3 (Good Health & Well-being), IoT-enabled Emergency Response, Wearable Health Technology
- **Outcome**: System tested in prototype phase

Title: Quantitative Portfolio Rebalancing and Optimization

- **Domain**: AI, FinTech
- **Description**:
  - Uses Hierarchical Risk Parity (HRP) for dynamic rebalancing
  - Financial data sourced via web scraping from NSE/BSE APIs
  - Back testing done using Python libraries
- **Impact, Sustainability, and Industry Relevance:** SDG 8 (Decent Work & Economic Growth), AI-driven Financial Optimization, Sustainable Investment Strategies
- **Outcome**: Paper under review