

PYTHON

Submitted in partial fulfilment of the required for the award of
Master of Science Degree in Bioinformatics and Data Science

By

BOOMISHA S D (43739037)



**DEPARTMENT OF BIOINFORMATICS AND DATA
SCIENCE**

SCHOOL OF BIO AND CHEMICAL ENGINEERING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

**Accredited with Grade “A++” by NAAC JEPPIAAR
NAGAR, RAJIV GANDHI SALAI, CHENNAI –
600119**

APRIL 2024



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

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DEPARTMENT OF BIOINFORMATICS AND DATA SCIENCE

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of BOOMISHA SD (43739037) who carried out the internship entitled "PYTHON" under my / our supervision from February 2024 to March 2024.

Internal Guide

External Guide (if Applicable)

Head of the Department

Submitted for Viva voce Examination held on_____

Internal Examiner

External Examiner

DECLARATION

I, **BOOMISHA S D** hereby declare that the INTERNSHIP entitled “PYTHON” done by me under the guidance of **EAGLE SOFTWARE INDIA PRIVATED LIMITED** is submitted in partial fulfillment of the requirements for the award of Master of Science degree in Bioinformatics and Data Science.

DATE:

PLACE: CHENNAI

BOOMISHA S D

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management of SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. REKHA CHAKRAVARTHI M.E., Ph.D. Dean of Arts and Science** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my project guide **Dr. JEMMY CHRISTY M** Department of Bioinformatics and Data Science for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Bioinformatics and Data Science** who were helpful in many ways for the completion of the project.

(BOOMISHA SD)

INDEX

S.NO	TITLE	PAGE NO
1	INTERNSHIP REPORT	1
1.1	OFFER LETTER FOR INTERNSHIP	1
1.2	OVIerview OF ORGANIZATION	2
1.3	INTRODUCTION TO PYTHON	3
1.4	PURPOSE OF PYTHON	4
1.5	METHODS USED IN PYTHON	5
1.6	SKILL USES IN PYTHON	6
1.7	IMPORTANCE OF THE SKILL GAINED	7
1.8	ABOUT MY EXPERIENCE	8
1.9	LEARNING OUTCOME	9
1.10	ACHIEVEMENT	10
1.11	CONCLUSION	11
2	PLAGARISAM REPORT	12
2.1	REVIEW ARTICLE	16
3	MATLAB COURSE	18
4	MATLAB CERTIFICATE	23

1. INTERNSHIP REPORT

1.1 OFFER LETTER FOR INTERNSHIP

ot on OnePlus
omi ma

eagle software
India Private Limited

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Website : www.eaglesoftware.in
GST No. : 33AABCE4796R1ZY

Date: 30.03.2024

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. BOOMISHA S D** has successfully completed two month of an internship program from **01.02.2024 to 30.03.2024** in the Project department of our organization.

She was highly motivated and hardworking. She worked sincerely at his tasks and did a very good job.

We wish her great success in her future endeavours.

For Eagle Software India Pvt,Ltd.,
K.H. Iyer
Authorized singnatory



REGD. OFFICE: 35, M. S. KOIL STREET, ROYAPURAM, CHENNAI - 600 0013, INDIA.

1.2 OVERVIEW OF ORGANIZATION

Eagle Diaries, established in 1956, stand as a cornerstone within the broader Eagle Group. With a rich legacy spanning several decades, they have entrenched themselves as a dominant force in the global diary market. Offering an extensive array of products, Eagle Diaries boast over 160 varieties of diaries and versatile notebooks, each embodying the hallmark of quality and craftsmanship.

A distinguishing feature of Eagle Diaries is their commitment to customization, tailoring their products to meet the unique specifications and preferences of their customers. This bespoke approach ensures that clients receive diaries and notebooks perfectly suited to their individual needs, fostering a sense of personal connection and satisfaction.

Through their dedication to excellence and innovation, Eagle Diaries continue to uphold their position as a leader in the industry, delivering premium-quality stationery solutions to consumers worldwide. Eagle Diaries play a crucial role within the expansive Eagle Group, a conglomerate that has been in operation since 1956. Renowned for their excellence, Eagle Diaries hold a significant share of the global diary market, a testament to their enduring quality and popularity.

The product range offered by Eagle Diaries is extensive, encompassing over 160 varieties of diaries and versatile notebooks. Each of these products reflects the brand's commitment to excellence and innovation, making them highly sought after by consumers worldwide.

One of the key strengths of Eagle Diaries lies in their ability to provide customized solutions tailored to the specific requirements and preferences of their customers. Whether it's for personal or professional use, Eagle Diaries can design and deliver diaries that perfectly align with individual needs, ensuring maximum satisfaction and utility.

1.3 INTRODUCTION TO PYTHON:

Python is a high-level programming language known for its simplicity, readability, and versatility. Created by Guido van Rossum and first released in 1991, Python has since become one of the most popular programming languages worldwide.

Python's syntax is designed to be easy to understand and learn, making it an ideal choice for beginners and experienced developers alike. It emphasizes readability and uses indentation to define code blocks, rather than relying on curly braces or keywords.

One of Python's key strengths is its extensive standard library, which provides a wide range of modules and functions for tasks such as file handling, networking, and data manipulation. This rich ecosystem simplifies development by offering pre-built solutions to common programming challenges.

Python supports multiple programming paradigms, including procedural, object-oriented, and functional programming, allowing developers to choose the approach that best suits their needs. It also has a vibrant community and extensive documentation, making it easy to find support and resources for learning and development.

Python is widely used in various fields, including web development, data analysis, artificial intelligence, scientific computing, and automation. Its versatility and ease of use have contributed to its popularity among developers, making it a valuable skill in today's technology landscape.

1.4 PURPOSE OF PYTHON INTERNSHIP:

The purpose of a Python internship is to provide students or aspiring developers with hands-on experience in Python programming. Through real- world projects and mentorship, interns enhance their coding skills, gain practical knowledge, and build a foundation for future careers in software development. Internships also offer opportunities for networking, resume building, and exposure to industry practices, helping interns' transition smoothly into professional roles in the field of Python development.

Interns gain hands-on experience and enhance their Python programming skills. Interns work on actual projects, gaining practical knowledge of Python development. Interns learn about industry practices, workflows, and collaboration methods. Interns connect with professionals in the field, building valuable relationships. Completing a Python internship adds relevant experience to a resume, enhancing employability.

1.5 METHODS USED IN PYTHON DEVELOPMENT:

Provide an overview of the internship, including the organization, duration, and objectives. Briefly discuss the context of Python programming and its relevance to the internship. Outline the scope of work and specific objectives of the internship project. Describe the approach and methods used during the internship, such as programming languages, tools, and frameworks. Detail the tasks, projects, and activities completed during the internship, highlighting key achievements and contributions.

1.6 SKILLS USE DURING THE INTERNSHIP:

Proficiency in writing clean, efficient and maintainable Python code to implement ~~was~~ functionalities and solve problems. Ability to analyze challenges, breaks them down into manageable tasks, and devises effective solutions using Python programming techniques. Skills in identifying and fixing errors or bugs in Python code utilizing debugging tools and techniques to troubleshoot issues.

Capability to manipulate and analyze data using Python libraries such as Pandas, NumPy and Matplotlib for tasks such as data cleaning, visualization and statistical analysis. Knowledge of web development frameworks like Django or Flask to build dynamic web applications using Python. Strong communication skills to effectively convey ideas collaborate with team members and provide updates on project progress.

1.7 IMPORTANCE OF THE SKILLS GAINED:

An intern who gains proficiency in Python programming enhances their attractiveness to potential employers. For example, a software development company may prioritize candidates with Python skills for roles such as software engineer or data analyst. With Python skills, interns can actively contribute to ongoing projects within the organization.

An intern with Python expertise may assist in developing automation scripts to streamline repetitive tasks, thereby improving efficiency and productivity. Python skills enable interns to innovate and solve complex problems creatively. For example, an intern with Python proficiency may develop algorithms or machine learning models to analyze large datasets and extract valuable insights, driving innovation within the organization.

Python is widely used across various industries, including software development, data science, artificial intelligence, and web development. Therefore, acquiring Python skills during an internship ensures that interns are equipped with relevant and in-demand skills that are applicable across different sectors, enhancing their long-term career prospects.

1.8 ABOUT THE EXPERIENCE:

"In my Python internship, I had the opportunity to work on a project aimed at automating data analysis processes for a financial services company. Using Python libraries such as Pandas and NumPy, I developed scripts to clean, pre-process, and analyze large datasets containing financial transactions. Additionally, I implemented data visualization techniques using Matplotlib to create insightful charts and graphs for stakeholders.

Throughout the internship, I encountered challenges such as handling missing data and optimizing code performance for efficient data processing. Through research and experimentation, I successfully addressed these challenges and improved the effectiveness of the data analysis pipeline.

One highlight of my experience was collaborating with senior developers to integrate machine learning algorithms into the analysis workflow. By leveraging libraries like sci kit-learn, I developed predictive models to forecast future financial trends based on historical data, providing valuable insights for decision-making.

Overall, my Python internship provided me with invaluable hands-on experience in data analysis, Python programming, and machine learning techniques. I am grateful for the opportunity to contribute to meaningful projects and further develop my skills in a real-world setting."

1.9 LEARNING OUTCOMES:

The project involved analyzing large volumes of financial data to identify trends, patterns, and anomalies. Using Python programming language and libraries such as Pandas, NumPy, and Matplotlib, I developed scripts to clean, pre-process, and analyze the financial datasets. One of the key tasks was data cleaning, where I handled missing values, outliers, and inconsistencies to ensure data quality and integrity.

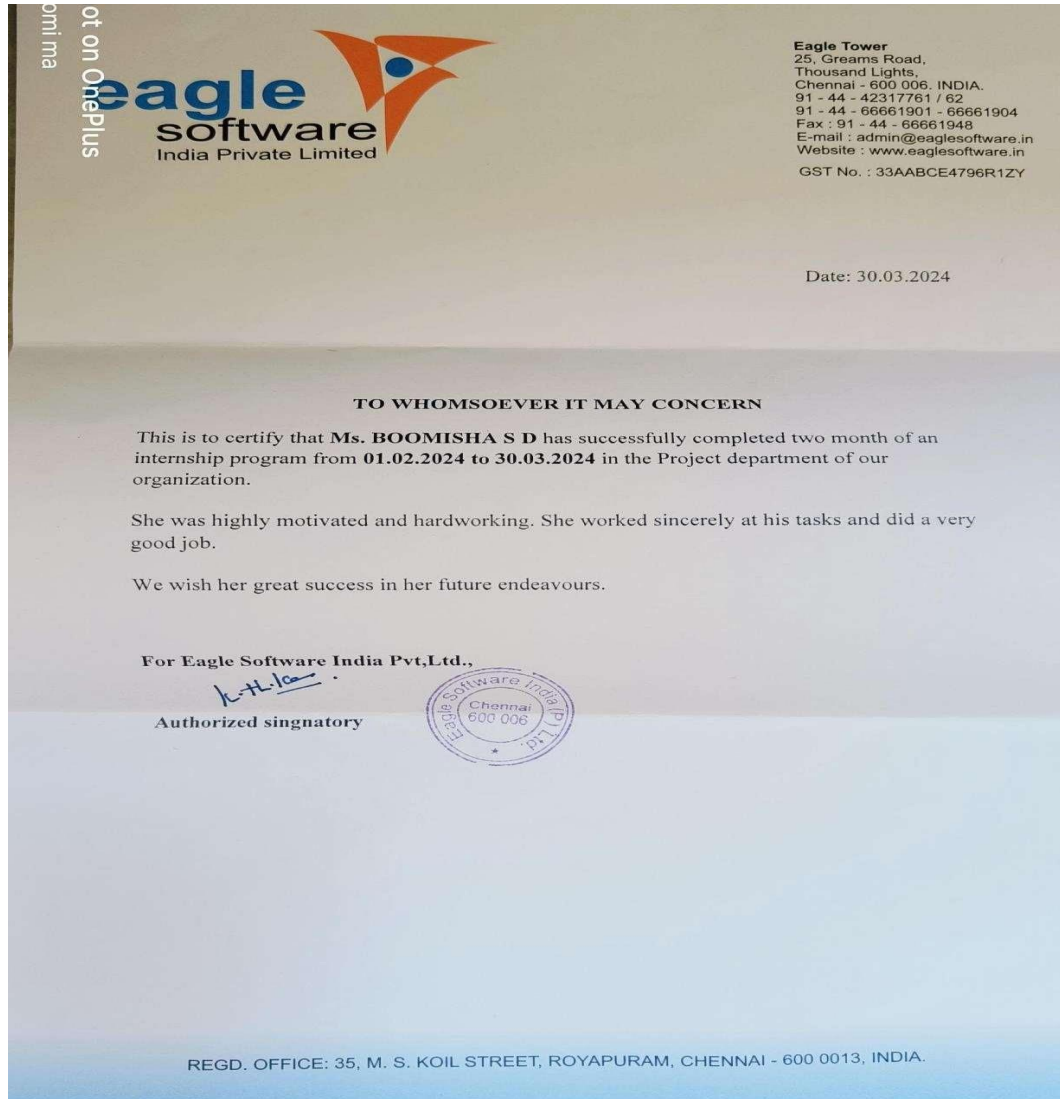
Next, I implemented various statistical and analytical techniques to gain insights from the data. This included calculating descriptive statistics, performing correlation analysis, and conducting time series analysis to identify patterns and trends over time.

Additionally, I utilized data visualization techniques to present the findings in a clear and informative manner. Using Matplotlib and Seaborn libraries, I created visualizations such as line charts, scatter plots, and histograms to visualize trends, distributions, and relationships within the data.

One of the challenges I encountered was optimizing the data analysis pipeline for efficiency and scalability. Through experimentation and optimization techniques, including vectorization and parallel processing, I was able to significantly improve the performance of the data analysis scripts, reducing processing time and resource utilization.

Furthermore, I collaborated closely with stakeholders, including data analysts, financial experts, and business decision-makers, to understand their requirements and tailor the analysis to their needs. This iterative process of feedback and refinement ensured that the analysis outputs were relevant, actionable, and aligned with business objectives.

1.10 ACHIEVEMENT:



1.1 1 CONCLUSION:

The Python development internship has been an experience that has deepened my passion for programming and equipped me with the knowledge, skills, and perspectives necessary to embark on a rewarding career in software development.

I am grateful for the opportunity to have been part of such an enriching experience and look forward to applying my new found.

2 RE-2022-250561 - Turnitin Plagiarism Report

by Boomisha S D

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MACHINE LEARNING APPROACHES IN SYSTEM BIOLOGY: TOWARDS PRECISION MEDICINE

PRECISION MEDICINE: TAILORING TREATMENT WITH DATA-DRIVEN INSIGHTS

Precision medicine is a producer to find the observable traits of all a person who is receiving the medical treatment with less popular rejoinder to treatment or require healthcare needs in our daily life. They influence computation and gather to generate insight, allowing us to reason and learn clinical decision-making through advanced intelligence. The medical care should be modified to each individual's health status which should provide clinical information like genetics and their environment.

OMICS DATA ANALYSIS FOR PATIENT STRATIFICATION

When the human data are compared to the DNA of participants having an observable trait for a particular trait or disease. Those participants may suffer from the disease that is with the case and not suffer from the disease in non-cases there may be people with different observable traits for a particular trait. The influence of the observed traits is classified early by the clinical expression of genetic makeup or observant traits. Each particular person gives a sample of DNA in which we can see millions of genetic variants are read by using scientific software. Therefore, they are easy to recognize and overcome the result of the disease by analysing the patient classification.

MACHINE LEARNING FOR BIOMARKER DISCOVERY

Biomarker discovery is the collection of a large database of a sample that has been identified and answered called testing. That is, they are finding the vast number of populations in the discovery through the treatment. The probability will tell the chance of the person's presence and the association present in their body. Machine learning decides a human when we run the exact code to examine and compare all the available information with the ill person. Once they find a way to treat it with the help of a machine algorithm.

CLINICAL DECISION SUPPORT SYSTEM: INTEGRATING BIOLOGICAL KNOWLEDGE

Using medicine, the researcher finds the solutions how they are predicted and how they are used in the system by integrating the biological knowledge and exploring the current data into the database support system. The focus on clinical medical advice is based on the plenty of multiple factors of the illness-related date. Concerning data, we carry the information and apply the biological information to make the machine learning support corresponding to exact the conclusion of the researcher of the sources. The discovery of the biomarker of the sample drug are any other sample data are inquired by the biological knowledge.

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PAGE 1

PAGE 2

2.1 MACHINE LEARNING APPROACHES IN SYSTEMBIOLOGY: TOWARDS PRECISION MEDICINE

PRECISION MEDICINE: TAILORING TREATMENT WITH DATA- DRIVEN INSIGHTS

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3 MATLAB COURSE

Based on the MATLAB Certificate there are 16 Course I have completed

- App Building Onramp
- Signal Processing with MATLAB
- Image Processing with MATLAB
- MATLAB Programming Techniques
- MATLAB for Data Processing and Visualization
- Machine Learning with MATLAB
- Image Processing Onramp
- Solving Nonlinear Equations with MATLAB
- Deep Learning with MATLAB
- Statistics Onramp
- MATLAB Fundamentals
- Reinforcement Learning Onramp
- Computer Vision Onramp
- Deep Learning Onramp
- Object-Oriented Programming Onramp
- Machine Learning Onramp

App Building Onramp

With its interactive, do-it-yourself design, App Building Onramp will provide quick video lessons and hands-on activities to help you learn how to use the MATLAB Application Designer to build interactive applications. After completing the application creation process, you can design, develop, and deploy MATLAB applications for a wide range of uses, from advanced computing to data visualization.

Signal Processing with MATLAB

Dive into the world of signal processing using MATLAB with the comprehensive Signal Processing Onramp. This interactive course combines theoretical concepts with hands-on exercises to help you understand and apply various signal processing techniques using MATLAB. From filtering and spectrum analysis to signal imaging, this Onramp gives you the capabilities to analyze and manipulate signals for a variety of applications.

Image Processing with MATLAB

Unleash the power of MATLAB for image manipulation with our Onramp image editor. This hands-on course is designed to introduce you to the basics of image processing and show you how MATLAB can be used to perform a variety of image analysis tasks. Through interactive tutorials and real-world examples, you will learn techniques such as image enhancement, segmentation and feature extraction that enable you to efficiently process and interpret images.

MATLAB Programming Techniques

Take your MATLAB skills to the next level with MATLAB Programming Techniques Onramp. This advanced course is designed for experienced MATLAB users who want to improve their programming skills. From optimization and debugging strategies to designing advanced data structures and algorithms, this Onramp

covers a wide range of programming techniques to help you write powerful, robust, and maintainable MATLAB.

MATLAB for Data Processing and Visualization

It's a good idea to learn MATLAB for data processing and visualization, especially if you work with numerical data. Here are some things you might want to learn about processing and visualizing a data with MATLAB. These MATLAB capabilities enable you to handle a variety of data processing and visualization tasks, making it a powerful tool for data analysis and visualization.

Machine Learning with MATLAB

MATLAB is a versatile machine learning environment that contains rich built-in tools, functions, and documentation. Gaining knowledge of MATLAB machine learning will enable you to apply various machine learning techniques to real-world problems.

Image Processing Onramp

With an interactive, do-it-yourself approach, Image Processing Onramp offers short video courses and hands-on exercises to help you understand and use MATLAB image processing concepts. Complete the image processing onramp for a thorough understanding of image processing principles and methods. You will also gain hands-on experience using MATLAB to develop image processing algorithms.

Solving Nonlinear Equations with MATLAB

Unleash the power of MATLAB to solve complex nonlinear equations with Nonlinear Equation Solving Onramp. This self-paced course is designed to give you the skills you need to effectively handle nonlinear equations using the extensive computing capabilities of MATLAB. Through guided exercises, you will

learn various numerical methods and techniques for finding solutions to nonlinear equations in various scientific and engineering applications.

Deep Learning with MATLAB

Explore the advancement of deep learning with MATLAB with Deep Learning Onramp. This interactive course provides a thorough introduction to deep learning concepts and shows how to use MATLAB to build, train, and deploy deep neural networks. Whether you're new to deep learning or want to deepen your knowledge, this Onramp gives you the skills to tackle complex problems.

Statistics Onramp

Dive into the world of statistical analysis and data interpretation with MATLAB Statistics Onramp. This interactive learning experience provides a comprehensive overview of statistical concepts, from basic descriptive statistics to advanced data modeling techniques. By learning the statistical capabilities of MATLAB, you can analyze data, generate meaningful insights, and make informed decisions in a variety of fields.

MATLAB Fundamentals

Learn the basics of MATLAB programming from the ground up with MATLAB Fundamentals Onramp. Designed for beginners, this interactive course provides a structured learning path covering basic MATLAB syntax, data types, control flow, and function writing. Whether you're new to programming or transitioning from another language, this Onramp provides a solid foundation for your MATLAB journey.

Reinforcement Learning Onramp

Reinforcement Learning Onramp for MATLAB is a comprehensive introductory course that teaches you how to use MATLAB to build reinforcement learning

algorithms and the principles of reinforcement learning.

Computer Vision Onramp

Computer vision is where knowledge from the real world meets digital data. Data from multiple cameras and sensors can be combined to create a digital reconstruction. In this course, you will use object recognition to find, track, and count turtles in a video.

Deep Learning Onramp

Deep Learning Onramp is an interactive, self-paced course that uses MATLAB to teach you how to apply and understand deep learning concepts through short video tutorials and hands-on activities. After completing the Deep Learning Onramp, you will have a thorough understanding of deep learning theories and methods and hands-on experience building and improving deep learning models in MATLAB.

Object-Oriented Programming Onramp

Journey through object-oriented programming (OOP) principles with the MATLAB object-oriented programming onramp. This interactive course combines concise video tutorials with hands-on exercises to teach you the basics of OOP in MATLAB. By the end of this Onramp, you will have a good understanding of how to use OOP concepts to create modular and reusable code in MATLAB.

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Course Completion Certificate

BOOMISHA S D

has successfully completed **100%** of the self-paced training course

Statistics Onramp

A handwritten signature in black ink, reading "Craig L. Santos".

DIRECTOR, TRAINING SERVICES

1 March 2024



Course Completion Certificate

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has successfully completed **100%** of the self-paced training course

Solving Nonlinear Equations with MATLAB

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DIRECTOR, TRAINING SERVICES

1 March 2024



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App Building Onramp

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2 March 2024



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Machine Learning Onramp

A handwritten signature in black ink, reading "Craig Santos".

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Deep Learning Onramp

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28 February 2024



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Reinforcement Learning Onramp

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MATLAB Fundamentals


DIRECTOR, TRAINING SERVICES

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Course Completion Certificate

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Image Processing Onramp


DIRECTOR, TRAINING SERVICES

2 March 2024



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Machine Learning with MATLAB

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Signal Processing Onramp

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3 March 2024



Course Completion Certificate

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Computer Vision Onramp


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MATLAB for Data Processing and Visualization


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MATLAB Onramp

Craig L. Santos

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8 November 2023