2024-25/Volume 24/Issue 1
June - December

K.S.R COLLEGE OF ENGINEERING

ELECTRONICS AND COMMUNICATION ENGINEERING

MAGAZINE

TRONIX

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

(Approved by AICTE, Affiliated to Anna University, Accredited by NAAC (A+))

K.S.R. Kalvi Nagar, Tiruchengode – 637 215, Namakkal District, Tamil Nadu

DEPARTMENT ELETRONICS AND COMMUNICATION ENGINEERING

TRONIX

TECHNICAL MAGAZINE

ACADEMIC YEAR 2024-2025

Vision and Mission of Institution

Vision

To become a globally renowned institution in Engineering and Management, committed to providing holistic education that fosters research, innovation and sustainable development.

Mission

IM1 Deliver value-based quality education through modern pedagogy and experiential learning.

IM2 Enrich Engineering and Managerial Skills through cutting-edge laboratories to meet evolving global demands.

IM3 Empower research and innovation by integrating collaboration, social responsibility, and commitment to sustainable development.

Vision and Mission of Department

Vision

We envision as a center of excellence in the field of Electronics and Communication Engineering to produce technically competent graduates with diverse teaching and research environments.

Mission

DM1 To educate the students with the state of art technologies to meet the growing challenges of the industries.

DM2 To develop an innovate, competent and ethical Electronics and Communication Engineer with strong foundations to enable them for continuing education.

PEOs and PSOs

Program Educational Objectives (PEOs)

PEO1 -	**Employability and Higher Education**	Excel in Professional career and higher education by acquiring knowledge in mathematical, social, scientific & engineering principles.
PEO2 -	**Core Competence**	Analyze, design and develop/implement core engineering problems in communication systems that are technically sound, economically feasible and socially acceptable.
PEO3 -	**Interpersonal Skills and Team Work**	Graduates will explore competency in the higher education and research and to become the State-of-the-art technocrat.

Program Specific Outcomes (PSOs)

PSO1 -	**Professional Skill**	Specify design and test modern electronic systems that perform analog and digital processing functions.
PSO2 -	**Problem – Solving Skills:**	Design essential elements (circuits and antennas) of modern RF/Wireless communication systems.

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

Chairman Message

Shri. R. Srinivasan, BBM., MISTE.,
Chairman, KSR Educational Institutions

"Education is the foundation of a brighter tomorrow, and this magazine reflects the vibrant spirit of our learners."

It brings me immense joy to witness the publication of this edition of the **Electronics and Communication Engineering Department Technical Magazine – TRONIX**. As we stand at the forefront of rapid technological advancement, it is essential that our students are not only informed but inspired to think critically, innovate responsibly, and act ethically.

At **KSR College of Engineering**, we have always emphasized the **importance of holistic learning**—where academic excellence is complemented by research, practical experience, and ethical grounding. This magazine is a testament to that vision. It represents the convergence of classroom knowledge and **real-world application**, aligning perfectly with our mission to create globally competitive and socially responsible engineers.

I extend my heartfelt congratulations to the editorial board, contributors, and faculty coordinators for their efforts in bringing this edition to life. I am confident that **TRONIX** will inspire many young minds and serve as a milestone in our journey towards academic and professional excellence.

With best wishes,
Shri. R. Srinivasan
Chairman, KSR Educational Institutions

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

Dean Message

Dr. M. Venkatesan, M.E., Ph.D.,
Dean, KSRCE

"Knowledge shared is knowledge multiplied."

I am delighted to extend my warm wishes to the Department of Electronics and Communication Engineering for the successful launch of the **TRONIX** magazine. This remarkable initiative stands as a reflection of the department's unwavering commitment to fostering knowledge sharing, innovation, and awareness in the dynamic and ever-evolving field of electronics and communication.

The insightful contributions from both students and faculty members, as showcased in this magazine, are a true testament to their dedication, creativity, and technical excellence. It is encouraging to see such a platform being established to spotlight emerging technologies, thought-provoking perspectives, and real-world applications in the ECE domain.

I whole heartedly encourage everyone to actively engage with **TRONIX**, leveraging it as a valuable medium to share insights, explore new ideas, and collaboratively strengthen the electronics and communication engineering ecosystem.

My heartfelt congratulations to the entire team behind **TRONIX** for their exceptional efforts and vision.

With best wishes,
Dr. M. Venkatesan
Dean, KSR College of Engineering

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

Principal Message

Dr. P. Meenakshi Devi, M.E., Ph.D.,
Principal, KSRCE

"It is with immense pride that I present the Electronics and Communication Engineering Department magazine."

This edition of **TRONIX** is not just a compilation of technical articles—it is a mirror reflecting the intellectual energy, dedication, and innovation of our students and faculty. In an era where technology is rapidly transforming every aspect of our lives, it is crucial that educational institutions take the lead in nurturing professionals who can think critically, innovate effectively, and uphold ethical standards in the face of evolving engineering challenges.

At **KSR College of Engineering**, we take immense pride in offering an environment that fosters innovation, interdisciplinary collaboration, and hands-on experience. Our state-of-the-art laboratories, industry-relevant curriculum, and dedicated faculty ensure that students are not only **job-ready but also future-ready**. This magazine is living proof of that vision—where students are encouraged to question, explore, and solve real-world problems through the lens of electronics and communication engineering.

I offer my heartfelt congratulations to the editorial team, student authors, and department staff who have contributed to the successful release of this magazine. Your efforts have created a platform for **thought leadership, creativity, and technical** insight.

Let this magazine serve as a source of **motivation, knowledge, and academic excellence**, and may it inspire all readers to contribute meaningfully to the ever - evolving world of electronics and communication.

With best wishes,
Dr. P. Meenakshi Devi
Principal, KSR College of Engineering

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

HoD Message

Dr. C. Gowri Shankar, M.E., Ph.D.,
Professor & Head, KSRCE

"It is with great pleasure that I present the Electronics and Communication Engineering Department magazine."

This edition of ***TRONIX*** goes beyond a simple collection of articles—it embodies the **enthusiasm, creativity, and hard work** of our students and faculty. In today's fast-paced technological world, it is vital for academic institutions to cultivate individuals who are not only technically sound but also ethically grounded and forward-thinking.

At **KSR College of Engineering**, we remain committed to providing a learning environment that **champions innovation, practical exposure, and interdisciplinary growth**. With cutting-edge labs, an industry-aligned curriculum, and passionate educators, we ensure that our students are equipped to face the future with confidence. ***TRONIX*** stands as a testimony to that mission—encouraging students to imagine, innovate, and implement.

I extend my warmest congratulations to the editorial board, contributing writers, and faculty coordinators who have worked diligently to bring this edition to life. Your dedication has given rise to a platform that **inspires knowledge-sharing, originality, and technical excellence.**

With best wishes,
Dr. C . Gowri Shankar
HoD, KSR College of Engineering

K S R COLLEGE OF ENGINEERING

An Autonomous Institution

TRONIX

What is Quantum Technology?

Quantum technology harnesses the principles of quantum mechanics – such as superposition and entanglement – to perform tasks that are impossible for classical systems. This emerging field promises to revolutionize various industries, offering unprecedented capabilities in computing, sensing, communication, and materials science.

Key Applications

Quantum Computing:

- Solves complex problems faster.
- Optimizes algorithms.
- Enables drug discovery.

Quantum Sensing:

- Ultra-precise measurements.
- Improved medical imaging.
- Advanced navigation systems.

Quantum Cryptography:

- Secure communication channels.
- Unbreakable encryption.
- Protection against cyber threats.

Quantum Computing: Quantum computers leverage qubits to perform calculations far beyond the reach of classical computers. This enables breakthroughs in drug discovery, materials science, and financial modeling, addressing some of the most computationally intensive challenges.

Quantum Sensing: Quantum sensors offer unprecedented precision in measuring physical quantities such as time, gravity, and magnetic fields. This leads to advancements in medical imaging, navigation systems, and environmental monitoring, enhancing accuracy and efficiency across diverse applications.

Quantum Cryptography: Quantum key distribution (QKD) provides a secure method for transmitting encryption keys, guaranteeing protection against eavesdropping. This ensures secure communication channels, safeguarding sensitive data and bolstering cyber security infrastructure.

Future Prospects

The future of quantum technology holds immense potential. Ongoing research and development efforts are focused on:

- **Scaling quantum computers:** Building larger, more stable quantum computers to tackle real-world problems.
- **Developing quantum algorithms:** Creating new algorithms optimized for quantum hardware.
- **Exploring novel quantum materials:** Discovering and engineering materials with unique quantum properties.

As quantum technology matures, it will continue to drive innovation, reshape industries, and redefine the boundaries of what's possible.

Conclusion

Quantum technology represents a paradigm shift in how we approach problem-solving and innovation. From revolutionizing computing power to enhancing security and sensing capabilities, the applications of quantum mechanics promise to unlock unprecedented advancements across various sectors, paving the way for a future driven by quantum possibilities.

NAME: C.LOKITH KUMAR

CLASS: I - ECE

How Microprocessors Evolved: From Tiny Chips to Smart Brains of the Modern World

"The microprocessor is not just a chip; it's the heartbeat of the digital era."

When Intel released the first commercially available microprocessor in 1971, few imagined that this fingernail-sized silicon chip would one day revolutionize almost every aspect of human life — from toasters to spacecraft, smart phones to supercomputers.

The Dawn: The Birth of the Microprocessor (1971–1980)

The story began with Intel 4004, the world's first microprocessor, launched in 1971. It was a 4-bit processor with a mere 2,300 transistors, running at 740 kHz — weaker than a modern calculator.

The late 1970s also saw the birth of the MOS 6502 and Zilog Z80, the building blocks for early personal computers like the Apple I, Commodore 64, and Atari systems. Microprocessors were no longer just laboratory curiosities — they were entering homes.

The Growth: Personal Computers and the 16-bit Revolution (1980–1995)

As computing needs grew, 8-bit systems hit their limits. This led to 16-bit microprocessors, such as the Intel 8086 (1978), which became the basis for the x86 architecture, still dominant today. With it came the birth of IBM PCs, running MS-DOS — and the PC revolution began.

Soon followed Intel's 80286, 80386, and 80486, introducing features like multitasking, memory management, and hardware-level security. Microprocessors now handled graphical interfaces, networking, and multitasking operating systems.

The Explosion: 32-bit, 64-bit & Multi-Core Eras (1995–2010)

By the late 1990s, microprocessors had become central to every aspect of modern life. 32-bit processors, like Intel's Pentium series, took over desktops and laptops, powering the internet boom, 3D gaming, and multimedia. Multi-core processors marked a huge leap. Instead of increasing clock speed (which led to overheating), manufacturers packed multiple cores into one chip. Dual-core, quad-core, and octa-core processors became main stream, boosting parallel computing power.

The Intelligence Era: AI, Edge Computing & Microprocessors Today (2010–Present)

Today's microprocessors are marvels of engineering — with billions of transistors, AI accelerators, graphic cores, and energy optimization circuits.

Apple's M-series, Qualcomm's Snapdragon, Intel Core i9, and AMD Ryzen chips don't just compute — they learn. They analyze images, predict user behavior, process speech, and power AI at the edge.

Conclusion: A Journey of Infinite Potential

From controlling calculators to empowering Mars rovers and Chat GPTs, microprocessors have truly evolved from humble origins to transformative forces in modern life. What started as a simple calculator-on-a-chip has become the central nervous system of the digital world — and its evolution is just beginning.

NAME: PRABUSHANKAR A

CLASS: I-ECE

Volume 24 Issue 1

AR/VR AND FLEXIBLE DEVICES

INTRODUCTION:

Augmented Reality (AR) and Virtual Reality (VR) are transforming how we interact with digital environments, while flexible devices are revolutionizing the physical form of electronics. Together, they create a future where immersive experiences are seamlessly integrated into wearable, adaptable hardware.

WHAT ARE AR/VR AND FLEXIBLE DEVICES?

AR projects digital information onto the real world, enhancing our perception through smart phones, glasses, or headsets. VR immerses users in a fully digital space, often using head-mounted displays. Flexible devices use bendable, stretchable materials, allowing electronics to comfortably conform to the body, clothing, or other curved surfaces. When combined, these technologies enable lightweight, wearable systems that offer immersive interaction and real-time feedback.

KEY INNOVATIONS AND APPLICATIONS

- **SMART AR GLASSES:**

Using flexible OLED micro displays and lightweight sensors, modern AR glasses overlay navigation, health data, and alerts directly into the user's vision without distraction.

- **VR WITH HAPTIC SUITS:**

Flexible haptic feedback suits let users feel pressure, touch, or temperature during VR sessions revolutionizing gaming, simulation training, and therapy.

- **HEALTHCARE AND REHABILITATION:**

AR-assisted surgeries guide doctors with real-time visuals of internal anatomy, while flexible VR suits monitor motion during physical therapy sessions for accurate recovery tracking.

- **EDUCATION AND DESIGN:**

AR allows students to explore interactive 3D models (e.g., human anatomy or space). Architects use VR headsets and flexible controllers to experience full-scale digital structures before construction.

ADVANTAGES OF AR/VR WITH FLEXIBLE DEVICES

- Comfortable Wear ability: Flexible designs adapt to body contours, making prolonged use easy.
- Immersive Interaction: Real-world feedback through haptics enhances virtual immersion.
- Health Integration: Flexible biosensors collect live vitals during sessions.

CHALLENGES AND THE ROAD AHEAD

- Display Durability: Flexible screens must withstand bending without losing resolution.
- Battery Efficiency: Powering immersive systems in a small, flexible form remains complex.
- Real-Time Performance: Ensuring low-latency feedback with wireless, wearable systems is still developing.

FUTURE SCOPE FOR ELECTRONICS AND COMMUNICATION ENGINEERS

- AR/VR Hardware Development
- Flexible Sensor and Display Design
- Human-Machine Interface Engineering
- Embedded Systems for Wearables
- Haptic and Motion-Tracking Systems

CONCLUSION

AR/VR combined with flexible devices is unlocking smarter, safer, and more immersive interactions across industries. These technologies are shaping the next generation of electronics—personalized, portable, and powerful. For future engineers, this field offers an exciting blend of creativity, technology, and impact.

.

NAME: PRABHU M

CLASS: II-ECE

Volume 24 Issue 1

QUANTUM ELECTRONICS

INTRODUCTION:

Quantum Electronics is the study and application of quantum mechanics to the behaviour of electrons in electronic devices. In 2024 and beyond, it is becoming a key area for future technologies such as quantum computing, secure communication, and ultra-sensitive sensors, promising to revolutionize how we process and transmit information.

WHAT IS QUANTUM ELECTRONICS?

Quantum Electronics focuses on devices where quantum mechanical effects—like tunnelling, superposition, and entanglement—play a critical role. Unlike classical electronics, where electrons move through semiconductors in predictable ways, quantum electronics harnesses the probabilistic nature of particles to achieve outcomes not possible with traditional methods.

KEY INNOVATIONS AND APPLICATIONS

➢ QUANTUM COMPUTERS:

Quantum computers use qubits that can exist in multiple states simultaneously, allowing massive parallel processing. Companies like IBM, Google, and start-ups are racing to build stable, scalable quantum systems that could solve problems classical computers cannot.

➢ QUANTUM COMMUNICATION:

With quantum key distribution (QKD), data can be transmitted with theoretically unbreakable encryption. This technology is already being tested in satellites and secure government networks to protect against cyber threats.

➢ QUANTUM SENSORS:

Quantum sensors can detect extremely small changes in gravity, magnetic fields, or time. These are useful in medical imaging, GPS-free navigation systems, and detecting underground structures without drilling.

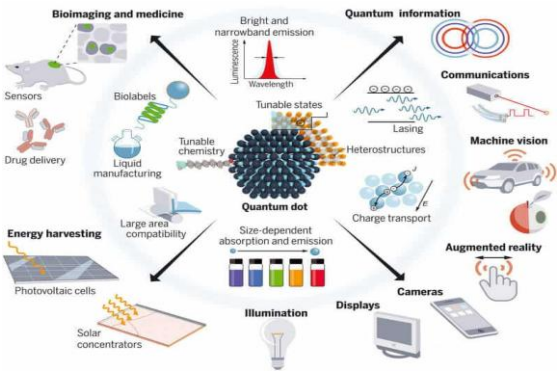
➢ LASERS AND MASERS:

Lasers (Light Amplification by Stimulated Emission of Radiation) and masers (Microwave Amplification...) are direct outcomes of quantum electronics. Their applications range from communication systems to medical treatments and spectroscopy.

Volume 24 Issue 1

ADVANTAGES OF QUANTUM ELECTRONICS

- **Unprecedented Speed:** Quantum processors can perform complex computations in seconds.
- **Enhanced Security:** Quantum encryption prevents data from being copied or intercepted.



CHALLENGES AND THE ROAD AHEAD

- **Decoherence:** Quantum systems are fragile and can lose information quickly.
- **Cooling Requirements:** Many quantum devices need ultra-low temperatures to operate.
- **Scalability:** Making large-scale quantum systems that are stable and affordable is still a major hurdle.

FUTURE SCOPE FOR ELECTRONICS AND COMMUNICATION ENGINEERS

- Quantum Processor and Chip Design
- Secure Quantum Communication Systems
- Advanced Semiconductor Research
- Quantum Algorithm Development

CONCLUSION

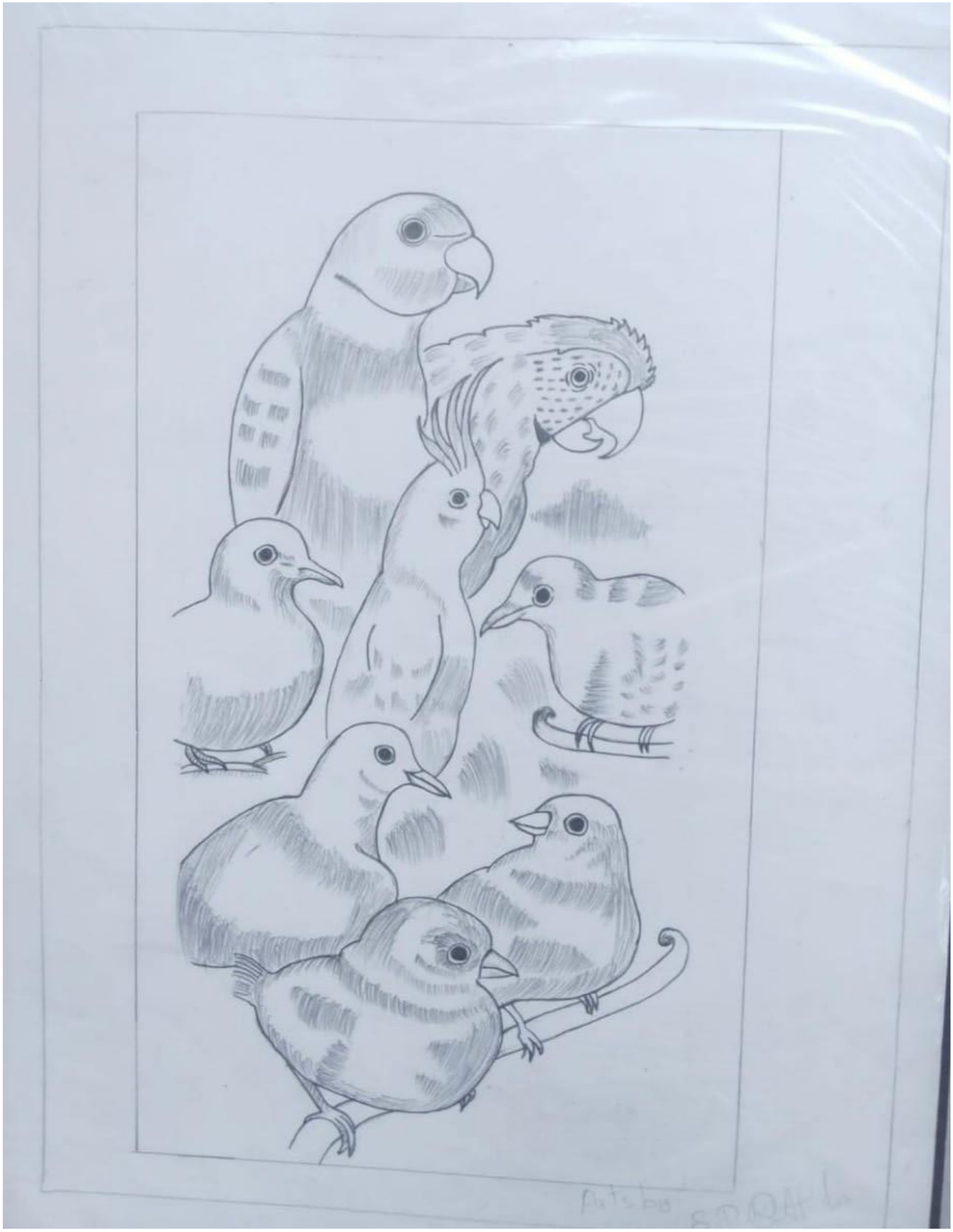
Quantum Electronics is set to transform how we compute, communicate, and sense the world. As technology advances, it opens exciting paths for engineers to innovate in next-generation electronics.

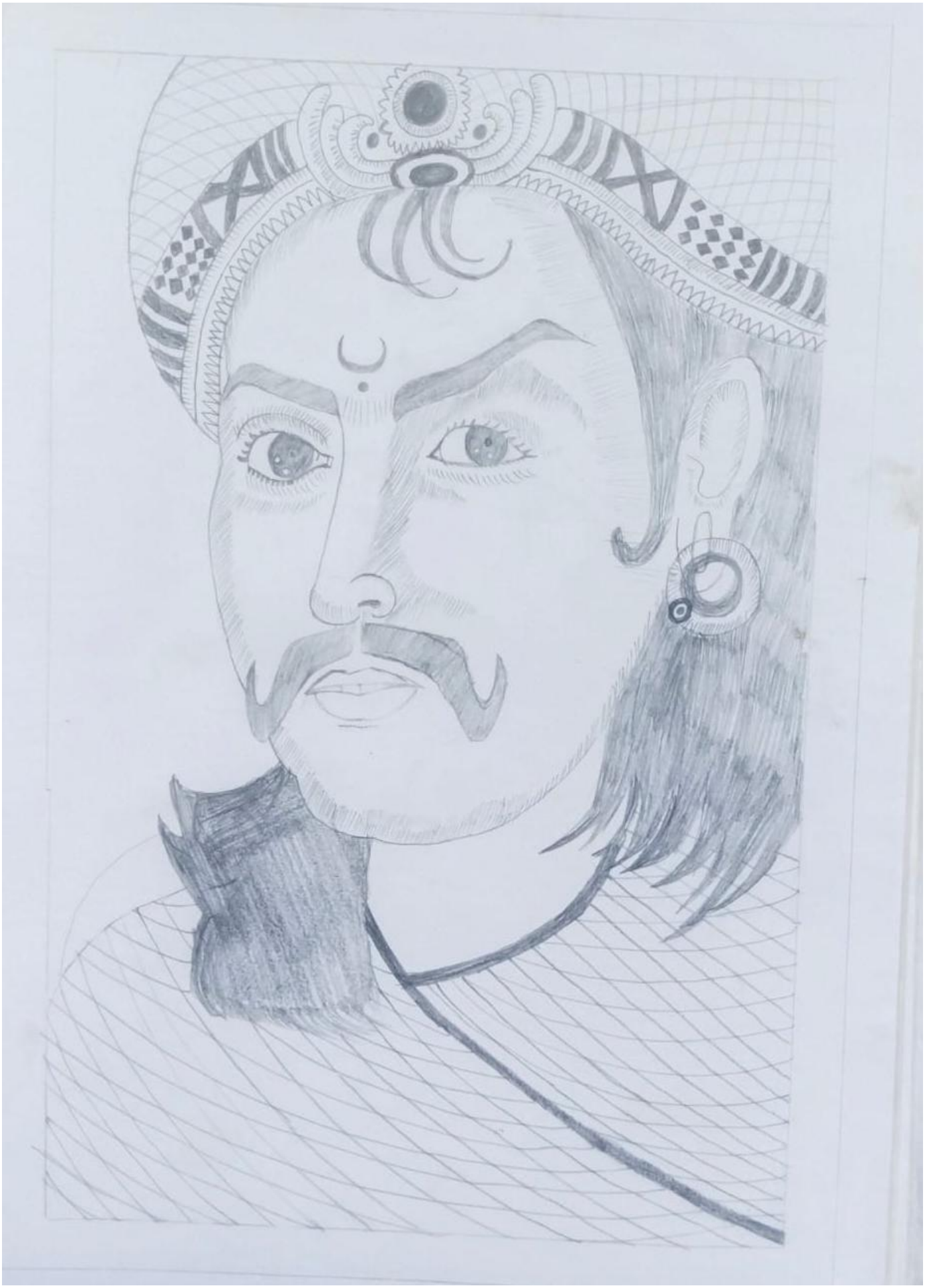
NAME:UGESHRAJA S

CLASS: II-ECE

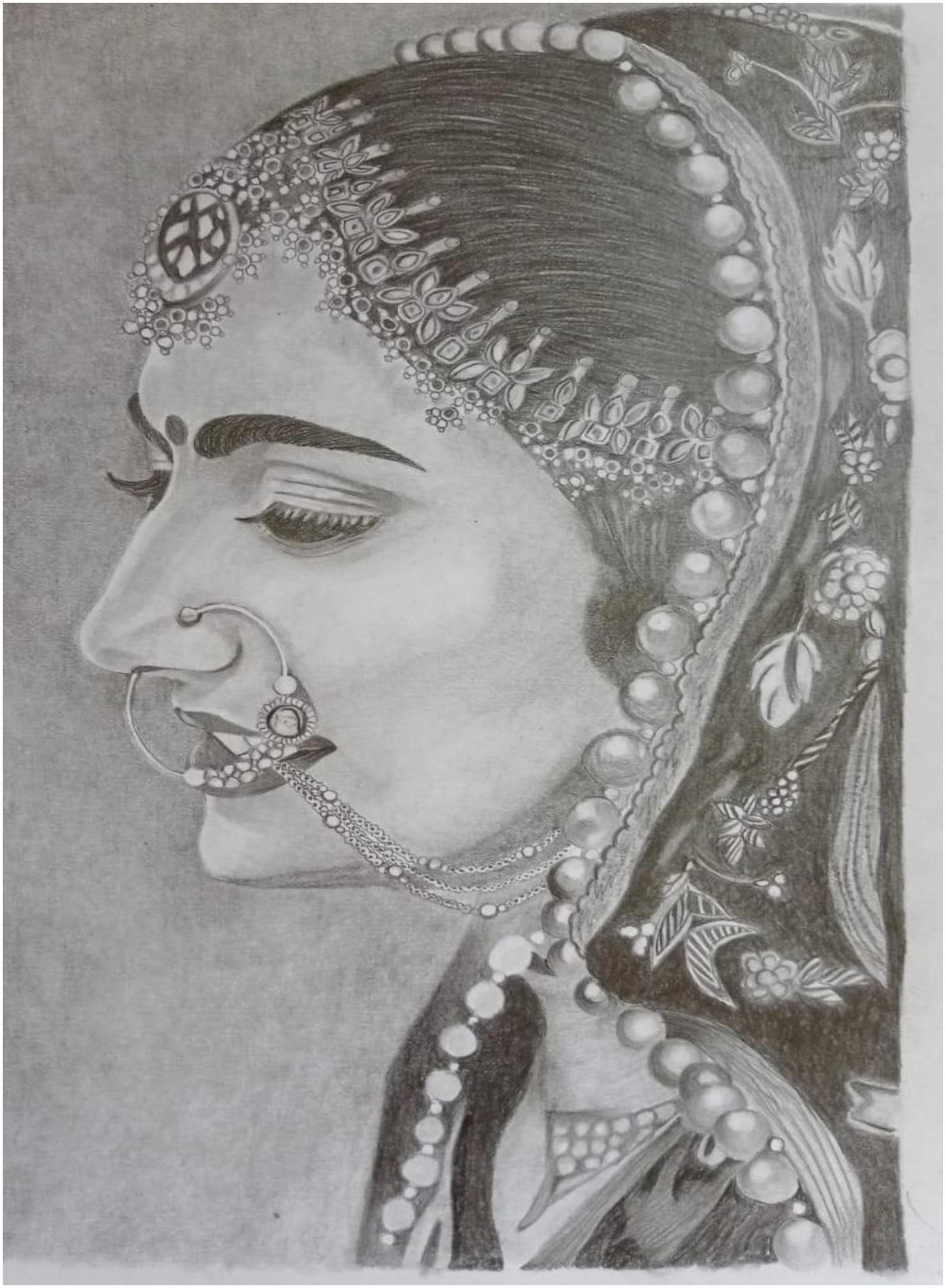

BUDHA
THIS BUDHA MY MOM GIFTS

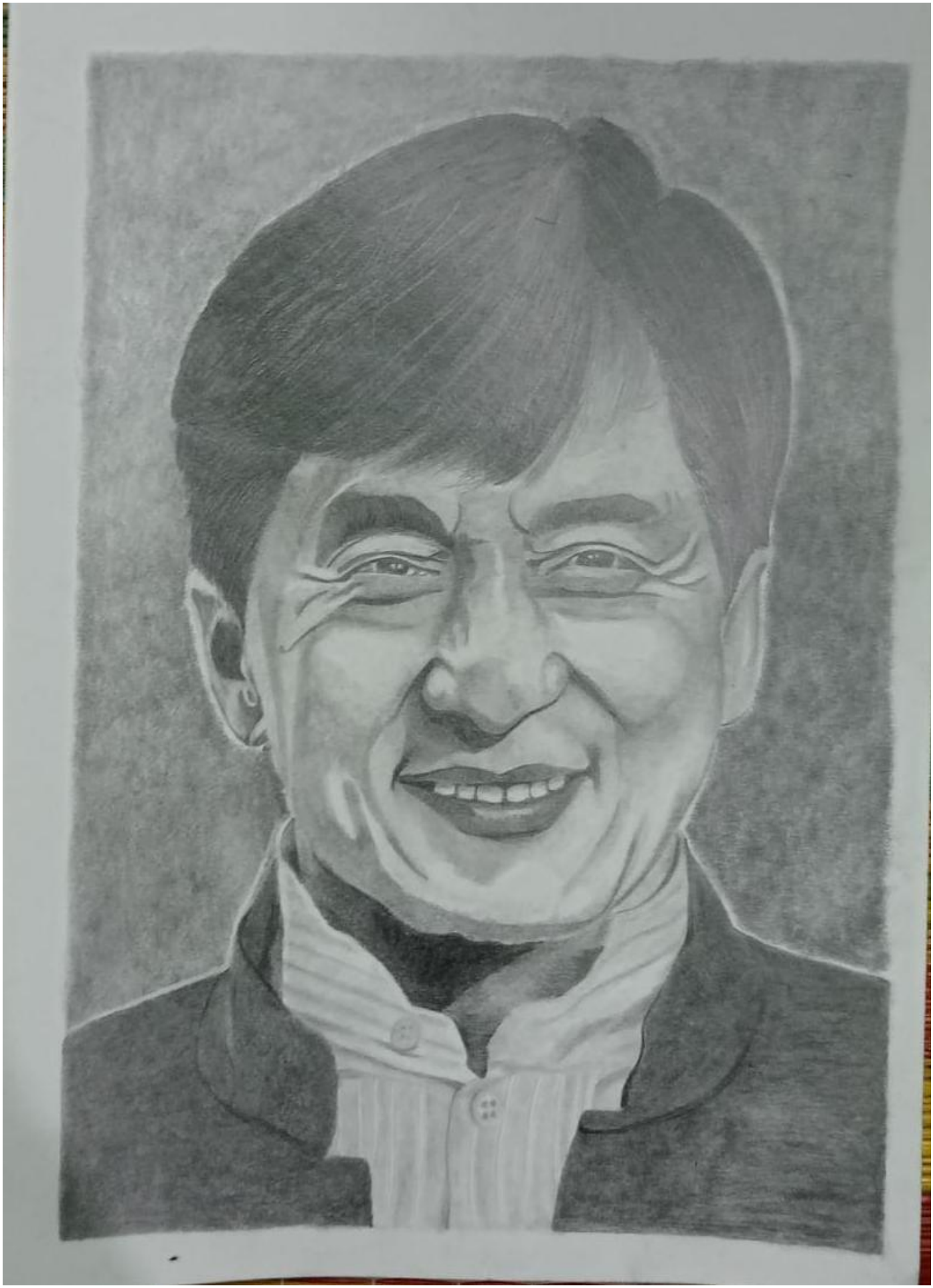

கார்த்திக்.செ.தி.






செ.பி.கார்த்திக்





NAM.E :S.P. Karthick

CLASS : I-ECE