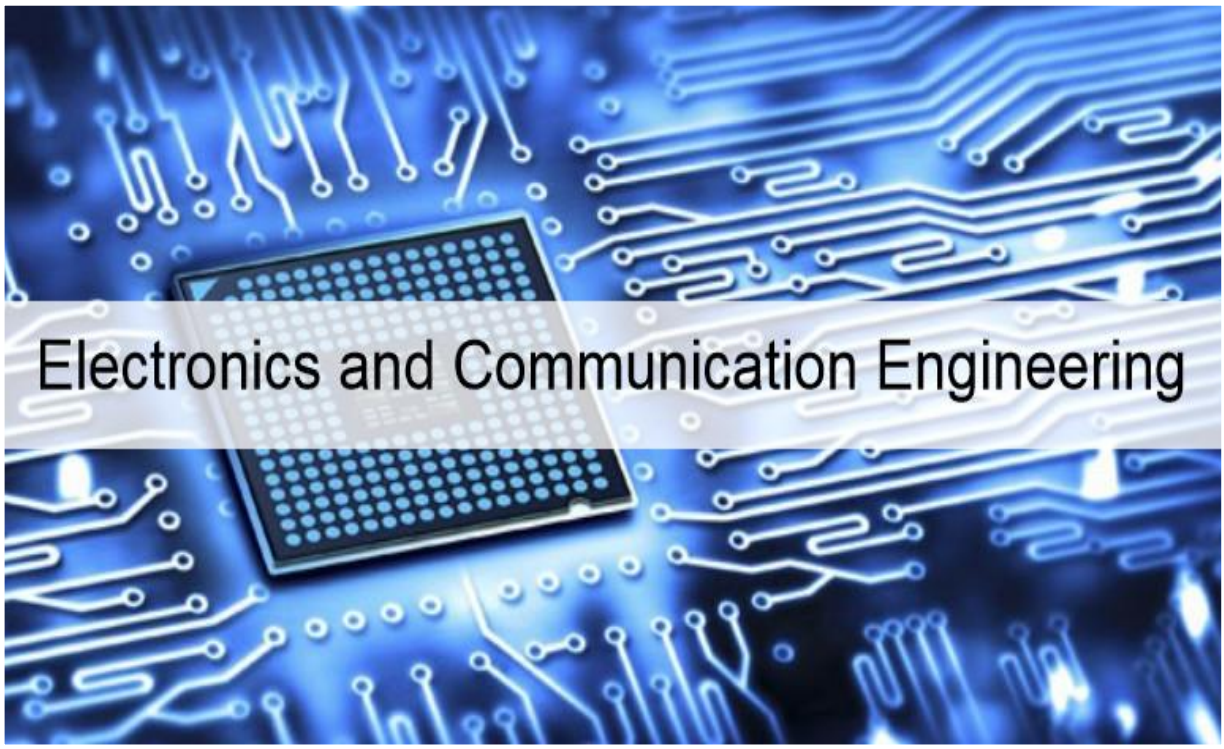
GOVERNMENT POLYTECHNIC JAMNAGAR

RESONANCE



Editor :
Mr. S. A. Pithia
Lecturer ECE Department
G P Jamnagar

Sub-Editor :
Mr. Zankhan Acharya
Student Coordinator
ECE Department

VISION

To produce creative, innovative and ethical EC engineers that will serve to societal and industrial needs.

MISSION

M1. To impart excellent technical education from fundamentals to application level, with ethics, to EC engineering students so that they can provide solution to industrial or social problems.

M2. Provide creative teaching-learning environment to students for achieving excellence in technical education.

M3. To develop state of art laboratories with latest instruments and equipment's to develop psychomotor skills in students.

M4. To establish department library with latest books, magazines, eBooks, video tutorials-lectures and other learning resources to promote reading attitude in students.

M5. To make students entrepreneur or employable in industries.

FROM PRINCIPAL'S DESK

Dear Students and Faculty Members,
Government Polytechnic, Jamnagar is moving ahead on many fronts. In this period, the consistent efforts and hard work of all has resulted in overall progress of college. I congratulate and appreciate the efforts of all involved in the process.

Mr. H. J. Baldania
Principal,
G P Jamnagar

MESSAGE FROM HOD

Dear Students, Faculties and Readers,
It is my pleasure to extend warm greetings from the ECE. As we continue our journey of academic excellence and innovation, I take immense pride in the progress our department has made—thanks to the collective efforts of our dedicated faculty, inquisitive students, and supportive stakeholders. Our curriculum is designed to balance strong theoretical foundations with practical exposure development. Let us continue to innovate, inspire and ignite minds for a better tomorrow. Our faculty members are equally committed to staying abreast of the latest technological trends, ensuring our department remains a hub of knowledge, curiosity and development. Through a blend of rigorous academics and hands-on projects, we aim to equip our students with the tools to solve real-world problems.

Mr. A. M. Bhatt,
HOD, ECE,
G P Jamnagar

ECE, G P Jamnagar

Industrial Visit to Alpha Drives

INTRODUCTION

On **28th March 2024**, the Department of Electronics and Communication Engineering, Government Polytechnic, Jamnagar, organized an **Industrial Visit** to **Alpha Drives**, Moti Banugar, Jamnagar. The visit aimed to expose the students to real-world industrial applications of motor drives and control systems, giving them a practical understanding of how electronic systems are integrated in the production and automation industries.

OBJECTIVE

The key objectives of the industrial visit were:

- To provide students with a comprehensive understanding of motor control systems and electrical drives used in industrial automation.
- To demonstrate the application of electronics and communication engineering in the manufacturing of motor drives.
- To help students relate theoretical concepts learned in class with their practical applications in a real industrial setup.
- To introduce students to the process of quality control, testing, and production planning at a manufacturing facility.

OVERVIEW OF ALPHA DRIVES

Alpha Drives is a leading manufacturer of industrial motor drives and control systems that are widely used in automation processes. The company specializes in producing high-efficiency electric motors, variable frequency drives (VFDs), and other motor control products that are essential for industrial operations. Their products cater to various sectors, including automotive, textile, manufacturing, and power generation industries.

SESSIONS AND ACTIVITIES

The industrial visit was structured into several segments to provide students with an in-depth understanding of Alpha Drives' manufacturing processes:

- **Introduction to Motor Drives and Control Systems:** The visit began with a technical presentation by Alpha Drives engineers, where students were introduced to various types of motor drives, including:
  - Variable Frequency Drives (VFDs)
  - Servo Motors
  - Stepper Motors
  - Synchronous and Induction Motors The session also covered the application of control electronics in regulating motor speed, torque, and efficiency in automated systems.

- **Manufacturing Process:** The students were taken on a guided tour of the manufacturing facility where they witnessed the production process for motor drives, including:
    - Assembly of motor control components.
    - PCB (Printed Circuit Board) design and soldering processes.
    - Wiring and integration of sensors and control circuits.
    - Final testing of motors and drives before shipment. The students were able to see how electronics and communication technologies are essential in ensuring the precision and reliability of motor control systems.
- **Quality Control and Testing:** The next segment focused on the rigorous testing and quality control measures followed by Alpha Drives. The students learned about the importance of testing motor drives under different load conditions to ensure operational safety and efficiency. They were shown how diagnostic equipment, such as oscilloscopes and signal analyzers, are used to monitor electrical parameters.
- **Automation Systems:** A session was conducted on the role of motor drives in industrial automation, covering:
    - Automated conveyor systems.
    - Robotics and motor control.
    - Integration of PLC (Programmable Logic Controllers) with motor drives for industrial applications. Students observed live demonstrations of motor drives operating in automated setups.
- **Interaction with Experts:** The students had the opportunity to interact with the engineers at Alpha Drives, who shared valuable insights into the latest trends in motor drive technology, challenges in the industry, and career opportunities in industrial automation and electronics engineering.

LEARNING OUTCOMES

The industrial visit provided the students with the following key insights:

- **Hands-on Knowledge of Motor Drives and Control Systems:** Students gained practical knowledge of the manufacturing, testing, and application of motor drives and control systems.
- **Real-World Application of Electronics Engineering Concepts:** The visit helped bridge the gap between theoretical knowledge and practical implementation, particularly in the areas of power electronics, embedded systems, and industrial automation.
- **Understanding of Quality Control Processes:** The students were introduced to the rigorous testing and quality assurance processes necessary to ensure the reliability of motor control products.
- **Career Insights:** Through interactions with industry professionals, students gained insights into the skill sets required to pursue careers in motor control technology and industrial automation.

CONCLUSION

The industrial visit to Alpha Drives, on 28th March 2024, was a success. It provided students with valuable exposure to the electronics and communication aspects of industrial motor drives, enhancing their understanding of how theoretical concepts are applied in real-world manufacturing and automation processes. The visit also inspired students to explore career opportunities in this field, making it a beneficial learning experience.

Industrial Visit to Epowertronics

INTRODUCTION

On 28/03/2024, 4th sem and 6th sem students along with two faculty members Mr. A. M. Bhatt and Mr. S. A. Pithia from the Electronics and Communication (EC) Department, had the privilege of visiting Epowertronics (Uma-Alfa), a leading manufacturer in the field of power electronics. Epowertronics specializes in designing and producing a wide range of products, including online-offline UPS systems, inverters, three-phase rectifiers, and servo stabilizers.

PURPOSE OF THE VISIT

The primary objective of our industrial visit was to gain practical insights into the manufacturing processes, quality control, and technological advancements employed by Alfa Drives. We aimed to understand how these critical power electronic devices are developed, tested, and optimized for various applications.

COMPANY OVERVIEW

EPowertronics Pvt. Ltd. founded in 2005 is a professional manufacturer and exporter that is concerned with the design, development and production of UPS, Inverters and Voltage Stabilizers. All of our products comply with international quality standards and are greatly appreciated in a variety of markets. Our innovative solutions for all power applications and our unsurpassed service offer our customers greater independence in meeting their energy needs.

VISIT HIGHLIGHTS

During our visit, we had the opportunity to :

Tour the Manufacturing Facility: We observed the assembly lines, quality control stations, and testing labs where the company produces its power electronic devices. The precision and attention to detail were impressive.

Learn about Design Considerations: the company engineers shared insights into the design process, considering factors such as load requirements, efficiency, and safety. We discussed the challenges faced in optimizing PTOs for different truck models.

Witness Testing Procedures: We witnessed rigorous testing procedures, including load testing, thermal testing, and durability tests. The company ensures that each product meets stringent performance standards.

Interact with Experts: We engaged in discussions with Epowertronics' technical team, gaining knowledge about the latest trends in power electronics and the company's commitment to innovation.

CONCLUSION

Our visit to Epowertronics was enlightening, providing us with practical exposure to the world of power electronics. We appreciate the company's dedication to quality and its role in enhancing the efficiency and reliability of commercial vehicles.

We extend our gratitude to Epowertornics for hosting us and sharing valuable insights. This experience will undoubtedly enrich our understanding of power electronics and inspire us in our academic pursuits.

Visit to *Pixon Green Energy Pvt. Ltd.*

INTRODUCTION

The students of the EC Engineering Department of Government Polytechnic, Jamnagar, had the privilege of visiting the Pixon Green Energy Pvt. Ltd, a solar Panel Manufacturing Industry. The visit was organized on 28/03/2024, with an objective to provide students an insight regarding internal working of companies and practical understanding of how industry operations are carried out.

OBJECTIVE OF THE VISIT

The main objective of the visit was to make students aware of how various activities related to manufacturing, assembling and testing of solar panels are carried out in the industry and give them an insight into real-world manufacturing scenarios.

OBSERVATIONS AND LEARNING

The students were introduced to the various stages of manufacturing solar panels. They were shown how raw materials are converted into solar cells and then assembled into solar panels. The testing process of these panels was also demonstrated. The students learned about the importance of quality control and the measures taken by the industry to ensure the efficiency of their solar panels.

Robotic Arm Automation


During the visit, the students were shown the **Robotic Arm Automation** system used in the assembly line. This system is designed to increase the efficiency and precision of the solar panel assembly process. The robotic arms, programmed with specific tasks, move with speed and accuracy that far surpasses human capability. They handle delicate tasks such as placing the solar cells onto the panel and soldering the connections. This automation reduces the risk of human error and increases the overall productivity of the manufacturing process.

Quality Control Using Image Processing


Another highlight of the visit was the demonstration of **Quality Control using Image Processing**. Pixon uses advanced image processing techniques to inspect the quality of the manufactured solar panels. High-resolution cameras capture images of the panels, which are then processed and analyzed by sophisticated software to detect any defects or irregularities. This automated quality control process ensures that every panel that leaves the factory meets the high standards set by Pixon.

The students were fascinated by these demonstrations of high-tech manufacturing processes. They gained a deeper understanding of how modern technology is used to improve efficiency and maintain quality in the production of solar panels. This visit to Pixon Industry was indeed a valuable learning experience for them.

CONCLUSION

The industrial visit to Pixon Solar Panel Manufacturing Industry was an enriching experience for students as it provided them with a practical perspective on the world of manufacturing. The students were able to correlate their theoretical knowledge with the practical working environment.

ACKNOWLEDGEMENT

We express our gratitude towards the Management of Pixon team for allowing us to visit their esteemed organization and gain valuable insights regarding the internal working environment.
All the students were awarded industrial visit completion certificate and all three faculty members were given box of goodies.

PCB Designing Workshop

Every year EC Department organizes workshop on PCB designing for pre-final year students of EC. This year also we had organized such workshop on 28/05/2024. In this workshop, all the students learn how to design and fabricate PCB and they design and fabricate PCB from given circuit diagram on their own.

The workshop runs full day from 11:30 am to 4:30 pm and it was held in computer lab no. 204 of EC department. Total 13 students attended the workshop. The students had designed PCB from circuit schematic and also fabricated PCB.

PCB designing is a 6 step process *:*
1. PCB designing: Designing PCB from schematic.
2. Printout: Print out of PCB design on glossy paper.
3. Pattern transfer: Pattern transfer from glossy paper to coper clad PCB using IRON Press.
4. Etching: etching out extra coper from PCB using FECl3.
5. Drilling: drilling holes for mounting components.
6. Mounting and soldering components.

Four senior students, Sanjeev, Jigar, Krushant and Pavan explained the complete process of PCB development and also demonstrated the process.

Then each student was given one circuit diagram to design and develop the complete PCB. All the students followed step by step procedure under the guidance of seniors and developed the PCB.

OUTCOME

The students learned how to design PCB from schematic diagram and developed complete PCB for given circuit on their own.

A *Student Article* on "***The Future of Interaction* : *Hand Gesture Control Technology* redefines *Human-Machine Communication***"

Introduction to a Touchless Era

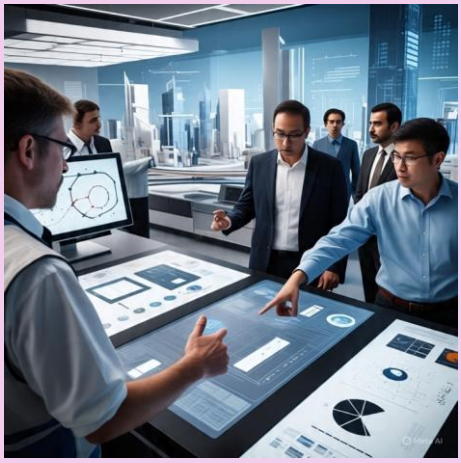
In an age where digital interfaces dominate our daily lives, hand gesture technology emerges as a revolutionary approach to human-computer interaction. This innovative system allows users to control devices and manipulate digital content through simple hand movements, eliminating the need for physical contact with screens or input devices. From smart homes to surgical theatres, gesture recognition is transforming how we engage with technology, offering a more intuitive and hygienic alternative to traditional interfaces. As we move toward more immersive computing experiences, hand gesture technology stands at the forefront of this interactive revolution, promising to reshape everything from entertainment to industrial operations.

The Science Behind Gesture Recognition

Modern hand gesture systems rely on sophisticated combinations of hardware and software to interpret human movements. Advanced depth-sensing cameras, such as those using time-of-flight or structured light technology, create detailed 3D maps of hand positions in real time. These systems employ machine learning algorithms trained on vast datasets of hand gestures to accurately distinguish between intentional commands and random movements. Some implementations use specialized sensors that detect muscle activity or bone conduction, while others rely purely on visual recognition. The technology has evolved from simple motion detection to complex interpretation of finger articulation, hand orientation, and even subtle wrist movements, enabling precise control of digital systems without any physical contact.

ECE, G P Jamnagar

Transformative Applications Across Industries



The healthcare sector has embraced gesture technology in operating rooms, where surgeons can manipulate medical images without breaking sterility protocols. Automotive manufacturers are integrating gesture controls into vehicle infotainment systems, allowing drivers to adjust settings with simple hand waves. Retail spaces are experimenting with gesture-activated displays that respond to customer movements, creating engaging shopping experiences. In industrial settings, workers wearing protective gear can operate machinery through recognized gestures when traditional interfaces are impractical. Perhaps most notably, the gaming and virtual reality industries have driven mainstream adoption of gesture technology, with systems that translate full-body movements into digital actions, creating unprecedented levels of immersion.

Balancing Potential with Practical Considerations

While gesture technology offers remarkable possibilities, it presents unique challenges that developers continue to address. The "gorilla arm" syndrome - fatigue from prolonged gesture use - remains a concern for certain applications. Environmental lighting conditions can affect optical systems' accuracy, and the technology sometimes struggles with distinguishing between similar gestures. Additionally, the lack of tactile feedback that users expect from traditional interfaces can create uncertainty in operation. These limitations are being mitigated through improved sensor technology, better feedback mechanisms like haptic responses, and more intuitive gesture vocabularies designed through extensive user testing.

The Road Ahead: Gestures in Tomorrow's World

The future of hand gesture technology points toward increasingly sophisticated and seamless integration into our daily lives. Emerging developments include the combination of gesture recognition with augmented reality interfaces, where users can manipulate holographic projections with natural hand movements. Researchers are working on systems that can interpret sign language in real time, potentially revolutionizing communication for the hearing impaired. Miniaturization of sensors is enabling gesture control in wearable devices, while advances in artificial intelligence are creating systems that can predict user intentions from partial gestures.

Conclusion: A Natural Evolution of Interaction

Hand gesture technology represents more than just an alternative input method - it signifies a fundamental shift toward more natural, intuitive ways of communicating with our devices. As the technology matures, we can expect to see gesture interfaces become as commonplace as touchscreens are today, blending seamlessly into our environments and daily routines. From reducing surface contact in public spaces to enabling new forms of creative expression, gesture recognition is poised to play a central role in the next generation of human-computer interaction. While it may not completely replace traditional interfaces, it will undoubtedly expand our digital capabilities, creating new paradigms for how we work, play, and connect with technology in an increasingly touchless world.

-Mr. Shivam Thanki
Enrollment No. 216250311003