VISVESVARAYA TECHNOLOGICAL UNIVERSITY
JANASANGAMA, BELAGAVI – 590018

An Internship Report On

"PYTHON WITH MACHINE LEARNING"

Submitted in partial fulfillment of the requirement for the award of the degree in Masters of Computer Applications

Submitted by

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1AT21MC001

Internship Carried Out At

PIE INFOCOMM

Guide

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CERTIFICATE

Certified that this internship work entitled "**PYTHON WITH MACHINE LEARNING"** presented by **"ADNAN AHAD" "1AT21MC001"** of Atria Institute of Technology, Bangalore in partial fulfilment for the award of Master of Computer Applications of Visvesvaraya Technological University, Belagavi during 2022-2023. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the department library. The internship report has been approved as it satisfies the academic requirements with respect to the internship report as prescribed for the said Degree.

Signature of Guide	Signature of Coordinator
Dr. Dattatreya P M	Ms. Veena S
Signature of HOD	Signature of Principal
Dr. Dattatreya P M	Dr. Y Vijayakumar

INTERNSHIP CERTIFICATE


Serial No : PI/22/2998

PIE INFOCOMM

ISO CERTIFIED Registration no. UPSA28727715

CERTIFICATE OF COMPLETION

This internship certificate for brilliant and consistent high standards of workmanship signed this day by the duly authorized officers is proudly presented to

Mr/Ms. Bharath S

For the successful completion of internship in

Cloud Computing

under Pie Infocomm Private Limited from 21st October, 2022 to 5th December, 2022. It led to the Completion of Project titled "Customer Segmentation"

Vijay Kumar Jaiswal
(Director)

DECLARATION

I, **ADNAN AHAD (1AT21MC001)** hereby declare that this internship work titled " **PYTHON WITH MACHINE LEARNING ",** is carried out under the guidance of Dr Dattatreya P M. This internship work is submitted to Visvesvaraya Technological University in partial fulfilment of the requirement for the award of the degree of **Master of Computer Applications** for the academic year 2022-2023.

Place: Bangalore

Date:

Signature of Student

ACKNOWLEDGEMENT

We express gratitude to our institution and management for providing us with good infrastructure, laboratory, facilities and inspiring staff, and whose gratitude was of immense help in completing this internship successfully.

The foundation for any successful venture is laid out not just by the individual accomplishing the task, but also by several other people who believe that the individual can excel and put in their every bit in every endeavour he/she embarks on, at every stage in life. And success is derived when opportunity meets preparation, also supported by a well-coordinated approach and attitude.

I would like to express my sincere gratitude to the respected principal Dr **Y Vijayakumar,** for providing a congenial environment to work. I also like to express my sincere gratitude to Dr **Dattatreya P M,** Head of Department, Master of Computer Applications, for his continuous support and encouragement.

I am indeed indebted to Dr **Dattatreya P M,** coordinator and guide for her continued support, advice and valuable input during the course of this internship work.

Last, but not least I would like to thank my family, who has acted as a beacon of light throughout my life.

My sincere gratitude goes out to all my comrades and well-wishers who have supported me through all the ventures.

EXECUTIVE SUMMARY

This internship at PIE Infocomm was a 6 - weeks long internship program. It aimed in training the interns and making them ready to face the corporate world. It included a well-prepared structure of the training program that included few basic concepts from the Database Management System followed by the programming language, Java. Soon after this training we were given our streams to continue with the internship which was JSP. It included learning advanced java, JSP Script lets and JDBC.

This internship further aimed at providing complete in-depth knowledge about the various technologies used by the company which would make their tasks easier to take the interns further into their company as employees. Various technologies that are a hot topic and used in completing their company projects are taught. Educators from PIE Infocomm would handle the classes and train the interns to understand the topic better and apply it during hands-on sessions. Various new techniques and easier way to learn and get the complete knowledge about the topic was imparted.

This internship included not only the technical benefits but added on to contribute further in my personal development and gave in a lifelong memory to cherish.

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CHAPTER - 1

ABOUT THE COMPANY

1.1 Introduction

PIE INFOCOMM PVT. LTD. is a Registered Software Company that has been providing specialized IT Services and Business Solutions Since 2002 to make Business Operations easier. Our Company's motto is "Generating Ideas" and we implement it to give our clients the best in the field of Software Development, AutoCAD Designing (Construction of Building) as well as preparing blueprints of motors and Spare Parts. We are also in Chip Level Designing using MATLAB Technology. We are Developing High-Level Scientific Calculation Program. In today's ERA, we are focusing on Digital Marketing and loT Technology. We are having one Sublet Department of Share Trading (Stock Trading Department) Our Organization was established in the year 2002 and is a registered and ISO-certified company. Started as a Training Organization, we are proud to have gained the trust of more than 25,000 students till now.

1.2 History of the company

PIE Infocomm Private Limited is a non-govt company, incorporated on 23 Mar 2011. It's a private unlisted company and is classified as a company limited by shares. Company's authorized capital stands at Rs 1.0 lakhs and has 100.0% paid-up capital which is Rs 1.0 lakhs. PIE Infocomm Private Limited is majorly in the Business Services business for the last 11 years and currently, company operations are being struck off. Current board members & directors are VIJAYKUMAR JAISWAL and SHAKTI JAISWAL. The company is registered in Kanpur (Uttar Pradesh) Registrar Office. PIE Infocomm Private Limited's registered address is A-ILNEHRU VIHAR RING ROAD, KALYANPUR LUCKNOW Lucknow UP 226001 IN.

Fig 1.1 Founder of PIE Infocomm

1.3 Services

- **Website Development**

Web development can range from developing a simple single static page of plain text to complex web-based internet applications, electronic businesses, and social network services.

- **Motor Spare Part Designing**

The way products are designed and built is changing rapidly. We can provide you with the right tools and workflows for each step of the product design and development process.

- **Stock Trading**

One great advantage of stock trading lies in the fact that the game itself lasts a lifetime. Investors have years to develop and hone their skills.

CHAPTER 2

TASKS PERFORMED

2.1 Schedule of Tasks Performed

All of the Machine Learning algorithms take data as input, but what they want to achieve is different. They can be broadly classified into a few groups based on the task they are designed to solve. These tasks are: classification, regression and clustering

If we have data, say pictures of animals, we can classify them. This animal is a cat, that animal is a dog and so on.

A computer can do the same task using a Machine Learning algorithm that's designed for the classification task. In the real world, this is used for tasks like voice classification and object detection

Regression

Sometimes you want to predict values. What are the sales next month? What is the salary for a job? Those type of problems is regression problems.

The aim is to predict the value of a continuous response variable. This is also a supervised learning task

Clustering

Clustering starts with data points. These data points can be measurements like length and width. These can be plotted, each record as a point (length, width)

Clustering is to create groups of data called clusters. Observations are assigned to a group based on the algorithm. This is an unsupervised learning task, clustering happens fully automatically

Imagining having a bunch of documents on your computer, the computer will organize them in clusters based on their content automatically

2.2 Induction Program

An induction programme is an important process for bringing staff into an organisation. It introduces the working environment and the set-up of the employee within the organisation. The process will cover the employer and employee rights and the terms and requirements for working at the company and pay attention to the health and safety of the new employee. An

induction programme is part of an organisation's knowledge management process and is intended to enable the new starter to become a useful, integrated member of the team, rather than being "thrown in at the deep end" without understanding how to do their job, or how their role fits in with the rest of the company. Good induction programmes can increase productivity and reduce short-term turnover of staff. These programs can also play a critical role in the socialization of the organization in terms of performance, attitudes and organizational commitment. In addition, well-designed induction programmes can significantly increase the speed of the competency of new employees, thus meaning they are more productive in a shorter period.

2.3 Generic Training

2.3.1 Programming using PYTHON

Python is a high-level programming language that is widely used for general-purpose programming. It has a simple and easy-to-learn syntax and is a great language for beginners to start with. Python has a large standard library that supports many common programming tasks, such as connecting to web servers, reading and writing files, and working with data. It is also popular for scientific computing, data analysis, and machine learning. Some popular applications and frameworks built using Python include Django, Flask, and TensorFlow.

2.3.1 Programming with Machine Learning

Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed. ML is one of the most exciting technologies that one would have ever come across. As is evident from the name, it gives the computer that makes it more similar to humans: *The* ability to learn. Machine learning is actively being used today, perhaps in many more places than one would expect

2.4 Stream Training

2.4.1 Python

Python is a high-level, interpreted programming language that is widely used for a variety of purposes, including web development, scientific computing, data analysis, artificial intelligence, and more. It is known for its simple and readable syntax, as well as its extensive standard library and the large community of users and developers.

2.4.2 Machine Learning

Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed. Machine learning focuses on the development of Computer Programs that can change when exposed to new data. In this article, we'll see the basics of Machine Learning and the implementation of a simple machine-learning algorithm using python.

Machine learning is a method of teaching computers to learn from data, without being explicitly programmed. Python is a popular programming language for machine learning because it has a large number of powerful libraries and frameworks that make it easy to implement machine learning algorithms.

To get started with machine learning using Python, you will need to have a basic understanding of Python programming and some knowledge of mathematical concepts such as probability, statistics, and linear algebra

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2.4.3 Creating Responsive web design using PYTHON, HTML, CSS and BOOTSTRAP

Web development has evolved, thanks to Machine learning. Discover how It seems like science fiction fantasies have become truth. We're not living in the real world anymore but in a futuristic world of people and robotic devices. What we were performing physically for decades, by using machines and computers, can now be accomplished electronically.

ML(Machine Learning), one of the fastest-emerging fields of computer engineering, emphasizes the notion of designing devices and models that can mimic human reasoning. Although its applications have been thin on the ground in the past, it has sought its applications in several diverse fields as we can see in the evolution of web development. The key advantages of Machine Learning are linked to its principle of learning; the more knowledge is provided to it, the further specific it gets. It makes them ideal for automated activities that need accuracy. Like us humans, machines could not get stressed or tired out

Creating a responsive web design using Python, HTML, CSS, and Bootstrap involves using these technologies together to build a website that adjusts its layout and design based on the size of the user's screen.

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CHAPTER 3

REFLECTION NOTES

3.1 Internship Experience

I was the first machine learning intern to join Python with ML at PIE INFOCOMM. Within the first few days, I was introduced to amazing colleagues, various traffic terms in the industry, and the ongoing exciting projects. One of the things that I liked the most about my internship was the trust and freedom given to me as an intern to choose the project that I was interested in and just went all-in for it! To my surprise, I realized that I was not the first one who was pioneering the project, as the team had already deployed similar models with high accuracy in production. When somebody has done something before, certainties come in because you know what has been tried and what has not. But in deep learning, these certainties seem like a black box to me as I was giving it a hit-and-trial approach.

Research

The second phase of my internship was a research project. To explain my point in simple words, our research was on finding an optimal algorithm that could help us accurately retrieve images from the data that are visually similar to a particular image. For example, you have an image of a “check pattern t-shirt” as a query and you want to retrieve more variants of that product from the data. In such a case, our research comes to the rescue. Our goal was to create such a deep learning model which could accurately capture this notion of visual similarity

The research was yet another learning experience for a beginner like me. The research phase was full of ups and downs. There were times when we got stuck on the same problem for months but at the end of the phase, we always end up solving it. I will be writing another detailed blog on the research soon.

Well, the internship has definitely reaffirmed my passion for Machine Learning and I am grateful that my work did leave some traction for future work. The research and development phase, the curiosity and passion to solve fashion apparel problems using data (just to name a few) and the communication skills I developed while communicating with the content team in order to understand the problem and their perspective on the problem have all contributed to my interest in this field.
The Data Science industry is still very young and its job description could somehow seem vague and ambiguous to job seekers like us. It's perfectly normal to not possess all the skills needed as most job description is idealistically created to align with their best expectation

3.2 Technical Outcomes

- ◊ Gain knowledge and experience in the field of machine learning through hands-on projects
- ◊ Work collaboratively with teams of experts to develop machine learning models.
- ◊ To learn how to maintain workflow using project management tools(like GitHub) with a team.
- ◊ Assist with data collection, pre-processing, and analysis.
- ◊ Understand and apply machine learning algorithms to solve complex problems.
- ◊ Develop software tools and applications to support machine learning projects.
- ◊ As a Front End Developer, my main goal is to combine technology and design to create inviting, easy-to-use websites for consumers.
- ◊ Keep up-to-date with the latest machine learning trends and technologies.
- ◊ Identify potential areas of improvement and develop strategies to address them.
- ◊ Prepare reports and presentations to communicate project results
- ◊ To learn how to maintain workflow using project management tools(like GitHub) with a team.
- ◊ To develop Proficiency in website programming languages such as HTML, CSS, JavaScript and React to build real-life businesses

3.3 Non-Technical Outcomes

3.3.1 Communication Skills

Volunteer to give a presentation: As a fresh face within an organization, you are in an ideal position to observe and learn. Suggest to your supervisor that at the mid-way point of your internship, you would like to give a short presentation of the new skills you have learnt or projects you have worked on. Not only will this demonstrate your initiative and enthusiasm for the role but you will have the ideal opportunity to practice your presentation skills.

Seek feedback from your peers as well as your manager: Do not wait for feedback to be given to you by your manager. Actively seek feedback from your peers to ensure you are constantly learning and improving your

communication skills. An intern I placed recently demonstrated a really proactive approach to this by honestly advising his peers that English was a second language for him and although he was working hard to improve, he sometimes struggled with written communication. He asked his peers to point out any grammatical errors in his emails so that he could constantly learn and improve. Because he had actively reached out to his peers, he was able to work on this area of development before his manager pointed it out. This demonstrated his proactive approach to his personal learning and development.

Practice your 'small talk' at informal times: The easiest and quickest way to improve your communication skills is to practice. Then practice some more! Use your internship as an ideal way to speak with your colleagues and learn from their experiences. Become involved with team and company events such as lunches, drinks and social activities. Make the effort to introduce yourself to people in your office. Ask them about their experience and engage them in conversation. This will help your language skills improve.

Reach out to those in a similar situation: This is a great way to not only build your professional relationships; it is also an invaluable method of gaining first-hand tips from people who have been in a similar situation. This intern was able to grasp strategies and methods to improve her communication skills as well as build a connection with her colleague.

Keep on learning and practising: The development of your communication skills needs to be an ongoing part of your professional learning and development. As you start your career, you will be learning many new technical skills, which are incredibly important for your development. However, effective communication skills will help you reach the next level of your career. You might want to consider extra training or classes to perfect your business communication – raise this with your line manager, as there might already be courses and training in place.

3.3.2 Adaptability Skills

Before we dive any deeper into the workings of machine learning, let’s take a moment to define the term properly. Machine learning is a form of technology based on artificial intelligence. It automatically analyses and processes data, and uses that information to make predictions in real-time.
Machine learning goes hand in hand with big data. It handles vast amounts of varied and constantly changing data in order to generate relevant results for the end user.
It’s important to think about data in a broad sense here. Statistics and numbers form one piece of the puzzle, but so too do images and text. Machine learning is able to pull in information from practically any kind of source—if it can be stored digitally, it can be used.

Adaptability is a soft skill that means you easily adjust to changing circumstances. An adaptable person in the workplace can keep up with moving priorities, projects, clients, and technology. They are skilled at dealing with changes at work, whether process updates or their work environment.

Adaptability skills are a type of soft skill, meaning they reflect how a person works and interacts with others in the workplace. Often, they're not learned from a course but rather from experiences reacting to changing environments.

Adaptability skills include:

- **Interpersonal skills**
- **Problem-solving skills**
- **Ingenious and Tactical thinking skills**
- **Teamwork skills**
- **Organizational skills**

3.3.3 Work Ethics

Ethics is, without a doubt, one of the most important topics to emerge in machine learning and artificial intelligence over the last year. While the reasons for this are complex, it nevertheless underlines that the area has reached technological maturity. After all, if artificial intelligence systems weren't having a real, demonstrable impact on wider society, why would anyone be worried about its ethical implications?
It's easy to dismiss the debate around machine learning and artificial intelligence as abstract and irrelevant to engineers' and developers' immediate practical concerns. However, this is wrong. Ethics needs to be seen as an important practical consideration for anyone using and building machine learning systems.
If we fail to do so the consequences could be serious. The last 12 months have been packed with stories of artificial intelligence not only showing theoretical bias but also causing discriminatory outcomes in the real world. Amazon scrapped its AI tool for hiring last October because it showed significant bias against female job applicants. Even more recently, last month it emerged that algorithms built to detect hate speech online have in-built biases against black people.
Although these might seem like edge cases, it's vital that everyone in the industry takes responsibility. This isn't something we can leave up to regulation or other organizations the people who can really affect change are the developers and engineers on the ground.

It's true that machine learning and artificial intelligence systems will be operating in ways where ethics isn't really an issue – and that's fine. But by focusing on machine learning ethics, and thinking carefully about the impact of your work you will ultimately end up building better systems that are more robust and have better outcomes.
So with that in mind, let's look at the practical ways to start thinking about ethics in machine learning and artificial intelligence.

3.3.4 Responsibility

- To research, modify, and apply data science and data analytics prototypes.
- To create and construct methods and plans for machine learning.
- Employing test findings to do statistical analysis and improve models.
- To search the internet for training datasets that are readily available.
- ML systems and models should be trained and retrained as necessary.
- To improve and broaden current ML frameworks and libraries.
- To create machine learning applications in accordance with client or customer needs.
- To investigate, test, and put into practice appropriate ML tools and algorithms.
- To evaluate the application cases and problem-solving potential of ML algorithms and rank them according to success likelihood.
- To better comprehend data through exploration and visualization, as well as to spot discrepancies in data distribution that might affect a model's effectiveness when used in practical situations.

3.3.5 Networking Skills

Networking skills involve the ability to establish and maintain professional relationships.

Incorporating machine learning tools into a network can help teams predict traffic flows, generate smarter analytics, monitor network health, tighten security measures and more. **Machine learning is a branch of AI focused on programming computers to solve problems without human involvement**

This includes being able to effectively communicate with colleagues, clients, and other stakeholders, as well as being able to engage in professional networking activities. Networking skills also involve being able to use online platforms, such as social media and professional networking sites, to build and maintain a network. Additionally, it involves being able to identify and leverage opportunities to create connections, build relationships, and foster collaboration.

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