



INNOVATE | CONNECT | INSPIRE

WAVES

DEPARTMENT MAGAZINE

Connecting Ideas, Transforming Futures

VOLUME

10

ISSUE

01

ACADEMIC YEAR

2025-26



INNOVATION

Ideas Today
Impact Tomorrow



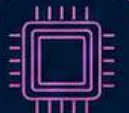
RESEARCH & DEVELOPMENT

Advancing Knowledge
Creating Solutions



COMMUNICATION

Connecting Minds
Beyond Boundaries



TECHNOLOGY

Exploring Innovations
Shaping Tomorrow



STUDENT ACTIVITIES

Learn, Lead,
Make an Impact



ACHIEVEMENTS & AWARDS

Recognizing Excellence
Inspiring Success

ECE

NBA ACCREDITED | NAAC 'A' GRADE INSTITUTION

5G



SANTHIRAM ENGINEERING COLLEGE

(AUTONOMOUS)

N A N D Y A L



ACADEMIC
EXCELLENCE



RESEARCH &
DEVELOPMENT



STUDENT
GROWTH



PLACEMENTS
& TRAINING



INDUSTRY
COLLABORATION



SUSTAINABLE
FUTURE



SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering

WAVES | Vol. 10 | Issue 01



**ACADEMIC YEAR
2025-26**

INSIDE THIS ISSUE

01

About College, Vision & Mission

02

About Department, Vision & Mission

03

PO's, PEO's & PSO's

04

Principal's Message, HoD's Message

05

Technology Catchment Area

06

ECE Events

07

Department Gallery





SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering



EDITORIAL BOARD

Editor-in-Chief: Dr. Y. Mallikarjuna Rao

Associate Editor: B. Sruthi Kumar



Autonomous



**NAAC
Accredited**



**NBA Accredited
ECE & CSE**



**AICTE
Approved**



ABOUT THE COLLEGE

Santhiram Engineering College (SREC) is sponsored by M/s Sri Shirdi Sai Educational Academy, Nandyal. SREC was established under the able guidance of Dr. M. Santhiramudu, Chairman, in the year 2007 with the noble motto Education for peace and progress. SREC is approved by AICTE, New Delhi; recognized by UGC under 2(f) and 12(B); permanently affiliated to JNTUA, Ananthapuramu; and certified to ISO 9001:2015. The college is ranked as one of the best engineering colleges of JNTUA, Ananthapuramu.

Santhiram Engineering College (SREC), Nandyal, is an autonomous, NAAC accredited institution offering NBA accredited B.Tech programs in ECE and CSE. Approved by AICTE and recognized by UGC under sections 2(f) and 12(B), SREC delivers outcome-based technical education aligned with industry expectations.

The college offers undergraduate and postgraduate programs such as B.Tech in CSE, CSE-AIML, CSE-Data Science and ECE, along with M.Tech in CSE, CSE-AIML, VLSI System Design (VLSID), Embedded Systems (ES), MBA and MCA.

With strong placements, research-driven learning, innovation labs and modern infrastructure, SREC prepares students to become industry-ready professionals and future-ready leaders.



SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering

WAVES | Vol. 10 | Issue 02 | 2025-26

ABOUT DEPARTMENT

Anticipating the growing importance of electronics and wireless communication in modern society, the **Department of Electronics and Communication Engineering** was established in 2007 with a vision to impart quality technical education and nurture innovation among young minds.

The department began with an initial intake of **60** students, which was increased to **90** in 2008 and further to **120** in 2009, reflecting the rising demand for skilled electronics and communication engineers.

To meet the expanding needs of the industry and academia, the department introduced a **Master of Technology (M.Tech)** program in **VLSI System Design** in 2011 with an intake of **18 students**, recognizing the immense potential in the area of Very-Large-Scale Integration (VLSI) design.

The department's B.Tech-ECE program has been accredited by the **National Board of Accreditation (NBA)** for a period of three years, from the academic year **2023-24 to 2025-26**, in recognition of its robust academic framework, quality teaching, and outcome-based education.

The department is also a recognized research center under **Jawaharlal Nehru Technological University Anantapur (JNTUA)**, facilitating research scholars to pursue Ph.D. programs in both full-time and part-time modes, thereby promoting advanced research and innovation.



OUR JOURNEY

2007



Department of ECE
established

2008



Intake increased
to **90** students

2009



Intake increased
to **120** students

2011



M.Tech in VLSI System Design
introduced with an intake of
18 students

NBA ACCREDITED



B.Tech-ECE program accredited
by NBA for
2023-24 to 2025-26

RECOGNIZED RESEARCH CENTER



Research center recognized
by **JNTUA** for Ph.D. programs
(Full-time & Part-time)

VISION & MISSION



Vision



To be a center of excellence in
Electronics and Communication
Engineering education, research
and innovation.

Mission



To impart quality education,
foster research and innovation,
and develop skilled professionals
to meet global challenges.

DEPARTMENT FOCUS AREAS



Wireless
Communication



VLSI System
Design



Signal Processing
& Networks



Embedded Systems
& IoT



Antenna &
Microwave Engineering

“

Empowering Innovation, Building Tomorrow
Through Electronics in Electronics & Communication Engineering”

”

PEOs & PROGRAM OUTCOMES



1. Program Educational Objectives (PEOs)



01
PEO1

Have in-depth knowledge in Electronics and Communication Engineering to innovate, design, and develop modern electronic systems.



02
PEO2

Sustain intellectual curiosity in professional career through life-long learning.



03
PEO3

Have strong work ethics, professional attitude, team spirit, leadership skills, and enterprising skills to serve industry and society.



2. Program Outcomes (POs)

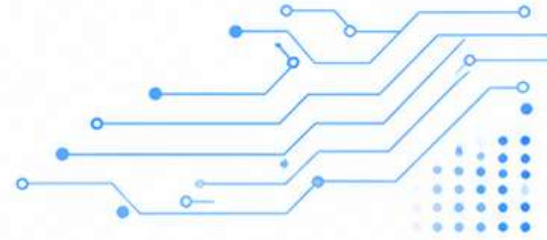
P0	Engineering Graduates will be able to
P01	Engineering knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and engineering specialization to develop solutions for complex engineering problems.
P02	Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems with consideration for sustainable development.
P03	Design/development of solutions: Design creative solutions and develop systems, components or processes considering health, safety, cost, society and environment.
P04	Conduct investigations: Use research-based knowledge, experiments, modelling, analysis and interpretation of data to provide valid conclusions.
P05	Engineering Tool Usage: Select and apply appropriate techniques, resources and modern engineering and IT tools to solve complex engineering problems.
P06	The Engineer and The World: Analyze societal and environmental aspects while solving engineering problems for sustainability, health, safety, legal and cultural impact.
P07	Ethics: Apply ethical principles, professional ethics, human values, diversity and inclusion, and adhere to national and international laws.
P08	Individual and Collaborative Team Work: Function effectively as an individual, member or leader in diverse and multidisciplinary teams.
P09	Communication: Communicate effectively through reports, documentation and presentations considering cultural, language and learning differences.
P010	Project management and finance: Apply engineering management principles and economic decision-making to manage projects in multidisciplinary environments.
P011	Life-long learning: Recognize the need for independent lifelong learning, adaptability to emerging technologies and critical thinking.



SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering

WAVES | Vol. 10 | Issue 01 | 2025-26



PROGRAM SPECIFIC OUTCOMES



1. B.Tech in Electronics and Communication Engineering

Graduates of the program will be able to:

PSO
01

Ability to analyze, design, and implement application-specific electronic systems for complex engineering problems in analog and digital communication, signal processing, and embedded domains, using knowledge of basic sciences, engineering mathematics, and engineering fundamentals.

PSO
02

Ability to design and develop real-time embedded systems by integrating hardware and software components, ensuring energy efficiency, security, and reliability for applications in IoT, automotive, and industrial automation.

PSO
03

Ability to analyze, design, and optimize VLSI circuits and systems, focusing on low-power design, high-performance architectures, and efficient fabrication techniques to meet modern industry demands.



2. M.Tech in VLSI System Design

Program Educational Objectives (PEOs)

PEO
01

Identify and apply appropriate Electronic Design Automation software and electronic equipment to analyze, synthesize and evaluate real-world problems in the VLSI domain.

PEO
02

Pursue research studies in the core or allied areas of VLSI circuits and systems.

PEO
03

Inculcate positive attitude, professional ethics, effective communication and interpersonal skills to succeed in research and development as a team member and leader.

Program Specific Outcomes (PSOs)

PSO
01

Ability to design and integrate analog, digital and mixed signal circuits and systems.

PSO
02

Design and develop solutions for real-world problems in IC fabrication, testing, verification and prototype development.

PSO
03

Understand, analyze, design and simulate communication systems and data processing techniques and validate their performance for practical applications.

SANTHIRAM ENGINEERING COLLEGE

Department of Electronics &
Communication Engineering



PROGRAM OUTCOMES



M. Tech in Embedded Systems



1. Program Educational Objectives (PEOs)

— Graduates of the M.Tech in Embedded Systems program will: —

PEO
01



Utilize advanced embedded system concepts to design and implement real-time applications in areas such as automation, healthcare, communication, and smart devices.

PEO
02



Pursue research and development activities focused on creating secure, energy-efficient, and intelligent embedded solutions to meet modern technological needs.

PEO
03



Demonstrate ethical behavior, effective collaboration, communication skills, and a commitment to continuous professional growth in technical, academic, or entrepreneurial roles.



2. Program Specific Outcomes (PSOs)

— Graduates of the M.Tech in Embedded Systems program will be able to: —

PSO
01



Design, develop, and optimize embedded systems by integrating hardware and software components for real-time applications in various domains.

PSO
02



Analyze, design, and implement advanced computing architectures, energy-efficient embedded solutions, and secure systems to address emerging challenges.

PSO
03



Apply modern tools, methodologies, and industry standards for embedded system design, validation, and testing to ensure efficiency, reliability, and sustainability.

MESSAGES



CHAIRMAN MESSAGE



WAVES is a reflection of our department's spirit, creativity, and commitment to excellence. It showcases the technical insights, innovative ideas, and literary talent of our students and faculty. I extend my heartfelt appreciation to the entire team for their dedication and hard work in bringing this magazine to life. May WAVES continue to be a platform that inspires curiosity, strengthens knowledge, and encourages every student to express, explore, and excel. Let the waves of ideas create a sea of innovation!

Dr. M. Santhiramudu
Chairman/Founder



MD'S MESSAGE



I am pleased to see WAVES, the technical magazine of our department, taking shape as a platform for sharing knowledge and innovation. It highlights the remarkable efforts and creativity of our students and the unwavering support of the editorial team. I encourage everyone to contribute, collaborate, and make WAVES a source of inspiration and learning for all readers. Wishing the team great success in all their future endeavors!

Mr. M. SivaRam
Managing Director

“

*WAVES is not just a magazine,
it is the voice of ideas, the rhythm of innovation,
and the reflection of our vibrant ECE community.*

”



MESSAGES



PRINCIPAL'S MESSAGE



It gives me immense pleasure to present Volume 10, Issue 1 of WAVES. This edition is a testament to the relentless pursuit of knowledge, innovation, and excellence by the students and faculty of the Electronics and Communication Engineering Department. The rapid advancements in technology demand continuous learning and adaptability, and I am proud to see our department embracing these challenges with enthusiasm and dedication.

I congratulate the entire team behind this issue for their commendable efforts and the valuable contributions that make WAVES a beacon of technical insight and creativity. I encourage our students to keep exploring, innovating, and striving for excellence in all their endeavors.

Let us continue to work together to build a brighter, more innovative future.

Dr. M.V. Subramanyam

Principal



HOD'S MESSAGE



I am delighted to present Volume 10, Issue 1 of WAVES. This issue reflects the vibrant academic spirit and innovative mindset of our department community. The contributions in this edition highlight the diverse interests and technical proficiencies of our students and faculty, covering emerging technologies, research insights, and practical applications.

I extend my heartfelt appreciation to the editorial team, faculty members, and student contributors for their dedication and hard work in bringing out this issue. I also encourage all students to participate actively, share their ideas, and continue to push the boundaries of creativity and innovation.

Together, let us strive to uphold the legacy of excellence and make our department a center of learning, discovery, and growth.

Dr. Y. Mallikarjuna Rao

HOD-ECE



TECHNOLOGY CATCHMENT AREA

ADVANCEMENTS IN COMMUNICATION NETWORKS: SHAPING THE FUTURE OF GLOBAL CONNECTIVITY

Faster Connections. Smarter Networks. Stronger Tomorrow.



Author : G. Neelima
Designation : Assistant Professor
Department : Electronics and Communication Engineering



1. INTRODUCTION

Communication networks have become the foundation of the modern digital world, enabling seamless connectivity between people, devices, and intelligent systems. The increasing demand for high-speed internet, cloud services, and smart applications has driven remarkable advancements in communication technologies. From traditional wired communication systems to next-generation wireless networks, the field has undergone a revolutionary transformation that continues to reshape society.



2. RECENT ADVANCEMENTS IN COMMUNICATION NETWORKS

One of the most significant developments is the widespread deployment of 5G communication technology, which offers ultra-high data rates, low latency, and massive connectivity. These features support advanced applications such as autonomous vehicles, smart cities, telemedicine, and Industrial Internet of Things (IIoT).

Artificial Intelligence (AI) and Machine Learning (ML) are also transforming communication networks by enabling intelligent traffic management, predictive maintenance, network optimization, and enhanced cybersecurity.

Another major advancement is the adoption of Software Defined Networking (SDN) and Network Function Virtualization (NFV). These technologies provide flexible and programmable network architectures, reducing operational complexity and improving resource utilization.



3. KEY TECHNOLOGIES ENABLING ADVANCEMENTS

 AI / ML Intelligent Network Management	 SDN Programmable Network Control	 NFV Virtualized Network Functions	 MASSIVE MIMO Higher Capacity and Improved Coverage
--	--	---	--



BENEFITS

- High Data Rates
- Low Latency
- Massive Connectivity
- Better Reliability
- Efficient Resource Utilization
- Enhanced Security



4. APPLICATIONS



5. FUTURE SCOPE



- 6G technology will deliver terabit-per-second data rates and ultra-low latency.
- Holographic communication and immersive experiences will become possible.
- Integration of terrestrial and satellite networks for seamless global coverage.
- Quantum communication for ultra-secure data transmission.
- AI-driven network automation for self-optimizing and self-healing networks.
- Edge computing will enable real-time data processing and decision making.



6. CONCLUSION

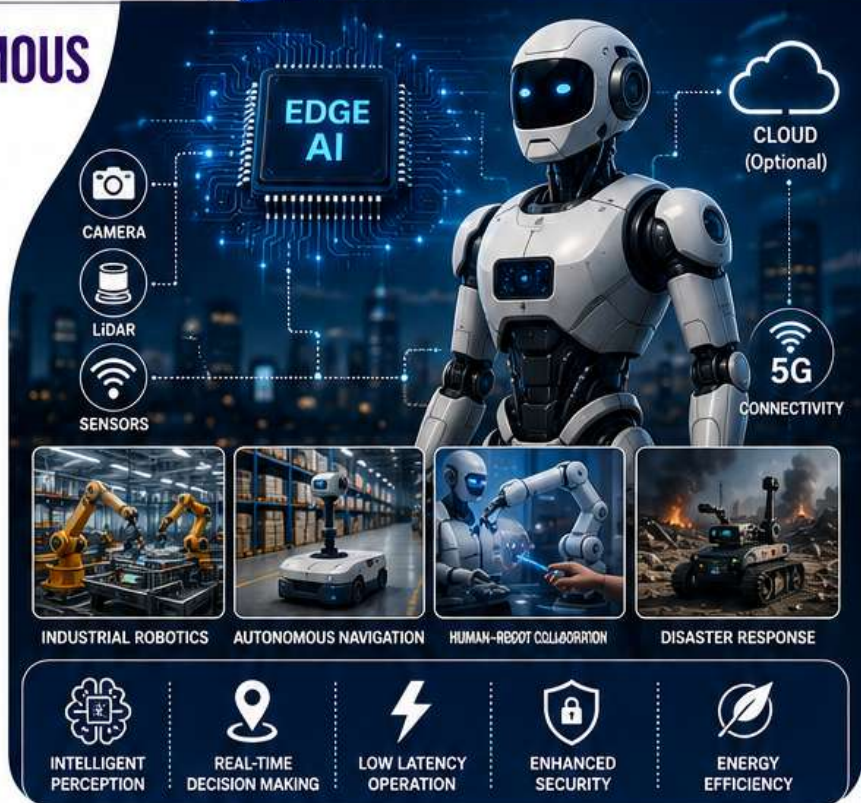
Advancements in communication networks continue to drive innovation across industries and improve the quality of life. As technologies evolve from 5G to 6G and beyond, communication systems will become faster, smarter, and more efficient, supporting the growing demands of a digitally connected world.

EDGE AI-POWERED AUTONOMOUS ROBOTS: TRANSFORMING THE FUTURE OF INTELLIGENT AUTOMATION

*Intelligent Robots. Real-Time Decisions.
Smarter Future.*



Author : Ch. Karimulla
Reg. No. : 23X51A0415
Department : Electronics and Communication Engineering
Academic Year : 2025-26



1. INTRODUCTION

Robotics has evolved significantly over the past decade, driven by advancements in Artificial Intelligence (AI), Machine Learning, and embedded systems. Modern autonomous robots are capable of sensing their environment, making intelligent decisions, and performing complex tasks with minimal human intervention. One of the most promising developments in this field is the integration of Edge AI, which enables robots to process data locally rather than relying entirely on cloud computing.



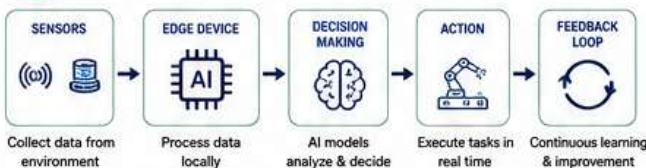
2. EDGE AI IN ROBOTICS

Edge AI combines artificial intelligence algorithms with edge computing devices, allowing robots to analyze sensor data in real time. This reduces communication delays, improves response times, and enhances operational reliability. Autonomous robots equipped with cameras, LiDAR sensors, and intelligent processors can identify objects, navigate environments, and make decisions instantly.

Unlike cloud-based systems, Edge AI ensures continuous operation even when internet connectivity is unavailable. This makes it highly suitable for critical applications where low latency and rapid decision-making are essential.



3. WORKING ARCHITECTURE



KEY TECHNOLOGIES

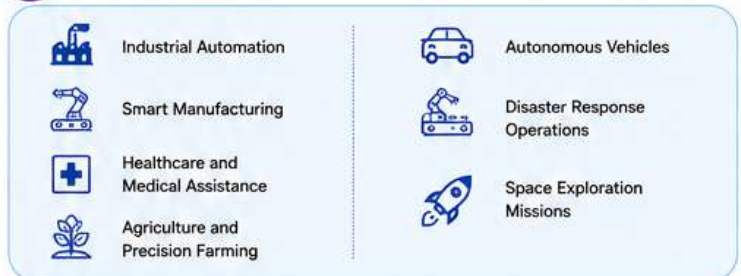
- Edge Computing
- Machine Learning / Deep Learning
- Computer Vision
- LiDAR & Sensor Fusion
- 5G Communication



4. ADVANTAGES



5. APPLICATIONS



6. FUTURE SCOPE

Future autonomous robots will integrate advanced AI models, 5G communication, and collaborative intelligence. These innovations will enable robots to work alongside humans safely and efficiently while performing increasingly sophisticated tasks across diverse environments.



7. CONCLUSION

Edge AI-powered autonomous robots represent a major breakthrough in intelligent automation. Their ability to process information locally and respond instantly makes them a key technology for the future of robotics and smart systems.

KEYWORDS: Robotics, Edge AI, Autonomous Systems, Intelligent Automation, Industry 4.0, Machine Learning.

FPGA-BASED YOLO ACCELERATOR FOR REAL-TIME OBJECT DETECTION

Accelerating Vision. Enabling Intelligence.



Author : E. Subbarayudu
Reg. No. : 22X51A0425
Department : Electronics and Communication Engineering
Institution : Kakinada Institute of Engineering and Technology (KIET)



1. INTRODUCTION

Object detection has become one of the most important technologies in modern computer vision applications, including autonomous vehicles, surveillance systems, robotics, healthcare monitoring, and smart city infrastructure. Among various object detection algorithms, You Only Look Once (YOLO) has gained significant popularity due to its ability to perform real-time detection with high accuracy. However, executing YOLO models on conventional processors often requires substantial computational resources and power consumption.



2. FPGA-BASED YOLO ACCELERATION

Field Programmable Gate Arrays (FPGAs) provide a flexible and energy-efficient hardware platform for accelerating deep learning algorithms. An FPGA-based YOLO accelerator implements critical operations such as convolution, pooling, and activation functions directly in hardware, significantly improving processing speed while reducing power consumption.

Unlike CPUs and GPUs, FPGAs offer massive parallelism and customizable architectures, enabling real-time object detection in resource-constrained environments. By optimizing data flow and hardware resources, FPGA accelerators can efficiently process high-resolution images with low latency.

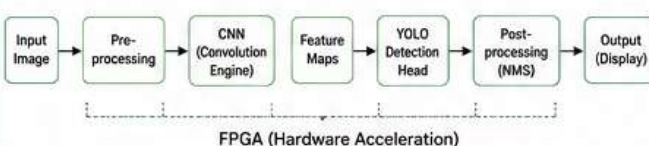


3. SYSTEM OVERVIEW

The FPGA-based YOLO accelerator typically includes the following modules:

- Input Image Preprocessing
- Convolution Engine
- Feature Extraction
- Bounding Box Prediction
- Non-Maximum Suppression (NMS)
- Output Display Interface

FPGA-Based YOLO Accelerator Architecture



The architecture is optimized for pipelined processing and parallel computations, ensuring high throughput and real-time performance.



4. ADVANTAGES



HIGH-SPEED REAL-TIME DETECTION

FPGA acceleration enables real-time performance even for high-resolution images and video streams.



LOW POWER CONSUMPTION

Hardware optimization reduces power usage compared to GPUs and CPUs.



HARDWARE-LEVEL PARALLELISM

Parallel processing of multiple operations improves speed and efficiency.



LOW LATENCY AND FASTER INFERENCE

Suitable for time-critical and safety-critical applications.



RECONFIGURABLE AND SCALABLE

FPGA can be reprogrammed to support different YOLO versions and custom models.



5. APPLICATIONS



Autonomous Vehicles



Medical Image Analysis



Smart Surveillance Systems



Intelligent Transportation Systems



Industrial Automation



Robotics and AI-enabled Devices



Drone Navigation



6. FUTURE SCOPE

With the rapid growth of Edge AI and intelligent embedded systems, FPGA-based accelerators are becoming increasingly important. Researchers are developing optimized YOLO architectures and hardware-aware neural networks to achieve higher accuracy and faster processing speeds. The combination of FPGA technology and deep learning is expected to drive the next generation of real-time intelligent systems.



7. CONCLUSION

FPGA-based YOLO accelerators provide an efficient solution for deploying real-time object detection systems. Their ability to deliver high performance, low power consumption, and flexibility makes them a promising technology for future AI-driven applications.

FPGA-BASED YOLO ACCELERATOR FOR REAL-TIME OBJECT DETECTION

Accelerating Vision. Enabling Intelligence.



Author : E. Subbarayudu
Reg. No. : 22x51a0425
Department : Electronics and Communication Engineering
Institution : Kakinada Institute of Engineering and Technology (KIET)



HIGH SPEED



LOW LATENCY



EDGE AI



REAL-TIME
DETECTION



ENERGY
EFFICIENT



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HARDWARE-LEVEL PARALLELISM

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LOW LATENCY AND FASTER INFERENCE

Suitable for time-critical and safety-critical applications.



RECONFIGURABLE AND SCALABLE

FPGA can be reprogrammed to support different YOLO versions and custom models.



5. APPLICATIONS



Smartphones and Tablets



Wearable Electronics



Internet of Things (IoT) Devices



Wireless Sensor Networks



Artificial Intelligence Hardware



Aerospace and
Defense Electronics



Medical Monitoring Systems



6. FUTURE SCOPE

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“ Innovation in materials today,
intelligence in electronics tomorrow. ”

Keywords: FPGA, YOLO, Object Detection, Edge AI, Deep Learning, Computer Vision, Hardware Acceleration.

AI-ASSISTED VLSI FLOORPLANNING: TRANSFORMING CHIP DESIGN THROUGH INTELLIGENT AUTOMATION

Smarter Planning. Efficient Chips. Intelligent Future.



Author : Ch. Anu
Reg. No. : 23X51A0413
Department : Electronics and Communication Engineering
Academic Year : 2025-26



1. INTRODUCTION

The increasing complexity of modern integrated circuits has created significant challenges in VLSI design. As semiconductor technology advances toward smaller technology nodes, designers must optimize chip area, power consumption, performance, and routing efficiency. Floorplanning is one of the most critical stages in the VLSI physical design process, determining the placement of functional blocks within a chip. Traditional floorplanning methods often require extensive computational effort and design iterations.



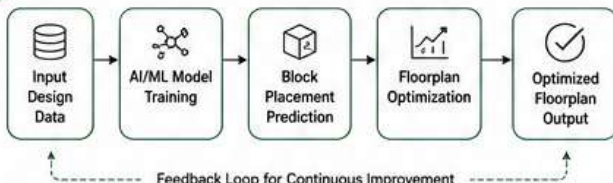
2. AI-ASSISTED FLOORPLANNING

Artificial Intelligence (AI) is revolutionizing VLSI design by introducing intelligent automation into floorplanning. AI-based algorithms analyze millions of possible placement combinations and identify optimal floorplans in a fraction of the time required by conventional approaches. Machine Learning (ML) techniques learn from previous chip designs and generate efficient placement strategies that improve overall design quality.

By utilizing reinforcement learning and optimization algorithms, AI-assisted floorplanning minimizes wirelength, congestion, and power consumption while maximizing chip performance. This enables designers to achieve better results with reduced design cycles.

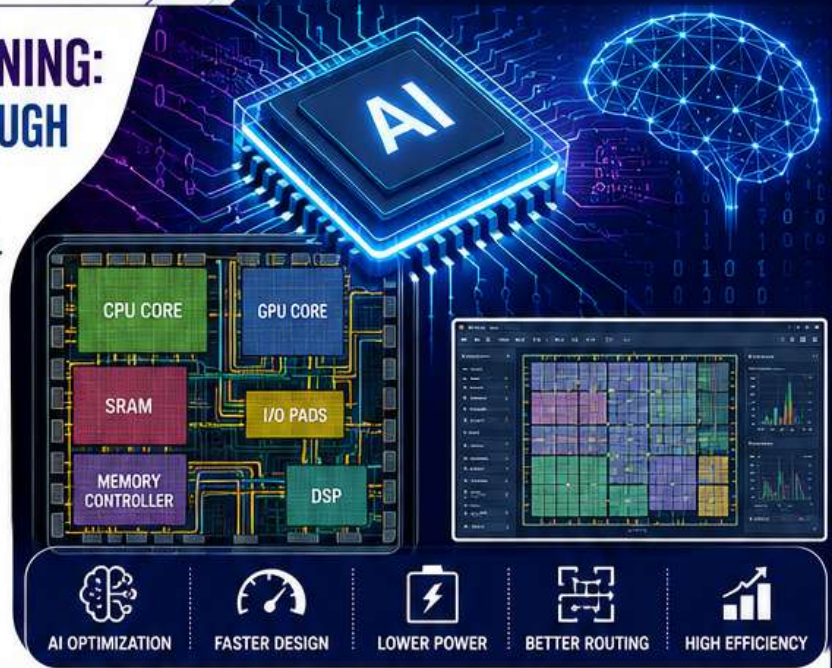


3. AI-ASSISTED FLOORPLANNING FLOW



AI TECHNIQUES USED

- Machine Learning (Supervised & Unsupervised)
- Reinforcement Learning
- Genetic Algorithms
- Deep Neural Networks



4. ADVANTAGES



FASTER DESIGN CONVERGENCE

AI algorithms explore the design space efficiently and produce high-quality floorplans in less time.



REDUCED CHIP AREA

Intelligent placement of blocks reduces dead space and improves area utilization.



LOWER POWER CONSUMPTION

Optimized floorplans lead to shorter interconnects and reduced switching activity.



IMPROVED ROUTING EFFICIENCY

AI minimizes congestion and wirelength, improving routing success and timing.



AI-DRIVEN OPTIMIZATION

Continuous learning from past designs enhances accuracy and adapts to design constraints.



6. FUTURE SCOPE

With the growing demand for complex semiconductor devices, AI-driven Electronic Design Automation (EDA) tools are expected to become a standard part of future chip design workflows. Advanced AI models will enable fully automated floorplanning and optimization for next-generation integrated circuits. The combination of AI, high-performance computing, and domain knowledge will further enhance accuracy, scalability, and efficiency in VLSI design.



7. CONCLUSION

AI-assisted VLSI floorplanning represents a major advancement in semiconductor design automation. By combining artificial intelligence with physical design techniques, engineers can create faster, smaller, and more power-efficient chips, paving the way for future innovations in electronics and computing.

KEYWORDS: Artificial Intelligence, VLSI, Floorplanning, Machine Learning, EDA, Chip Design, Semiconductor Technology, Optimization, Automation.

IOT-BASED ELECTRIC VEHICLE MONITORING SYSTEM: ENABLING SMART AND SUSTAINABLE TRANSPORTATION

*Smart Monitoring. Efficient Driving.
Sustainable Future.*



Author : M. Poojitha
Reg. No. : 22X51A0453
Department : Electronics and Communication Engineering
Academic Year : 2025-26



1. INTRODUCTION

The rapid adoption of Electric Vehicles (EVs) is transforming the transportation sector by providing an eco-friendly alternative to conventional fuel-powered vehicles. However, efficient monitoring and management of EV performance remain essential for ensuring reliability, safety, and optimal energy utilization. The Internet of Things (IoT) has emerged as a powerful technology that enables real-time monitoring and intelligent management of electric vehicles.



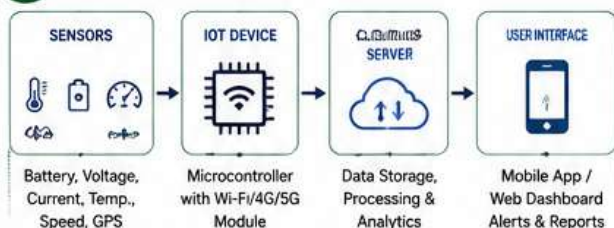
2. IOT-BASED EV MONITORING SYSTEM

An IoT-based Electric Vehicle Monitoring System utilizes sensors, communication modules, and cloud platforms to continuously collect and analyze vehicle data. Parameters such as battery voltage, current, temperature, charging status, speed, and location are monitored in real time. The collected data is transmitted to cloud servers through wireless communication technologies, enabling users and fleet operators to access vehicle information remotely.

The system can provide instant alerts regarding battery health, abnormal temperature rise, charging issues, and maintenance requirements. Integration with GPS technology further enables vehicle tracking and route optimization.



3. SYSTEM ARCHITECTURE



KEY FEATURES

- Real-time battery and vehicle health monitoring
- Live tracking with GPS
- Remote diagnostics and fault detection
- Cloud-based data storage and analytics
- Alerts and notifications for critical events



4. ADVANTAGES



REAL-TIME
MONITORING



BATTERY HEALTH
TRACKING



GPS
NAVIGATION



SMART
CHARGING



PREDICTIVE
MAINTENANCE



5. APPLICATIONS



Smart Transportation Systems



Delivery and Logistics Vehicles



Electric Cars and Buses



Smart City Infrastructure



Fleet Management Services



Shared Mobility Platforms



6. FUTURE SCOPE

With the advancement of 5G, Artificial Intelligence, and Edge Computing, future EV monitoring systems will become more intelligent and autonomous. AI-driven analytics can predict battery failures, optimize charging schedules, and improve vehicle performance. These innovations will contribute to sustainable transportation and smarter mobility solutions.



7. CONCLUSION

IoT-based Electric Vehicle Monitoring Systems play a vital role in enhancing EV efficiency, safety, and reliability. By combining real-time monitoring with intelligent analytics, these systems support the future of connected and sustainable transportation.

KEYWORDS: IoT, Electric Vehicle, Smart Transportation, Battery Monitoring, GPS Tracking, Cloud Computing, Sustainable Mobility.

1 One-day Awareness Program on “EMPOWERING LEARNING: NPTEL Awareness Drive”

📅 19 July, 2025

For III-year ECE students. Mr. S. Mohammad Eliyas from Santhiram Engineering College, Dept. of ECE, Nandyal acted as a resource person.

2 One-day Workshop Program on “Virtual Labs: Experiment anytime, anywhere”

📅 29 July, 2025

For III-year ECE students.

3 One-day Entrepreneurship Program on “Startup Minds: The Power of Entrepreneurial Thinking”

📅 28 Aug, 2025

For II, III year ECE students. Dr. K.V. Subba Reddy from General Manager, IITTNI, and IIT Tirupati acted as a resource person.

4 One-day Alumni Talk on “Alumni Insights: Journeys, Career, and Lessons”

📅 29 Aug, 2025

For IV-year ECE students. The resource person was Mr. S. Intiyaz Systems Engineer, TCS, and Hyderabad.

5 One-Day Seminar on “Deep Learning Demystified: From Concepts to Applications”

📅 29 Aug, 2025

For III, IV year ECE students. Dr. S. Nagesh Bhattu, Asst. Professor & HOD, Department of CSE, NIT-AP acted as a resource person.

6 One-day Awareness Program on “One - Day Awareness Program on GATE-2026”

📅 30 Aug, 2025

For III, IV-Year ECE students. Dr. K. Satish Kumar & Mr. Abhirup Pal from IISc, Bangalore were acted as resource persons.

7 Two days' Workshop on “From Pixels to Perception: A Hands-on Workshop on PYTHON for VISION - AI”

📅 29-30 Aug, 2025

For II, III-year ECE students. Dr. K.V. Subba Reddy from General Manager, IITTNI, and IIT Tirupati acted as resource person.

8 Two days' Workshop on “Coding Challenge for Star PNT Internship Selection”

📅 30 Aug to 01 Sept, 2025

For II, III-year ECE students.

9 Two Day's Industrial Visit to Naval Science & Technological Laboratory (NSTL)

📅 18-19 Sept, 2025

For IV-year ECE students.

10 One-day Intellectual Property Rights program on “Secure your Genius: The IPR Insight Program”

📅 19 Sept, 2025

For IV-year ECE students. Dr. Lodi Rathna Silviya from Post Doctorate, China-250100 acted as resource person.

11 Two Day's Workshop on “Innovating with IoT: Build, Connect and Automate”

📅 22-23 Sept, 2025

For III-year ECE students. Mr. K. Abdul Rehman Assistant Professor Santhiram Engineering College, Nandyal acted as resource person.

12 Hackathon Program on “Smart India Internal Hackathon - 2025”

📅 24 Sept, 2025

For II, III & IV-Year ECE students.

PROGRAMS ORGANISED



Two Day's Workshop on “Embedded Systems Design Using Arduino and Communication Protocols”

📅 08-09 Oct, 2025

For II-year students. Mr. C. Dhinesh Kumar, Senior Trainer, Pantech e-learning Pvt.Ltd. acted as a resource person.



One day awareness program on “Strategies to Succeed in NPTEL Certification Courses”

📅 14 Oct, 2025

For III-year students. Mr. S. M. Eliyas, SPOC NPTEL, Asst.Professor, Dept.of ECE acted as a resource person.

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