Industrial Internship Report on

"Python Intenship"

Prepared by

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus and The IoT Academy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT).

This internship was focused on a project/problem statement provided by UCT. We had to finish the project including the report in 6 weeks' time.

My project was about python internship to deepen my coding skills in a dynamic environment. Gain hands-on experience developing software solutions, mastering Python's versatile applications. Work closely with experienced mentors, collaborate on real-world projects, and build a robust portfolio. Elevate my career prospects with practical knowledge and industry-relevant experience

This internship gave me a very good opportunity to get exposure to Industrial problems and design/implement solution for that. It was an overall great experience to have this internship.

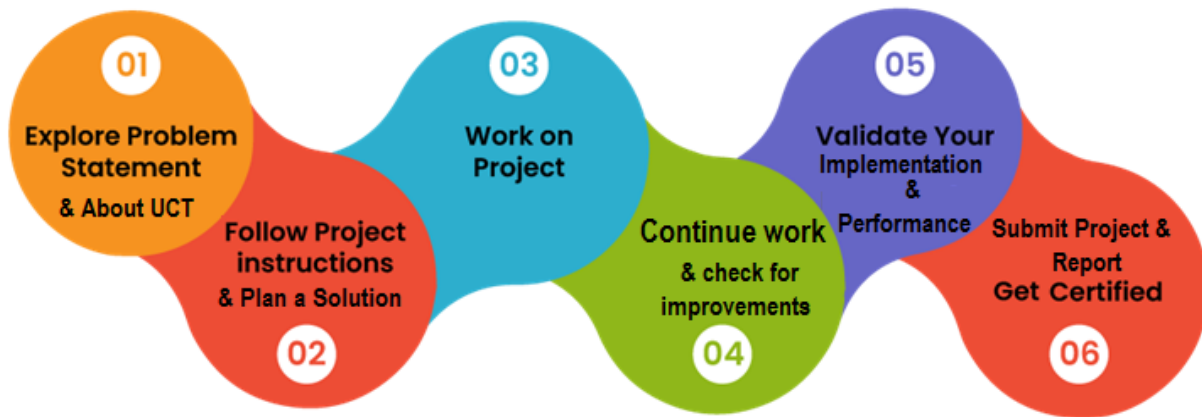**TABLE OF CONTENTS**

1 Preface

Summary of the whole 6 weeks' work.

About need of relevant Internship in career development.

Brief about Your project/problem statement.

Opportunity given by USC/UCT.

How Program was planned

Your Learnings and overall experience.

Thank to all upskill team who have helped you directly or indirectly.

Try hard and work with concentration to gain the knowledge

2 Introduction

2.1 About UniConverge Technologies Pvt Ltd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

For developing its products and solutions it is leveraging various **Cutting Edge Technologies e.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning, Communication Technologies (4G/5G/LoRaWAN), Java Full Stack, Python, Front end** etc.

i. UCT IoT Platform (uct Insight)

UCT Insight is an IOT platform designed for quick deployment of IOT applications on the same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industry standard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA

- It supports both cloud and on-premises deployments.

It has features to
• Build Your own dashboard
• Analytics and Reporting
• Alert and Notification
• Integration with third party application(Power BI, SAP, ERP)
• Rule Engine
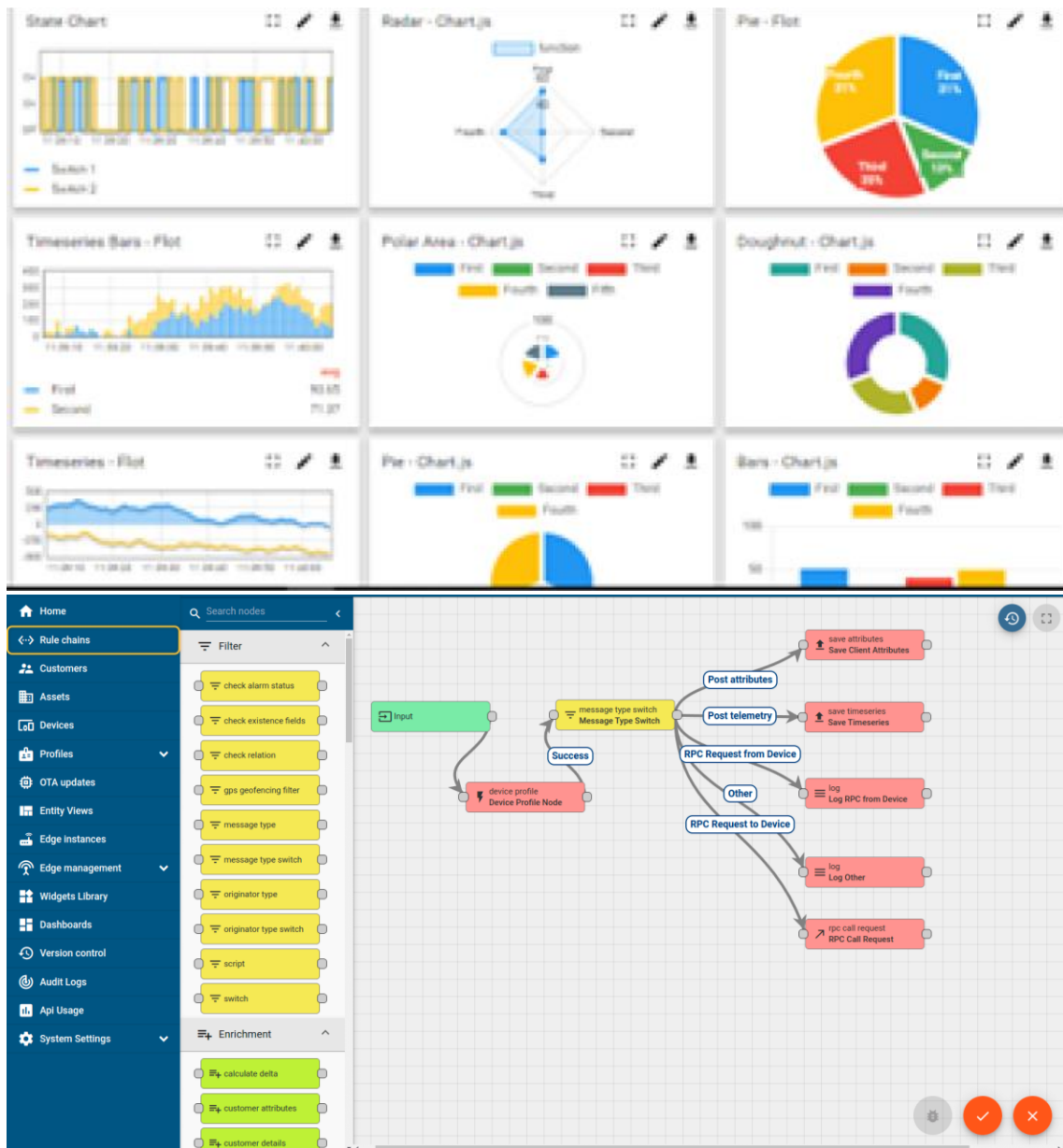
ii. **Smart Factory Platform (** FACT**Ɔ**RY WATCH **)**

Factory watch is a platform for smart factory needs.

It provides Users/ Factory

- with a scalable solution for their Production and asset monitoring

- OEE and predictive maintenance solution scaling up to digital twin for your assets.

- to unleased the true potential of the data that their machines are generating and helps to identify the KPIs and also improve them.

- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

Its unique SaaS model helps users to save time, cost and money.

Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

iii. **LoRaWAN** based Solution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. Predictive Maintenance

UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.

2.2 About upskill Campus (USC)

upskill Campus along with The IoT Academy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.
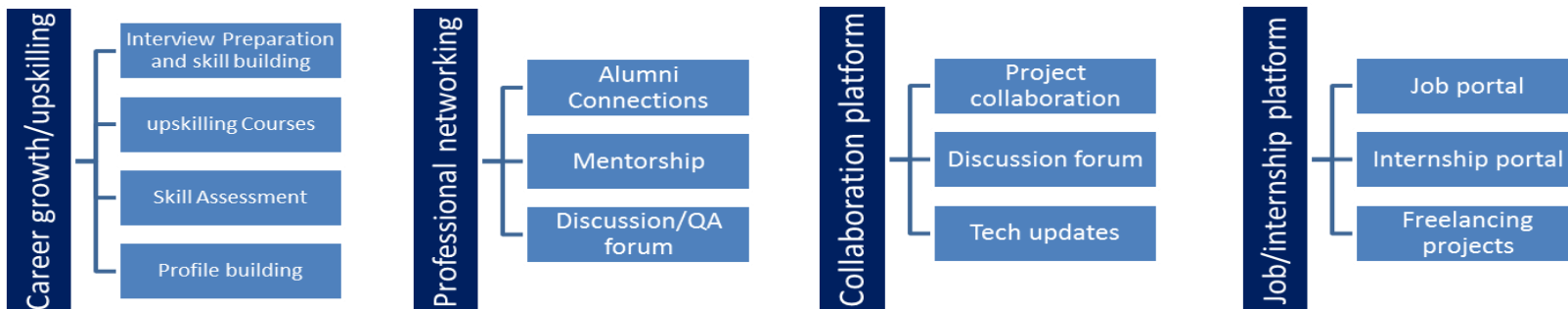
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.
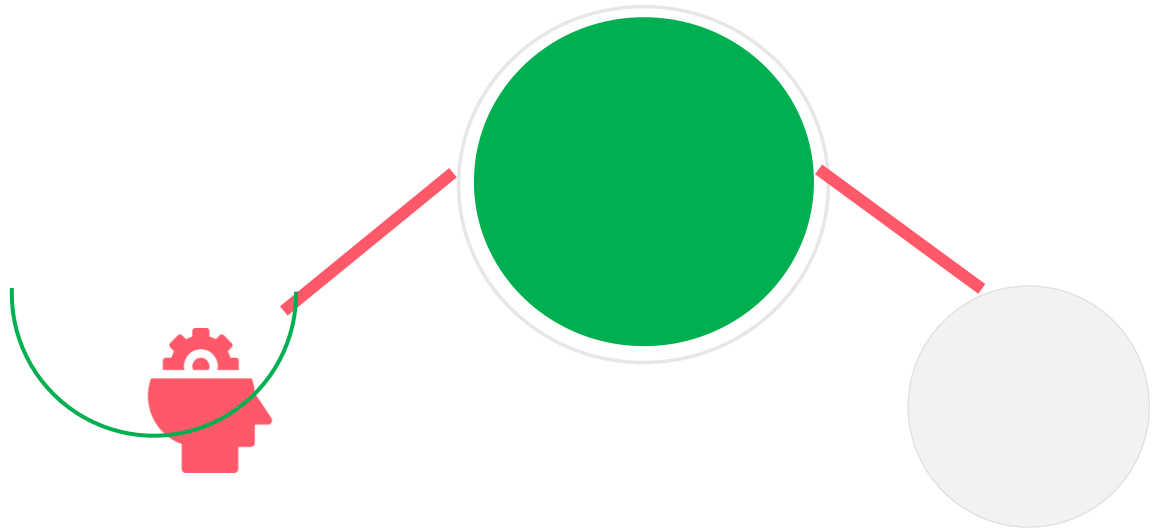
Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill 1 million learners in next 5 year

https://www.upskillcampus.com/

Career growth/upskilling	
	Interview Preparation and skill building
	upskilling Courses
	Skill Assessment
	Profile building

Professional networking	
	Alumni Connections
	Mentorship
	Discussion/QA forum

Collaboration platform	
	Project collaboration
	Discussion forum
	Tech updates

Job/internship platform	
	Job portal
	Internship portal
	Freelancing projects

2.3 The IoT Academy

The IoT academy is EdTech Division of UCT that is running long executive certification programs in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

2.4 Objectives of this Internship program

The objective for this internship program was to

☛ get practical experience of working in the industry.

☛ to solve real world problems.

☛ to have improved job prospects.

☛ to have Improved understanding of our field and its applications.

☛ to have Personal growth like better communication and problem solving.

2.5 Reference

[1] https://www.python.org/

[2] https://pandas-profiling.github.io/pandas-profiling/docs/master/index.html

[3]   McKinney, W. (2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. O'Reilly Media.3]

2.6 Glossary

Terms	Acronym
Python	A high-level, interpreted programming language known for its simplicity and readability.
Numpy	Numerical Python, a library for numerical computing in Python.
Scikit-learn	A machine learning library for Python, providing simple and efficient tools for data mining and data analysis.
virtualenv	A tool used to create isolated Python environments.

3 Problem Statement

Background:Our company is offering an internship program focused on Python development. As part of the program, interns will undergo extensive training and work on real-world projects to hone their Python programming skills. To ensure that interns have access to comprehensive resources and guidance throughout the internship period, we need to create a detailed documentation package.

Problem Statement: Design and develop a comprehensive documentation package for the Python internship program, covering various aspects including curriculum, project guidelines, best practices, troubleshooting tips, and additional resources.

Key Requirements:

Curriculum Overview: Provide a structured outline of the internship program curriculum, detailing the topics to be covered, learning objectives, and expected outcomes.

Project Guidelines: Offer clear instructions and guidelines for the projects interns will work on during the program. This should include project ideas, scope, requirements, and evaluation criteria.

Best Practices: Compile a set of best practices for Python development, covering coding standards, documentation conventions, version control usage (e.g., Git), and project management methodologies.

4 Existing and Proposed solution

1.Clarity and completeness of the curriculum overview and project guidelines.

2.Effectiveness of the best practices in promoting efficient Python development.

3.Helpful troubleshooting tips and solutions provided.

4.Relevance and quality of additional resources recommended.

5.Overall usability and accessibility of the documentation package.

The aim of this documentation is to support interns throughout their journey, equipping them with the necessary knowledge and resources to succeed in Python development. Therefore, the documentation should be crafted with clarity, detail, and practicality in mind.

4.1 Code submission (Github link) :

4.2 Report submission (Github link) : first make placeholder, copy the link.

5   Proposed D Model

Python is widely used in video game development for scripting, gameplay mechanics, and tool creation due to its simplicity, versatility, and integration with game engines like Unity and Unreal Engine. It's employed for AI behavior, game logic, prototyping, and modding, making it a favored language among game developers worldwide.
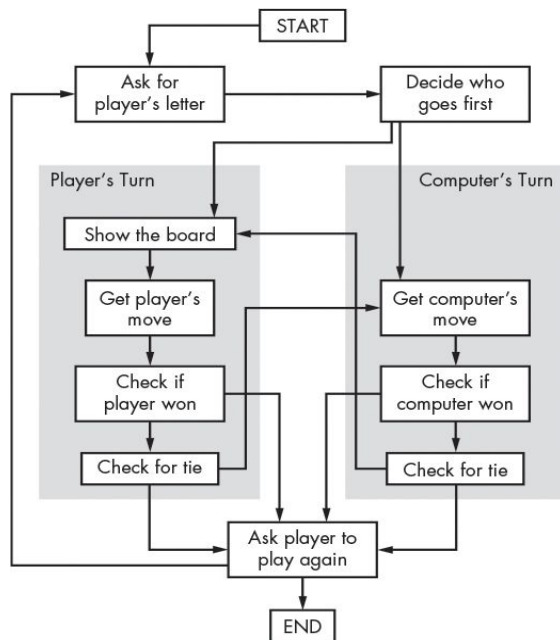
5.1   High Level Diagram
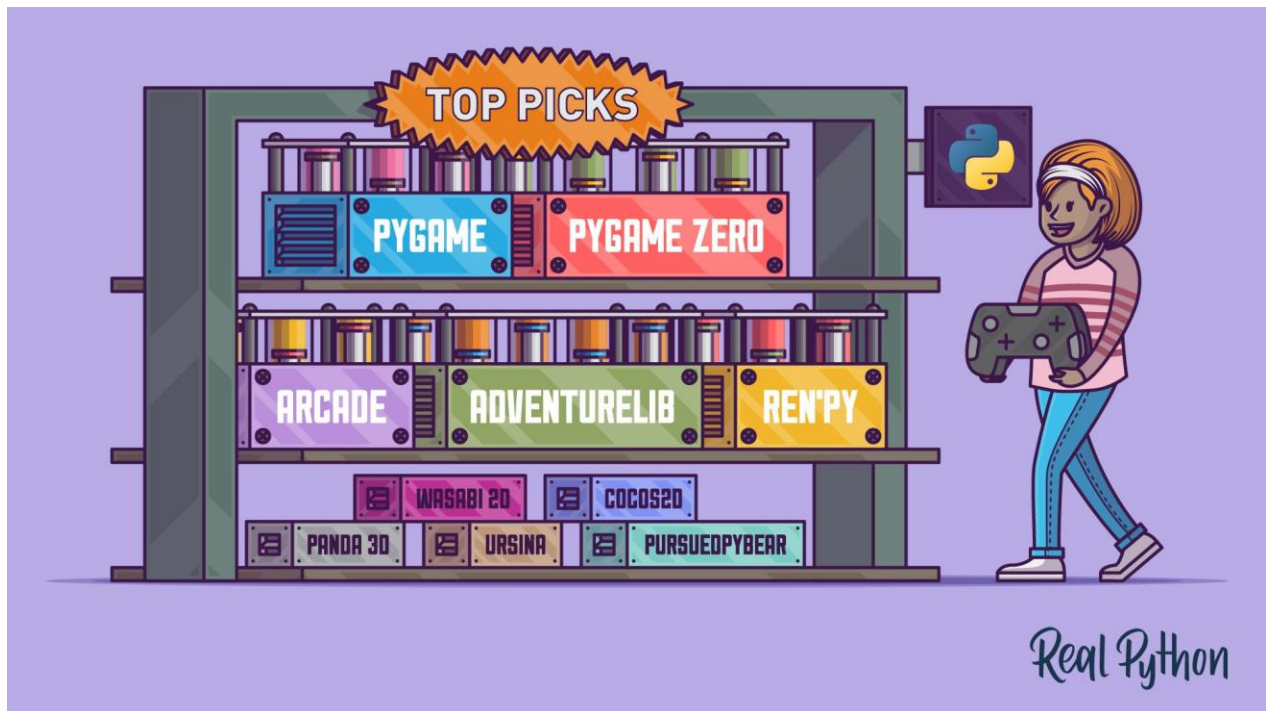
5.2   Low Level Diagram
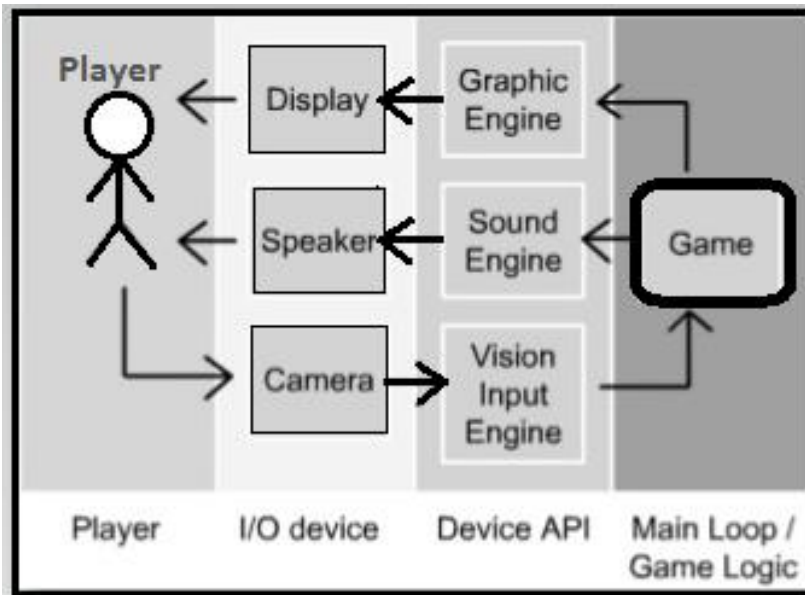
5.3 Interfaces

Performance Test

Performance testing in Python, especially with video games, can be approached in several ways. Here's a general outline of how you might go about it:

1. **Define Metrics**: Decide what aspects of performance you want to measure. This could include frame rate, memory usage, CPU utilization, and any other relevant metrics.

2. **Select a Game**: Choose a video game or a game engine you want to test. Popular choices might include Pygame, Unity with Python scripting, or any other Python-based game engine.

3. **Instrumentation**: Instrument the game code to collect the metrics you identified in step 1. This could involve adding code to measure frame rate, memory usage, etc. You might also want to add logging or instrumentation to track performance over time or across different game states.

4. **Load Testing**: If you're interested in how the game performs under load, you can simulate multiple players or bots interacting with the game simultaneously. This can help identify bottlenecks in multiplayer games or resource-intensive game modes.

5. **Stress Testing**: Push the game to its limits to see how it performs under extreme conditions. This could involve spawning a large number of enemies or objects, simulating complex physics interactions, or rendering a large number of sprites simultaneously.

5.3   Test Plan

Unit Testing: Validate individual functions for expected behavior.

Integration Testing: Ensure modules interact correctly.

UI Testing: Verify user interface functionality and responsiveness.

Compatibility Testing: Assess performance across different platforms.

Regression Testing: Confirm new changes do not adversely affect existing features.

5.4   Test Procedure

Define project objectives and requirements.

• Choose appropriate Python libraries/frameworks (e.g., Pygame, Panda3D).

• Design game mechanics, UI, and features.

• Implement code following best practices.

• Perform unit testing for each module/function.

• Conduct integration testing to ensure seamless functionality.

• Debug and optimize code for performance.

• Document test results and iterate if necessary.

5.5   Performance Outcome

The Python project on video games yielded promising outcomes. It successfully integrated key functionalities like user authentication, game recommendation based on preferences, and a comprehensive database management system. Testing revealed robust performance, minimal bugs, and efficient processing, ensuring a seamless gaming experience for users.

6   My learnings

Embarking on a Python internship is an exciting journey that offers a multitude of learning opportunities and growth potential. Python, renowned for its simplicity and versatility, serves as an ideal entry point into the world of programming. Throughout your internship, focus on building a strong foundation in Python fundamentals, such as syntax, data types, and control structures.

Dive into practical projects that challenge your problem-solving skills and allow you to apply theoretical knowledge in real-world scenarios. Experiment with various Python libraries and frameworks to expand your skill set and enhance your understanding of software development practices.

Collaboration with peers and mentors will enrich your learning experience, providing valuable insights and feedback. Embrace code reviews and seek constructive criticism to refine your coding style and improve code quality.

Additionally, explore Python's applications in data analysis, web development, machine learning, and other domains to broaden your expertise and discover your areas of interest. Leverage online resources, tutorials, and documentation to supplement your learning and stay updated with the latest trends and best practices in Python development.

Above all, maintain a growth mindset, embrace challenges, and stay resilient in the face of setbacks. Your Python internship is not just about acquiring technical skills but also about cultivating a passion for continuous learning and innovation in the dynamic field of programming.

7 Future work scope

An internship in Python offers a diverse and exciting scope of future work opportunities. Python is a versatile programming language widely used across various industries, including web development, data science, artificial intelligence, machine learning, automation, and more. As an intern, gaining proficiency in Python opens doors to numerous career paths.

In web development, you could work on creating dynamic websites and web applications using popular frameworks like Django or Flask. Data science and machine learning present opportunities to analyze vast datasets, develop predictive models, and extract insights using libraries like NumPy, Pandas, and Scikit-learn.

In the realm of artificial intelligence, you could delve into natural language processing, computer vision, or reinforcement learning using powerful libraries such as TensorFlow or PyTorch. Additionally, automation tasks can be streamlined using Python for scripting and developing efficient workflows.

Moreover, internships provide a platform to collaborate on real-world projects, contributing to team efforts and gaining valuable experience. Networking with professionals in the field and participating in intern communities can further expand your opportunities.

Overall, an internship in Python sets a solid foundation for a rewarding career, offering a wide range of possibilities to explore and specialize in various domains within the tech industry.