Intern At Invarsys Consultancy Private Limited

Internship Report

Submitted for the partial fulfilment of the degree of

Bachelor of Technology

In

Computer Science & Engineering

Submitted By

Ishita Rochlani

0901CD211030

UNDER THE SUPERVISION AND GUIDANCE OF

Dr. Khushboo Agarwal

Assistant Professor

Department of Computer Science & Engineering

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR (M.P.), INDIA
माधव प्रौद्योगिकी एवं विज्ञान संस्थान, ग्वालियर (म.प्र.), भारत
(Deemed to be University)
NAAC ACCREDITED WITH A++ GRADE

January-May 2025

DECLARATION BY THE CANDIDATE

I hereby declare that the work entitled **"Data Analytics"** is my work, conducted under the supervision of **Dr. Khushboo Agrawal, Assistant Professor, during** the session Jan-May 2025. The report submitted by me is a record of Bonafide work carried out by me.

I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Ishita Rochlani

0901CD211030

Date: 23-04-2025
Place: Gwalior

This is to certify that the above statement made by the candidates is correct to the best of my knowledge and belief.

Guided By:

_____

Dr. Khushboo Agrawal
Assistant Professor
Department of Computer Science & Engineering
MITS, Gwalior

Departmental Internship Coordinator   **Approved by HoD**

_____   _____

Dr Kuldeep N. Tripathi   **Dr. Manish Dixit**
Designation   **Designation**
CSE   CSE
MITS, Gwalior   MITS, Gwalior

PLAGIARISM CHECK CERTIFICATE

This is to certify that I/we, a student of B.Tech. in **Computer Science & Engineering** have checked my complete report entitled **"Internship Report"** for similarity/plagiarism using the "Turnitin" software available in the institute.

This is to certify that the similarity in my report is found to be …… which is within the specified limit (30%).

The full plagiarism report along with the summary is enclosed.

Ishita Rochlani

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Checked & Approved By:

Khushboo Agrawal
Assistant Professor
CSE
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ABSTRACT

During the internship at Invarsys, the intern aimed to gain practical experience in data analytics through real-world projects. Their primary responsibilities included analyzing and interpreting datasets to derive meaningful insights, supporting data-driven decision-making processes, and developing proficiency in analytical tools and technologies. The internship also focused on enhancing problem-solving, critical thinking, and data visualization skills while contributing to projects that improve business outcomes through data analysis.

The project undertaken was healthcare-focused, leveraging AI and 3D modeling to support dentists in visualizing post-dental surgery outcomes. This involved developing and refining a 3D AI-trained model capable of generating accurate facial images, thereby enhancing surgical planning and patient care. Working with KLOwen Orthodontics, a leader in innovative orthodontic solutions, provided a unique opportunity to gain hands-on experience with 3D imaging technologies and explore their applications in healthcare. Additionally, the intern learned about advanced AI and machine learning techniques used for training predictive models and their integration with 3D visualization to create practical, real-world solutions.

Throughout the internship, the intern successfully developed or contributed to a 3D AI-trained model, assisted dentists in improving pre-surgical planning and patient communication through AI-powered visualization, and gained comprehensive knowledge of 3D imaging, AI, and machine learning techniques. They developed proficiency in tools and technologies used for 3D modeling and AI training, enhanced their data analysis, problem-solving, and technical skills, and built an understanding of healthcare-specific AI applications and their impact on patient outcomes. This experience allowed the intern to create a valuable deliverable that supports KLOwen Orthodontics' mission and objectives while acquiring teamwork and collaboration skills by working with industry professionals.

ACKNOWLEDGEMENT

The full semester internship has proved to be pivotal to my career. I am thankful to my institute, **Madhav Institute of Technology and Science, Gwalior** to allow me to continue my disciplinary/interdisciplinary internship as a curriculum. I extend my gratitude to the Director of the institute, **Dr. R. K. Pandit** and Dean Academics, **Dr. Manjaree Pandit** for this.

I would sincerely like to thank my department, **Department of Computer Science and Engineering**, for allowing me to explore this internship. I humbly thank **Dr. Manish Dixit**, **Professor and Head**, Department of Computer Science and Engineering, for his continued support during this engagement, which eased the process and formalities involved. I am sincerely thankful to my faculty mentors.

I am grateful to the guidance **Dr. Khushboo Agrawal**, Assistant Professor, Department of Computer Science and Engineering, for his continued support and close mentoring throughout the internship. I am also very thankful to the faculty and staff of the department.

Ishita Rochlani

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CHAPTER 1: INTRODUCTION

As an intern at Invarsys, I am delighted to present this mid-term evaluation report, documenting my progress and experiences during my internship. Throughout this internship, I have been immersed in the dynamic field of data analytics, actively engaged in projects aimed at enhancing my skills and contributing to the company's objectives. One of the significant projects I have been working on is a healthcare-focused initiative that leverages AI and 3D modeling to support dentists in visualizing post-dental surgery outcomes.

This project involves developing and refining a 3D AI-trained model capable of generating accurate facial images, thereby enhancing surgical planning and patient care. Working with KLOwen Orthodontics, a leader in innovative orthodontic solutions, has provided a unique opportunity to gain hands-on experience with 3D imaging technologies and explore their applications in healthcare. Additionally, I have been learning about advanced AI and machine learning techniques used for training predictive models and their integration with 3D visualization to create practical, real-world solutions.

In addition to my work on the project, I have dedicated time to improving my skills and learning. This internship has provided me with a valuable opportunity to apply theoretical knowledge to real-world projects, significantly enhancing my practical skills and understanding of data analytics processes. In this report, I will outline my accomplishments, challenges faced, skills developed, and the support I have received from my colleagues and supervisors during my internship at Invarsys.

CHAPTER 2: COMPANY PROFILE

About Invarsys

Invarsys is an innovative software development company specializing in providing advanced technology solutions across various industries. With expertise in data analytics, artificial intelligence, and custom software development, Invarsys is dedicated to helping businesses achieve operational excellence and sustainable growth. The company offers a wide range of services, including AI-driven solutions, cloud integration, and mobile and web application development, tailored to meet client-specific needs. Serving sectors like healthcare, finance, education, and e-commerce, Invarsys has earned a reputation for delivering high-quality, scalable, and intelligent solutions. Guided by values of innovation, customer focus, and integrity, Invarsys is committed to empowering businesses with cutting-edge technologies.

Key Highlights

Software Publishing:

Our software publishing division is committed to delivering high-quality, ready-made software solutions across various domains. From operating systems software to business applications and computer games for all platforms, we offer a comprehensive range of products that cater to diverse needs. With a focus on reliability, performance, and user experience, our ready-made software solutions are designed to streamline processes, enhance productivity, and drive business growth.

Consultancy:

At Invarsys, we understand that every business is unique, with its own set of challenges and requirements. That's why our consultancy services are tailored to provide the best solutions to address the specific needs of our clients. Whether it's analysing user needs, identifying problems, or developing custom software solutions, our team of experienced consultants works closely with clients to deliver personalized, cost-effective, and scalable solutions that drive business success.

Our consultancy services extend to providing made-to-order software based on orders from specific users, ensuring that every solution is precisely tailored to meet individual requirements. Additionally, we offer software maintenance services to ensure the continued performance and reliability of our solutions, providing peace of mind to our clients.

Web-Page Design:

In today's digital age, a strong online presence is essential for businesses to succeed. Our web-page design services are aimed at helping businesses establish and enhance their online presence through visually appealing, user-friendly, and responsive websites. Whether it's a simple landing page or a complex e-commerce platform, our team of talented designers and developers creates custom web solutions that captivate audiences, drive engagement, and deliver results.

Founding Principles

Founded on the principles of innovation, integrity, and collaboration, Invarsys was established with a clear mission: to harness the power of technology to create transformative products that make a positive impact on people's lives. With a team of highly skilled and passionate professionals, Invarsys is committed to pushing the boundaries of possibility and driving positive change through technology.

Product-Centric Approach

At Invarsys, we believe that great products are the result of a deep understanding of user needs, relentless innovation, and uncompromising quality. Our product-centric approach is guided by a relentless pursuit of excellence and a commitment to delivering solutions that exceed customer expectations. Whether it's developing cutting-edge software applications, pioneering new technologies, or reimagining existing products, we are dedicated to pushing the envelope and delivering value-driven solutions that drive tangible results.

CHAPTER 3: INTERNSHIP WORK

Throughout the internship, the intern has been involved in various learnings and implementations, including a significant healthcare-focused project.

Project – 3D AI-Enhanced Dental Visualization: The project involves developing a 3D AI-trained model to support dentists in visualizing post-dental surgery outcomes. The application consists of several modules: the data preprocessing module, which handles data cleaning and preparation; the AI training module, which uses advanced machine learning techniques to train the model; and the visualization module, which generates accurate 3D facial images. Technologies used in this project include Python for data preprocessing and integration, TensorFlow and Keras for deep learning model training, Scikit-learn for implementing machine learning algorithms, and PySpark for processing large datasets. Additionally, SQLAlchemy was used for data storage, Flask for deploying models and creating APIs, and Docker for containerization. The intern also utilized 3D modeling tools such as Blender or Autodesk Maya, intraoral scanners like the TRIOS 6, Cone Beam Computed Tomography (CBCT), and digital X-rays to enhance the accuracy and efficiency of the 3D models.

Main Objectives of the 3D AI-Enhanced Dental Visualization Project: The primary objectives of this project are to improve surgical planning and patient communication through AI-powered visualization, enhance the accuracy of 3D facial image generation, and support the mission of KLOwen Orthodontics by providing innovative solutions. The project aims to leverage AI and 3D modeling to create practical, real-world applications that improve patient outcomes and streamline dental procedures. By working on this project, the intern has gained comprehensive knowledge of 3D imaging, AI, and machine learning techniques, and has developed proficiency in tools and technologies used for 3D modeling and AI training.

They have successfully developed or contributed to a 3D AI-trained model, assisted dentists in improving pre-surgical planning, and gained hands-on experience with cutting-edge technologies. The support and guidance from colleagues and supervisors have been instrumental in their learning and development, making this internship a highly enriching experience.

CHAPTER 4: IMPLEMENTATION

Here are the key technologies used to develop the 3D AI-enhanced dental visualization model and imaging:

1. **Python**: Used for data preprocessing, machine learning model development, and integration with other tools.

2. **TensorFlow and Keras**: Deep learning frameworks used for training the AI model.

3. **Scikit-learn**: Machine learning library used for implementing various algorithms and model evaluation.

4. **PySpark**: Used for processing large datasets and distributed data processing.

5. **SQLAlchemy**: Used for data storage and management.

6. **Flask**: Web framework used for deploying machine learning models and creating APIs.

7. **Docker**: Containerization technology used for deploying models in a consistent environment.

8. **Airflow**: Used for automating data pipelines and workflow management.

9. **3D Modeling Tools**: Software such as Blender or Autodesk Maya used for creating and refining 3D facial images.

10. **Intraoral Scanners**: Devices like the TRIOS 6 scanner used for capturing high-resolution 3D images of patients' teeth and gums

11. **Cone Beam Computed Tomography (CBCT)**: AI algorithms enhance CBCT images to provide detailed 3D views of the jawbone and surrounding structures

12. **Digital X-rays**: AI systems analyze digital X-rays for early detection of issues such as bone loss and tooth decay

These technologies collectively enable the development of accurate and efficient 3D AI-enhanced dental visualization models, improving surgical planning and patient care.

CHAPTER 6: EXPECTED / ACHIEVED OUTCOME

Outcomes:

The following is the list of Expected/Achieved Outcomes –

• Successfully develop or contribute to a 3D AI-trained model capable of generating accurate facial images post-dental surgery.

• Assist dentists in improving pre-surgical planning and patient communication through AI powered visualization.

• Gain comprehensive knowledge of 3D imaging, AI, and machine learning techniques.

• Develop proficiency in tools and technologies used for 3D modeling and AI training.

• Enhance data analysis, problem-solving, and technical skills through practical application.

• Build an understanding of healthcare-specific AI applications and their impact on patient outcomes.

• Create a valuable deliverable that supports KLOwen Orthodontics' mission and objectives.

• Acquire teamwork and collaboration experience by working with industry experts on cutting-edge solution

CHAPTER 7: CONCLUSION

My solution-focused internship at Invarsys provided a transformative experience by directly applying AI and machine learning to address a tangible healthcare challenge. The core of my work involved developing a 3D model designed to visualize post-dental surgery outcomes, offering a practical technology-driven solution for KLOwen Orthodontics. This hands-on engagement significantly enhanced my analytical abilities and deepened my understanding of 3D imaging concepts within a problem-solving context. Contributing to a project with the clear aim of improving surgical planning and fostering better patient communication was particularly rewarding and reinforced my passion for utilizing innovative technology for positive impact in the healthcare sector.

The internship allowed me to work with a variety of advanced technologies, including Python, TensorFlow, Keras, Scikit-learn, PySpark, SQLAlchemy, Flask, Docker, and 3D modeling tools such as Blender or Autodesk Maya. Additionally, I gained experience with intraoral scanners like the TRIOS 6, Cone Beam Computed Tomography (CBCT), and digital X-rays. These tools and technologies were instrumental in developing a robust 3D AI-trained model that could accurately generate facial images post-dental surgery. The integration of these technologies not only improved my technical skills but also provided a comprehensive understanding of their applications in healthcare.

Overall, the internship at Invarsys was a highly enriching experience that significantly enhanced my practical skills and theoretical knowledge. The support and guidance from colleagues and supervisors were invaluable, helping me navigate challenges and achieve project goals. This experience has solidified my commitment to leveraging innovative technology to create positive impacts in the healthcare sector, and I am eager to continue exploring and contributing to this field in the future.
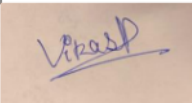
CHAPTER 8: FUTURE WORK

To further enhance the accuracy and realism of the 3D AI-trained model for visualizing post-dental surgery outcomes, several advanced strategies can be implemented. Increasing the volume and diversity of data used to train the AI model can significantly improve its accuracy and realism. Incorporating advanced AI techniques such as deep learning, convolutional neural networks (CNNs), and generative adversarial networks (GANs) can help the model learn more complex patterns and generate more precise predictions. These techniques can be used to refine the model's ability to simulate facial changes post-surgery, ensuring that the generated images are as realistic as possible.
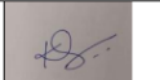
Integrating dynamic factors such as healing and swelling into the model can provide more comprehensive predictions. By incorporating temporal data and physiological models that simulate the healing process, the AI can predict how a patient's appearance will change over time. Personalizing predictions based on individual patient characteristics and specific surgical plans can greatly improve the model's relevance and accuracy. By incorporating patient-specific data such as age, gender, skin type, and medical history, the AI can tailor its predictions to reflect the unique aspects of each case. Additionally, integrating detailed surgical plans can help the model simulate the precise effects of different procedures, providing more accurate visualizations.

Expanding the applications of the technology to cover a wider range of dental procedures, such as orthodontics, implants, and cosmetic dentistry, can make the AI model a versatile tool for dental professionals. Real-time visualization and integration with augmented reality (AR) and virtual reality (VR) technologies can revolutionize the way dental professionals and patients interact with the model. Developing a cloud-based platform can make the technology more accessible to dental professionals worldwide, facilitating collaboration and knowledge sharing. These strategies can significantly enhance the capabilities of the 3D AI-trained model, making it a powerful tool for improving surgical planning, patient communication, and overall dental care.
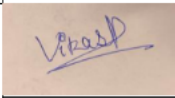
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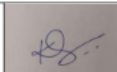## MONTHLY REPORT OF PROGRESS (MRP) FROM INDUSTRY MENTOR

Name of student	Ishita Rochlani		Department	Computer Science and Engineering	
Industry/Organization	Invarsys Consultancy		Date/Duration	02/01/25 -08/02/25	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge upgradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	She demonstrates impressive grasping skills and is a good performer, her tasks for this month generally involved around learning basic concepts of 3-D imaging and Open-cv. She was punctual with all her assigned deadlines and completed all the tasks with perfection.				
OVERALL GRADE (Any one)	**EXCELLENT**				
Name of Industry Mentor	Mr. Vikas Parikh				
Signature of Industry Mentor					

Receiving Date	11-02-25	Name of Faculty Mentor	Prof. Khushboo Agrawal	Sign	

MPR 2

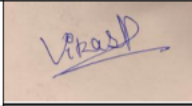## MONTHLY REPORT OF PROGRESS (MRP) FROM INDUSTRY MENTOR
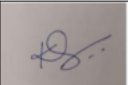
Name of student	Ishita Rochlani		Department	Computer Science and Engineering
Industry/Organization	Invarsys Consultancy		Date/Duration	12/02/25 -12/03/25

Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge upgradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓

Comment on nature of work done/Area/Topic	This month, she has effectively learned about all the ML models and features involved in our project and successfully suggested fine tuning measures and different approaches to increase the efficiency of the 3D image scanning model. She also dedicatedly helped in analysing different datasets and generating a comparative report for our various projects using data analysis tools. Her perseverance and management skills are commendable.
OVERALL GRADE (Any one)	**EXCELLENT**
Name of Industry Mentor	Mr. Vikas Parikh
Signature of Industry Mentor	

Receiving Date	12-03-25	Name of Faculty Mentor	Prof. Khushboo Agrawal	Sign	

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MONTHLY REPORT OF PROGRESS (MRP) FROM INDUSTRY MENTOR

Name of student	Ishita Rochlani	Department	Computer Science and Engineering
Industry/Organization	Invarsys Consultancy	Date/Duration	13/03/25 -12/04/25

Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					✓
Learning capacity/Knowledge upgradation					✓
Performance/Quality of work					✓
Behaviour/Discipline/Team work					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	Her work majorly revolved around analusing different CT Scan Images and study the pattern of the model generated images to enhance and work upon its efficiency. She also dedicatedly helped in analysing different datasets and generating a comparative report for our various projects using data analysis tools. Her perseverance and management skills are commendable.				
OVERALL GRADE (Any one)	**EXCELLENT**				
Name of Industry Mentor	Mr. Vikas Parikh				
Signature of Industry Mentor					

Receiving Date	12-04-25	Name of Faculty Mentor	Prof. Khushboo Agrawal	Sign	