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An Internship Report on

"RESTAURANT PREDICTION FOR ZOMATO"

SUBMITTED IN FULFILLMENT FOR THE AWARD OF THE DEGREE OF

BACHELOR OF ENGINEERING
IN

ELECTRONICS AND COMMUNICATION ENGINEERING

SUBMITTED BY

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Invent Innovate Iterate

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SJB INSTITUTE OF TECHNOLOGY

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Kengeri-Bengaluru-560060

2020-21

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CERTIFICATE

Certified that the Internship work entitled "**RESTAURANT PREDICTION FOR ZOMATO**" carried out by **B SHAMANTH KOWSHIK [1JB17EC081]** is a bonafide student of **SJB INSTITUTE OF TECHNOLOGY** in partial fulfilment for the award of **"BACHELOR OF ENGINEERING"** in **ELECTRONICS AND COMMUNICATION ENGINEERING** as prescribed by **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the academic year **2020-2021**. It is certified that all corrections/suggestions indicated for internal assessment have been incorporated in the report deposited in the departmental library. The internship report has been approved as it satisfies the academic requirements in respect of Internship work prescribed for the said degree.

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Regards,
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DECLARATION BY THE STUDENT

I, **B Shamanth Kowshik**[1JB17EC081], student of 8th semester Electronics and Communication Engineering, **SJB INSTITUTE OF TECHNOLOGY**, Bangalore, hereby declare that the internship entitled "**Restaurant Prediction for Zomato**" submitted to the **Visvesvaraya Technological University, Belagavi** during the academic year **2020-21**, is a record of an original work done by me under the guidance of my Internal guide **Mrs. Supriya M**, Assistant Professor, Department of Electronics and Communication Engineering, SJB Institute of Technology, Bangalore and my external guide **Mr. Aditya SK,** Co-Founder, Tequed Labs, Bangalore. This internship dissertation report is submitted in partial fulfillment for the award of Electronics and Communication Engineering. The results embodied in this report have not been submitted to any other University or Institute for the award of any degree.

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ABSTRACT

Machine learning is a data analytics technique that teaches computers to do what comes naturally to humans and animals: learn from experience. Machine learning algorithms use computational methods to “learn” information directly from data without relying on a predetermined equation as a model. The algorithms adaptively improve their performance as the number of samples available for learning increases.

There is a overwhelming variety of restaurants around the city, predicting the restaurant based on various categories and conditions by using machine learning algorithm to enhance the accuracy. GUI Application to perform this operation lead to get more value.

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ABOUT TEQUED LABS

1.1 Brief History

Tequed Labs private limited is an emerging technology company, founded and established in January 2018. The company's primary focus is on providing quality education on latest technologies and to develop products which are of great need to the society. They run a project consultancy where they undertake various projects from wide range of companies and assist them technically and build products and provide services to them. They are continuously involved in research about futuristic technologies and finding ways to simplify them for their client.

Tequed Labs business model looks forward to offering a cutting-edge value proposition for clients, customers and partners aiming at consistently delivering outstanding technology and exceptional values. It offers a unique opportunity for intern to work closely with development team on cloud and Services (SaaS developers platform) discover a new way to cloud applications-faster, better and using building blocks of pre-configured instant services, runtime and sample code.

Research and development include activities that companies undertake to innovate new products and services. It is often the first stage in the development process. The goal is to take new products and services to market and add to company's bottom line. The research and development are typically not performed with expectation of immediate profit. Instead, it is expected to contribute to the the long-term profitability of a company. Companies that set up and employ R & D departments commit substantial capital to the effort. They may lead to patents, copyrights and trademarks as discoveries are made and products are created.

The firm has phenomenal achievements. They are one of the emerging top organized services firms. Customer satisfaction has been their predominant strategy for success and that's the reason why they excel in consulting services. They organize internship programs for the freshers and train them about software industry. They train students about how the industry work and what are all the steps will be followed when any project of any domain is

undertaken.

Customer retention has played a key role in expanding their network and this fact alone depicts how they really care about satisfying their clients. Their panel comprises of members with esteemed work force who are strategically driven by noble ideas and made them experienced HR and Business consultants.

They have an excellent customer retention rate They have managed to engage our customers in long term relationships. Most of the customers are still dealing with us. This fact alone depicts how their service is and how highly they value their customers. Their relationship doesn't end with recruitment. They make regular follow ups and get to know updates from you. Customer service has been and will always be their top priority.

There may be many consulting services. But, there can be only one specialist. The one which has expertise in industry and follows strategic approach with sublime ideas will be able to succeed and be a specialist in the field. They have been able to turn the tables in this aspect. They have expanded our business to many sectors and have dealt with top industrialists from many sectors.

Consultative approach is a way to build trust in both the customers and candidates. They neither see their customers as profits, candidates as machines nor themselves as deal makers. They see candidates as potential problem solvers, customers as resources and ourselves as a coordinating platform.

Tequed Labs Private Limited is a classified Non-government company and is registered at Registrar of Companies, Bangalore. It mainly focuses on providing quality education on latest technologies and developing products that are the great need to society.

The principles of Tequed labs are as follows:

- Zeal to excel and zest for change.
- Integrity and fairness in all matters.
- Respect for dignity and potential of individuals.
- Strict adherence to commitments.
- Ensure speed of response.

- Faster learning, creativity and team work.
- Loyalty and pride in the company.

1.2 Project Team Structure

1.2.1 What is a project team?

A project team is a team whose members usually belong to different groups, functions and are assigned to activities for the same project. A team can be divided into sub-teams according to need. Usually project teams are only used for a defined period of time. They are disbanded after the project is deemed complete. Due to the nature of the specific formation and disbandment, project teams are usually in organizations.

A team is defined as "an interdependent collection of individuals who work together towards a common goal and who share responsibility for specific outcomes of their organizations". An additional requirement to the original definition is that "the team is identified as such by those within and outside of the team". As project teams work on specific projects, the first requirement is usually met. In the early stages of a project, the project team may not be recognized as a team, leading to some confusion within the organization. The central characteristic of project teams in modern organizations is the autonomy and flexibility availed in the process or method undertaken to meet their goals.

Most project teams require involvement from more than one department, therefore most project teams can be classified as cross functional team. The project team usually consists of a variety of members often working under the direction of a project manager or a senior member of the organization. Projects that may not receive strong support initially often have the backing of a project champion. Individual team members can either be involved on a part-time or full-time basis. Their time commitment can change throughout the project depending on the project development stage. Project teams need to have the right combination of skills, abilities and personality types to achieve collaborative tension. Teams can be formulated in a variety of ways. The most common method is at the discretion of a senior member of the organization.

There are many components to becoming a top performing team, but the key is working on highly cooperative relationship. The job of management is to create a relaxed and comfortable atmosphere where members are allowed to be themselves and are engaged and

invested in the project work. All team members are encouraging for relationship building. Each member is responsible to give constructive feedback, recognize, value and utilize the unique strengths of each other. The whole team is tuned on trust and cooperation.

The Project Team Tree mainly consists of 4 levels, they are:

- Software Head
- Project Manager
- Technical Manager
- Technical Head

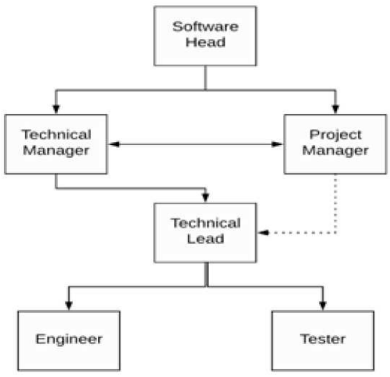

Fig 1.1 Project Team Tree

- **Software Head:**

The Software Head is a versatile position that requires sufficient managerial skills as well as sufficient technical skills. A Software Head should be able to perform all necessary tasks related to company systems including troubleshooting any technical issues. They must oversee the development and implementation of any system through all steps of the process. They must make sure their team is fully trained and able to perform their jobs. The Software Head is the point person for any issues that arise within the team. They are responsible for making key decisions for technical issues related to the company after considering everything from cost to quality of hardware or software.

The Software Head must provide guidance for all members of the team when it comes to designing, implementing, and updating software. They should constantly evaluate company platforms and networks and search for ways to improve them. They are responsible for addressing faults within any company system and making sure those faults are fixed. The technical director should make sure that all procedures are documented for reference and that all of the members of the IT team are trained to handle any situation.

They are the communication source between clients and upper management of the company. The Software Head must also perform management tasks for the team. These duties include conducting employee reviews, handling employee complaints, and dividing the workload among members of the team.

- **Project Manager**

A project manager is a professional in the field of project management. Project managers have the responsibility of the planning, procurement and execution of a project, in any undertaking that has a defined scope, defined start and a defined finish; regardless of industry. Project managers are the first point of contact for any issues or discrepancies arising from within the heads of various departments in an organization before the problem escalates to higher authorities. Project management is the responsibility of a project manager. This individual seldom participates directly in the activities that produce the end result, but rather strives to maintain the progress, mutual interaction and tasks of various parties in such a way that reduces the risk of overall failure, maximizes benefits, and minimizes costs.

Project Manager and Infrastructure Project Manager. Software Project Manager -- A Software Project Manager has many of the same skills as their counterparts in other industries. Beyond the skills normally associated with traditional project management in industries such as construction and manufacturing, a software project manager will typically have an extensive background in software development. Many software project managers hold a degree in Computer Science, Information Technology, Management of Information Systems or related field. In traditional project management a heavyweight, predictive methodology such as the waterfall model is often employed, but software project managers must also be skilled in more lightweight, adaptive methodologies such as DSDM, Scrum and XP. These project management methodologies are based on the uncertainty of developing a new software system and advocate smaller, incremental development cycles. These incremental or iterative cycles are time boxed (constrained to a known period of time, typically from one to four weeks) and produce a working subset of the entire system deliverable at the end of each iteration. The increasing adoption of lightweight approaches is due largely to the fact that software requirements are very susceptible to change, and it is extremely difficult to illuminate all the potential requirements in a single project phase before the software development commences.

The software project manager is also expected to be familiar with the Software Development Life Cycle (SDLC). This may require in depth knowledge of requirements solicitation, application development, logical and physical database design and networking. This knowledge is typically the result of the aforementioned education and experience. There is not a widely accepted certification for software project managers, but many will hold the Project Management Professional (PMP) designation offered by the Project Management Institute, PRINCE2 or an advanced degree in project management, such as a MSPM or other graduate degree in technology management.

IT Infrastructure Project Management -- An infrastructure IT PM is concerned with the nuts and bolts of the IT department, including computers, servers, storage, networking, and such aspects of them as backup, business continuity, upgrades, replacement, and growth. Often, a secondary data centre will be constructed in a remote location to help protect the business from outages caused by natural disasters or weather. Recently, cyber security has become a significant growth area within IT infrastructure management. The infrastructure PM usually has an undergraduate degree in engineering or computer science, with a master's degree in project management required for senior level positions.

Along with the formal education, most senior level PMs are certified by the Project Management Institute, as a Project Management Professional. PMI also has several additional certification options, but PMP is by far the most popular. Infrastructure PMs are responsible for technology in order to reach the desired goals of the project managing projects that have budgets from a few thousand dollars up to many millions of dollars. They must understand the business and the business goals of the sponsor and the capabilities of the most difficult parts of the infrastructure PM's job may be this translation of business needs / wants into technical specifications. Oftentimes, business analysts are engaged to help with this requirement. Another team size of a large infrastructure project may run into several hundred engineers and technicians, many of whom have strong personalities and require strong leadership if the project goals are to be met.

Due to the high operations expense of maintaining a large staff of highly skilled IT engineering talent, many organizations outsource their infrastructure implementations and upgrades to third party companies. Many of these companies have strong project

management organizations with the ability to not only manage their client's projects, but to also generate high quality revenue at the same time.

The Project Manager is accountable for ensuring that everyone on the team knows and executes his or her role, feels empowered and supported in the role, knows the roles of the other team members and acts upon the belief that those roles will be performed. The specific responsibilities of the Project Manager may vary depending on the industry, the company size, the company maturity, and the company culture. However, there are some responsibilities that are common to all Project Managers,

- Developing the project plans
- Managing the project stakeholders
- Managing communication
- Managing the project team
- Managing the project risks
- Managing the project schedule
- Managing the project budget

- **Technical Manager**

The technical manager is a versatile position that requires sufficient managerial skills as well as sufficient technical skills. A technical manager should be able to perform all necessary tasks related to company systems including troubleshooting any technical issues. They must oversee the development and implementation of any system through all steps of the process. They must make sure their team is fully trained and able to perform their jobs. The technical manager is the point person for any issues that arise within the team. They are responsible for making key decisions for technical issues related to the company after considering everything from cost to quality of hardware or software.

Job Duties: The technical manager must provide guidance for all members of the team when it comes to designing, implementing, and updating software. They should constantly evaluate company platforms and networks and search for ways to improve them. They are responsible for addressing faults within any company system and making sure those faults are fixed. The technical director should make sure that all procedures are

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They are the communication source between clients and upper management of the company. The technical manager must also perform management tasks for the team. These duties include conducting employee reviews, handling employee complaints, and dividing the workload among members of the team**.**

- **Technical Head**

A Technical Lead is a software engineer, responsible for leading a development team, and responsible for the quality of its technical deliverables. Leading a development team is no easy task. An effective Technical Lead establishes a technical vision with the development team and works with developers to turn it into reality. Along the way, a Technical Lead takes on traits that other roles may have, such as a Team Lead, Architect or Software Engineering Manager but they remain hands- on with code. Although an Engineering Manager represents technology, they are often very far-removed from a development team and rarely code. In contrast, a Technical Lead sits with developers, very much focused on moving them towards their goal. They work to resolve technical disputes, and are watchful of technical decisions that have long- term consequences. A Technical Lead works closely with the Engineering Manager to build an ideal work environment. The Architect role ensures overall application architecture suitably fits the business problem, for now and for the future. In some organizations, Architects work with the team to establish and validate their understanding of architecture. A suitable amount of standardization helps productivity. Too much standardization kills innovation. Some organizations have the “Ivory Tower Architect” who swoops in to consult, standardize and document. They float from team-to-team, start new software projects, and rarely follow up to see the result of their initial architectural vision.

An effective Architect looks like a good Technical Lead. They establish a common understanding of what the team is aiming for, and make adjustments as the team learns more about the problem and the technology chosen to solve it.

Technical Lead Responsibilities are shown in Responsibilities of Circles,

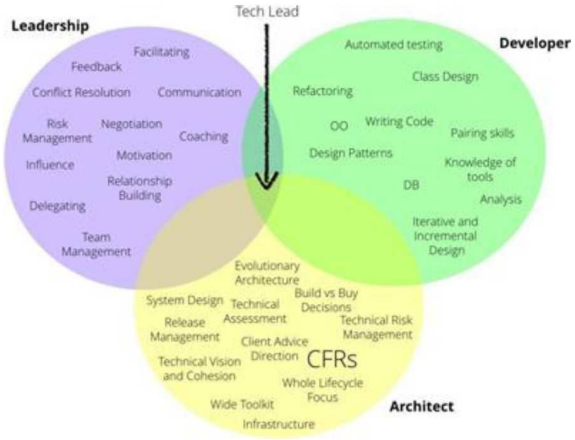

Fig 1.2 Technical Lead: Circles of Responsibilities

A Tech Lead is developer who is a Leader:

A Technical Lead wouldn't be the same without being technical and there are a whole bunch of development skills we would expect any capable Technical Lead of having. In today's age of agile development practices, there are a whole set of engineering practices, they would expect Technical Leads capable of doing such as refactoring and Behaviour/Test-Driven Development. A Technical Lead different from developers is their breadth and depth using leadership skills to help the team move towards a goal. Unlike developers who can avoid giving feedback to their peers, a leader must be able to give and receive feedback to help people develop and be more effective.

This means not only focusing on the technical aspects, but also the team and people aspects such as relationship building, motivating, delegating, and influencing. Technical Leads must work to resolve conflict. Conflict itself is a sign of a healthy team, but only when the Technical Lead creates an environment where conflict is resolved.

Developing skills in the Leader role:

Developers have little opportunity to practise leadership skills. Technical Leads are fortunate to have many resources that address the leadership circle. Leadership skills are important to all leaders regardless of industry or position and you can find a plethora of books, training courses and websites.

A Tech Lead is hands-on Architect:

We expect effective Technical Leads and Architects to have some level of coding ability. We have even gone so far to suggest they should ideally spend a minimum of 30% of their time in the code. Developers spend much of their time in the code, but

unless they start thinking of the bigger picture, it is difficult for them to start thinking beyond that. Technical Leads must help the team to:

Build systems, not software

This mind-set shift helps developers think about a lot more than just the software – to start thinking of the quality attributes of software systems (or the Cross- Functional/Non-Functional Requirements) as well as the whole interaction with the deployment environment in which the software lives. When someone plays the Architect role, they are naturally taking a broader view of the software – how long it's going to last for and how it is going to evolve over time.

1.3 Services Offered by the Organization

1.3.1 General Aptitude and Soft Skill Training:

Topics – Pre Placement Training, Pre training assessment numerical reasoning, verbal reasoning, logical reasoning, communication skills, situational judgement, diagrammatic reasoning, cognitive ability, inductive tests, Group Discussions etc.

1.3.2 Basic Technical Training Program:

Topics – coding online platforms on web development – Brush up and Practice sessions on online platforms.

1.3.3 Advanced Technical Training Program:

Topics – Advanced Designing using CSS, JavaScript, JQuery, Bootstrap and etc. Programming Strategies, hands on Competitive Coding, Solve Company specific quest languages – C, C++, Java or Python – Brush up and Practice sessions on ones, learn advanced topics like cyber security, Machine Learning – Artificial Intelligence, Training will be focused on cracking coding interviews of big international companies.

1.3.4 Industrial Skill Development and Internship Program:

Tequed Labs Private Limited conducts a hybrid program during the summer and winter vacation for engineering students. These programs provide opportunity for students to learn new technologies along with hands on experience and shall also get a chance to work on the project given by the companies.

1.4 Product Lines

In the quest to be world-class, Tequed Labs pursues continual improvements in the quality of its products, services and performance leading to total customer satisfaction and business growth through dedication, commitment and team work of all employees.

They have developed Student Tracking/Monitoring System. TRACE is a copyright product and a pilot project which is developed and enhanced based on the requirements elicitation they had through their various engagements with the institutions they were associated previously. The application developed will be an easy-go user interface which captures the data at the enterprise level and assists the individual and the institution on a whole in various administrations, reporting and tracking activities.

This product mainly concentrates on easing and reducing the manual efforts that have been currently put by both the faculty and students combined by automating various aspects of the institutions. They are currently a web-based application and are looking to sync into a mobile based application as well. They intend to help the students with live end term projects by engaging them into their pilot projects and also initiate to start a knowledge-based portal which helps students to share ideas, job opportunities or any curriculum related activities if any.

Chapter 2

LITERATURE SURVEY

- Toby Sagaran - "Programming Collective Intelligence", The Programming Collective Intelligence is less of an introduction to machine learning and more of a guide for implementing ml. The book details on creating efficient ml algorithms for gathering data from applications, creating programs for accessing data from websites, and inferring the gathered data. Each chapter features exercises for extending the stated algorithms and further improve their efficiency and effectiveness.[1]

- Andreas Muller and Sarah Guido: "Introduction to machine learning with Python", O'Reilly, 2007 guides students through the advance python knowledge using current development frameworks, this book is as valuable to students as a guide [2]

- W3Schools – "https://www.w3schools.com/python" , python, numpy, matplotlib, machine-learning and etc. [3]

- Tutotialspoint – "https://www.javatpoint.com/machine-learning". A tutorial for Machine Learning and Artificial Intelligence technology.[4]

CHAPTER 3

SYSTEM REQUIREMENTS

Requirements analysis is critical for project development. Requirements must be documented, actionable, measurable, testable and defined to a level of detail sufficient for system design. Requirements can be architectural, structural, behavioural, functional, and non-functional. A software requirements specification (SRS) is a comprehensive description of the intended purpose and the environment for software under development.

3.1 Functional Requirements

• Develop an architecture based on a machine learning that can objectively demonstrate whether the prediction system is well managed.

• Restrict unwanted data usage in the model.

• Provide a way to perform the prediction check to ensure the result is accurate.

• Provide an ability for the customer to increase the number of criteria to as many as they wish

3.2 Non-Functional Requirements

• Should be easier to access it from the GUI application

• Response time of the applications should reflect the real time observations.

• The algorithm should never fail in any of the test cases.

• Each user's activity should be separated from the other user's activities

3.3 Software requirements

Operating System	Linux, Mac or Windows
Programming Language- Backend	Python
Programming Language- Frontend	Python, TKInter Module
Development environment	Pycharm IDE
Algorithm	Super Vector Machine
Interface	Graphical User Interface

3.4 Hardware Requirements

Processor	Intel Core i3 or AMD FX 8 core series with clock speed of 2.2GHz or above
RAM	2GB or more
Hard disk	40GB or above
Input device	Keyboard or mouse or compatible pointing devices
Display	XGA (1024*768 pixels) or higher resolution monitor.
Miscellaneous	USB Interface, HDMI, etc

3.5 Assumptions and Dependencies

• Python 3 shall be installed in the machine where all the three subcomponent will be executing.

• The package installer for python should be installed.

• The model shall be fitted as per the data provided in the program.

• All the required modules shall be installed as per the requirement.

• The data science libraries and csv file shall be imported from the computer.

Chapter 4

TASK PERFORMED

4.1 Software Development

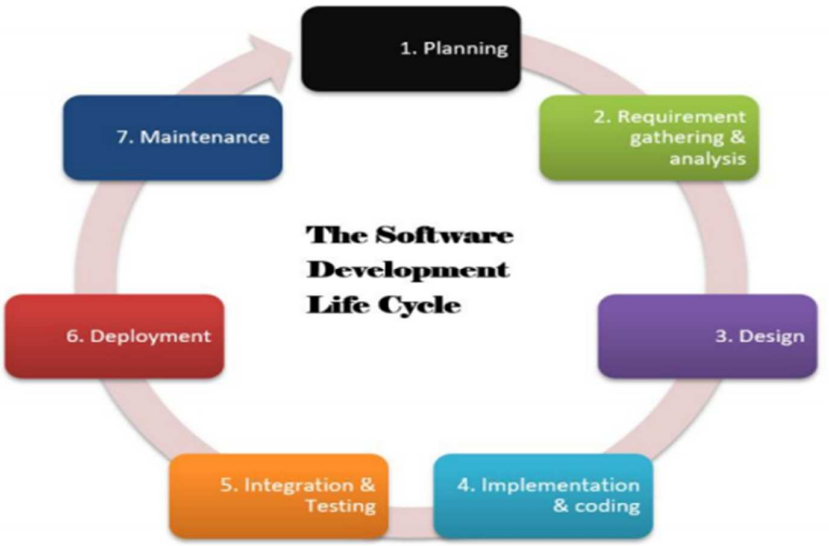

Fig 4.1 Software Development Life Cycle

SDLC is the abbreviation used for Software Development Life Cycle. It is also known as Software Development Process.

SDLC is a description of phases in the life cycle of a software application. It consists of a detailed plan as how to develop, build and enhance a specific software. Each phase of the SDLC lifecycle has its own process and deliverables that feed into the next phase

Importance of Software Development Life Cycle (SDLC)

- It acts as a guide to the project and meet client's objectives.
- It helps in evaluating, scheduling and estimating deliverables.
- It provides a framework for a standard set of activities.
- It ensures correct and timely delivery to the client.

1. **Planning**

The most important parts of software development, requirement gathering or requirement analysis are usually done by the most skilled and experienced software engineers in the organization. After the requirements are gathered from the client, a

scope document is created in which the scope of the project is determined and documented.

2. Requirement gathering and Analysis

It is the most important phase in Software Development Life Cycle (SDLC) in which all the information is gathered from customers, users and other stakeholders.

This phase gives the clear picture of the scope of the project and all the minute details (Planning, risk factors) are collected in this phase which helps to finalize the timeline boundary of the project.

3. Design

SRS (Software Requirement Specification) is the reference document used in this phase for the product to be developed. System and software design documents are prepared as per the specification document.

4. Implementation and Coding

The software engineers start writing the code according to the client's requirements.

5. Integration and Testing

After the unit testing is completed by the developer and the software is complete, it is deployed in the testing environment. The testing team then checks the functionality of the system as per the design documents shared with them.

During this testing phase, QA and testing team may find some bugs/defects which they communicate to developers. The development team fixes the bugs and send it back to QA with the updated design document, if needed to re-test. This process continues till the software tested is defects-free, stable and working according to the business needs of the system.

6. Maintenance

The users start using the developed system, once the system is deployed. In this phase, some issues are discovered and it is important to resolve them to ensure smooth functioning of the software.

Bug fixing (if any), Upgradation and Enhancement of some new features are done in the maintenance phase.

4.2 Technologies used

4.2.1 Machine Learning

Machine learning (**ML**) is the study of computer algorithms that improve automatically through experience and by the use of data.It is seen as a part of artificial intelligence. Machine learning algorithms build a model based on sample data, known as "training data",in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.

4.2.2 GUI Development

GUI development is a broad term for the work involved in developing a Graphical user Interface, as the user can get easy access to the data and the path. GUI designer, is a software development tool that simplifies the creation of GUIs by allowing the designer to arrange graphical control elements using

Tkinter module provides Python users with a simple way to create GUI elements using the widgets found in the Tk toolkit. Tk widgets can be used to construct buttons, menus, data fields, etc. in a Python application. Once created, these graphical elements can be associated with or interact with features, functionality, methods, data or even other widgets.

4.2.3 Python

Python is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. Java applications are typically interpreted that can run on any computer architecture which the python is currently installed.

When we consider a Java program, it can be Python is a multi-domain, interpreted programming language. It is a widely used general-purpose, high-level programming language. It is often used as a scripting language because of its forgiving syntax and compatibility with a wide variety of different eco-systems. Its flexible syntax enables developers to write short scripts while at the same time, they can use object-oriented concepts to develop very large projects.

Python is –

- **Object Oriented–** In Python, everything is an Object. Java can be easily extended since it is based on the Object model.
- **Simple–** Python is designed to be easy to learn. If you understand the basic concept of OOP , it would be easy to master.
- **Secure–** With python's secure feature it enables to develop virus-free, tamper-free systems. Authentication techniques are based on public-key encryption.
- **Robust–** Python makes an effort to eliminate error prone situations by emphasizing mainly on compile time error checking and runtime checking.
- **Multithreaded–** With python's multithreaded feature it is possible to write programs that can perform many tasks simultaneously. This design feature allows the developers to construct interactive applications that can run smoothly.
- **Interpreted–** Python is interpreted and light-weight process with fast execution.
- **High Performance–** With the use of Just-In-Time compilers, Java enables high performance.
- **Distributed–** It is designed for the distributed environment of the internet.
- **Dynamic–** It is considered to be more dynamic than C or C++ since it is designed to adapt to an evolving environment. Java programs can carry extensive amount of run-time information that can be used to verify and resolve accesses to objects on run-time.

4.3Process

These are the steps considered while developing a project:

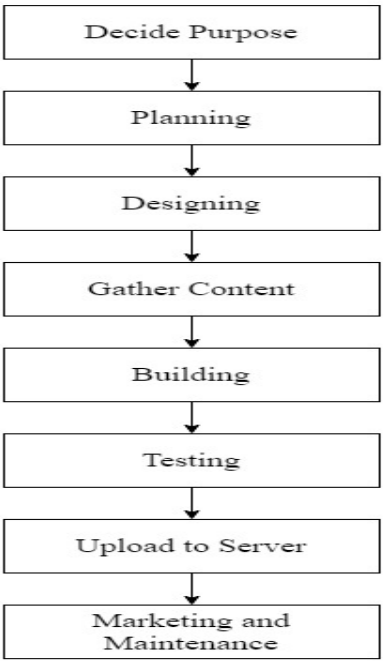

Fig 4.3 Process

4.4 Support Vector Machine

Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning.

The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane. SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine. Consider the below diagram in which there are two different categories that are classified using a decision boundary or hyperplane

4.5 Pycharm IDE

PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a wide range of essential tools for Python developers, tightly integrated to create a convenient environment for productive Python, web, ML and data science development.

4.6 Some tasks performed during internship

To learn about the technology being used in the current project and learn about the applications being used for project and communication.

Tasks were to improve or add some features to the project like:

- To handle the csv file and cleaning of data using data science modules.
- To build the GUI application using Python.
- To predict the restaurant in the city based on the user wish.
- To plot various graphs and histograms to predict the rating based on the user data.
- To add a feature to select rating, dish, area and restaurant in the application.

Chapter 5

IMPLEMENTATION

5.1 Analysis

5.1.1 Introduction

Analysis is the process of breaking a complex topic or substance into smaller parts to gain a better understanding of it. Analysts in the field of engineering look at requirements, structures, mechanisms, and systems dimensions. Analysis is an exploratory activity.

The Analysis Phase is where the project lifecycle begins. The Analysis Phase is where you break down the deliverables in the high-level Project Charter into the more detailed business requirements. The Analysis Phase is also the part of the project where you identify the overall direction that the project will take through the creation of the project strategy documents.

Gathering requirements is the main attraction of the Analysis Phase. The process of gathering requirements is usually more than simply asking the users what they need and writing their answers down. Depending on the complexity of the application, the process for gathering requirements has a clearly defined process of its own. This process consists of a group of repeatable processes that utilize certain techniques to capture, document, communicate, and manage requirements

5.1.2 Scope

The software product produced is an application by name “An efficient implementation of Restaurant prediction system using machine learning". In this project, we propose a Prediction Application based on Machine Learning.

The proposed system consists of a supervised machine learning algorithm called Support Vector Machine Algorithm. To fit the model the data is required, since it is a supervised Algorithm. The proposed architecture build with various data science methods The dataset must be cleaned using various data science technique and the data is huge in number, difficult to process.

To solve this problem, a system has been developed that applies prediction of best restaurant around the city. Since we have large number of restaurants around the city,

predicting is quite hard, so we provided users to search according to various filters.

5.1.3 Various Divisions in this Project

- **Data Preprocessing** As the initial graph has hundreds of thousands of nodes and it is memory intensive to store the similarity score for every pair of nodes, we have to do some pruning to get rid of some of the irrelevant nodes. As we are doing recommendation, a lot of the nodes and edges can be removed. The csv file has more number of data so we need to make use of required data by deleting unwanted data sources.

- **Algorithm Implementation**

  Here, we implement support vector machine algorithm, which implies the training data and testing data to fit the model. By using python module to train and test the model and finally fit the model to predict.

- **Prediction Application**

Here, we implement the application which predicts on the given data and the condition provided by the user. It is a Graphical User Interface Application so the user can access to various graphical diagram and histograms

- **GUI Implementation**

Here, we make use of python library that helps to build Graphical User Interface window. TKInter Module shall be imported to the development environment which access to various methods and classes to implement the application.

5.2 System Design

Systems design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. Systems design could see it as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering.

Object-oriented analysis and design methods are becoming the most widely used methods for computer systems design. The UML has become the standard language in object-oriented analysis and design. It is widely used for modeling software systems and is increasingly used for high designing non-software systems and organizations.

5.2.1 System Architecture Diagram

The below figure shows a general block diagram describing the algorithm performed by this project.

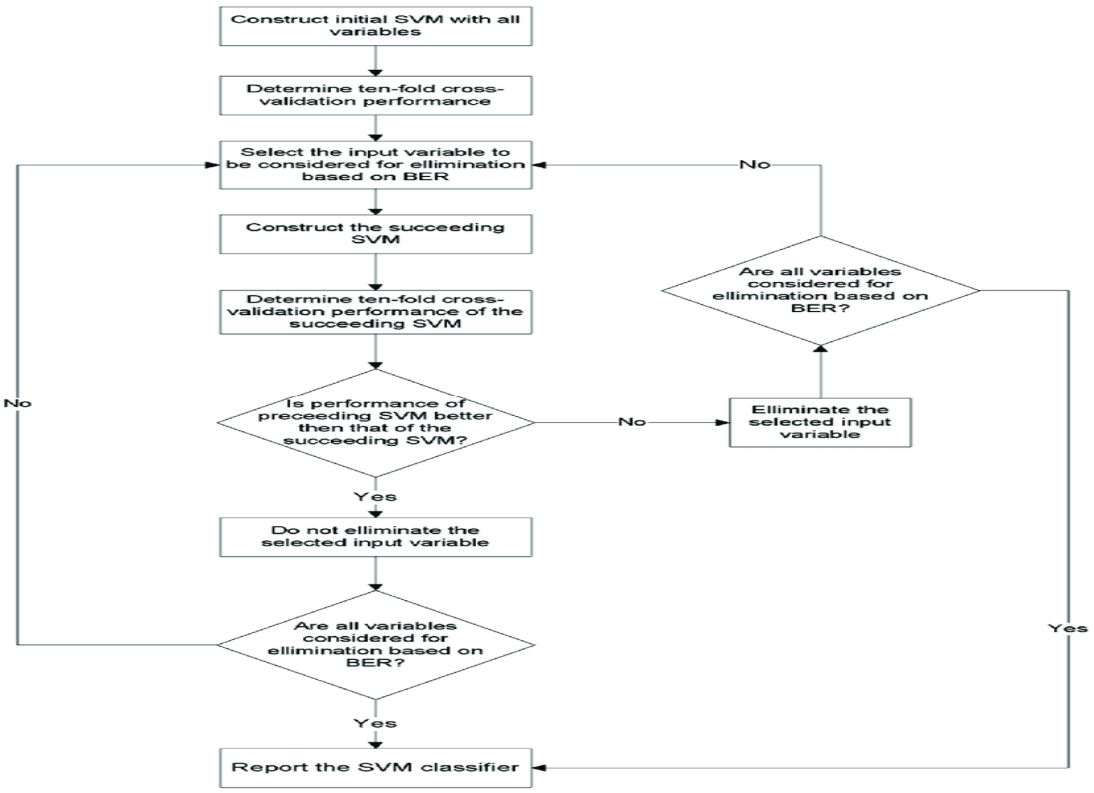

Fig 5.2.1 Algorithm Architecture Diagram

Major divisions in this project are

Data Preprocessing

Data preprocessing is the one which is the major method in any machine learning model implementation, it uses data science libraries in the python that helps in seperation of wanted and unwanted datasets.

Algorithm Implementation

Here, we implement the support vector machine Algorithm. To build this model the dataset has ready with the format, we need to train the model we have imported the machine

learning libraries in python that it predict using the test train module. Users can add as many filters as they want. More the trained data, better the accuracy.

GUI Application Implementation

Here, we implement the application which communicates with the backend algorithm we have developed and predict the result on a graphical window. Python's TKinter module helps us in building graphical window.

Histogram and Chart Implementation

Here, we provide couple of modules to help us in developing the application which shows the data according to the user input. Python's matplotlib module plots various plotings around the graphical application.

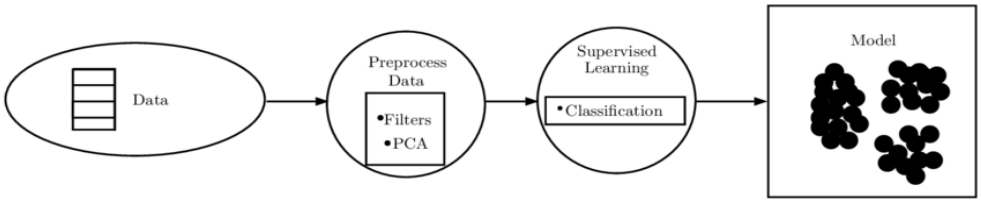

Fig 5.2.2 Overall representation diagram for this project

Predictor Application

Feeder application is developed using pycharm framework using TKInter module. Since we come across developing with large dataset, fitting the machine learning algorithm model takes some time then the application window arises with an optional frame. The home page consists of various options provided in the window, user can opt for any of the given options to know about the restaurants around the city.

User Window

This Module implements the user window on the system, which provides search options for adding various filters on the application

5.5 Snapshots

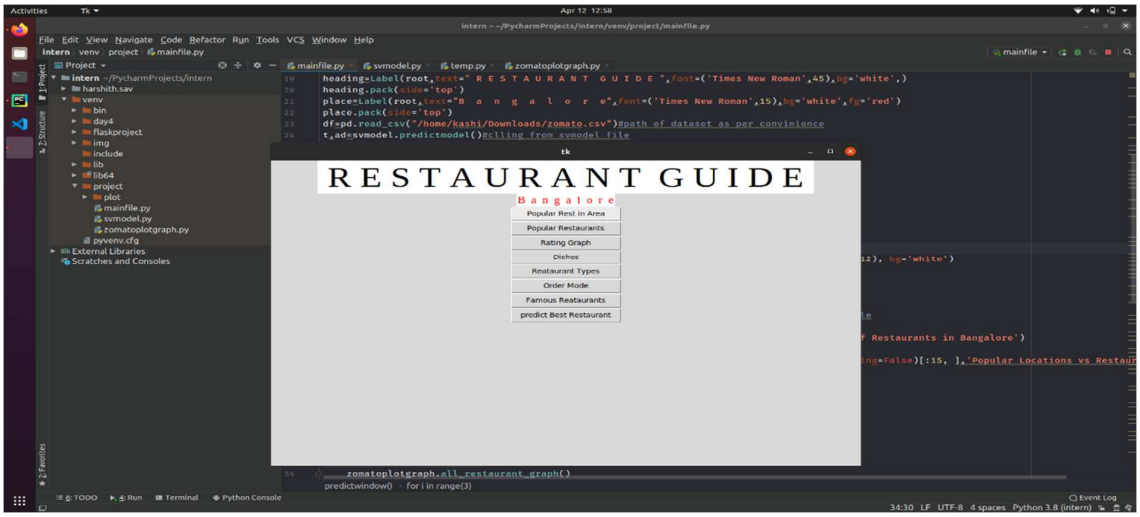

Fig 5.5.1 Home page

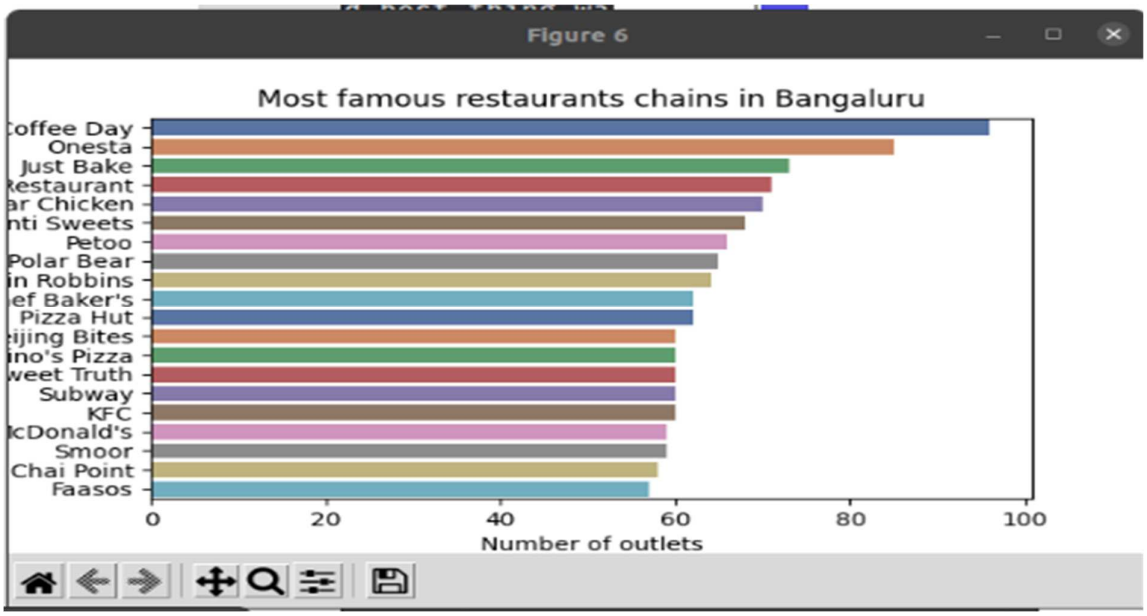

Fig 5.5.2 Graph

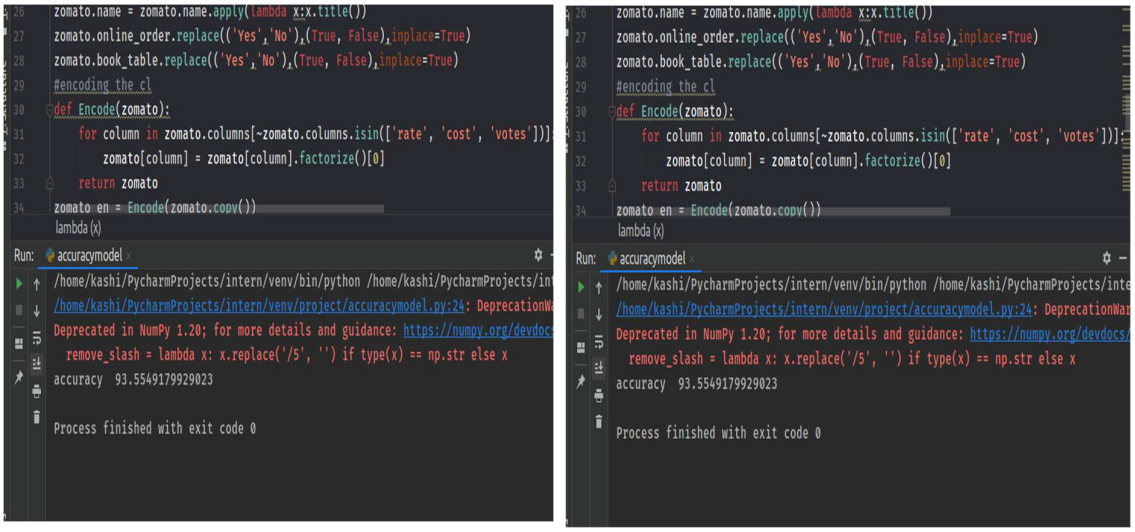

Fig 5.5.3 Accuracy

Fig 5.5.4 Result Page

Chapter 6

REFLECTION NOTES

The time I had spent as an intern in Tequed Labs is one of the most memorable experience that I had. The five weeks work allowed me to realize my true potential and gave me an opportunity to gain immense knowledge. The experience I got when I worked on a real world project and the advices given by the experienced people is invaluable for me.

6.1 Experience

In order to complete the engineering degree, as per the specified rules of VTU, the students need to complete 4 weeks of internship assessment to get a better insight about the working cultures where the students are supposed to work in the near future. During the whole course my internship there was not a single point where I would sit and get trained by the company people. I was not a student at that company moreover the authorities in the company treated me as one of the employees. I was craving for such an experience as I had spent 3 years of my engineering life in training. It was a time for me to explore things and internship at Tequed Labs, helped me in a great way.

I along with my team members had to give the report about the progress every day to our higher authorities. This improved my communication skills, presentation skills. The way the company people encouraged and pushed us to complete the project was a wonderful lesson. The internship gave me an opportunity to understand how the industry works and I would say working on a real world project and completing it within the deadline is by far the best achievement of my life.

6.2 Benefits of doing the Internship

This 4 weeks internship at Tequed Labs has taught many things that I was not aware about. I got to know methods used in the industry to solve a particular problem. I learnt the skill to work efficiently in a group of people. I learned the process of decomposing bigger problems into smaller sub problems and solving them one step at a time. I got a better insight about the industry and got the opportunity to interact with the people who are currently working on various domains in the industry. Apart from all the technical skills I was able to gather knowledge about certain skills which is essential to lead a happy life. Now I can say I am better listener, better team worker, overall a better human being after all the lessons I got to learn during the internship.

6.3 Contribution to the organization

It is important to think about some of the skills that will help us succeed in this different world. Here are nine ways you can contribute more efficiently to make the projects you work on more successful, regardless of your specific role.

1. **Understand the end goal**: Since a project has a defined ending, it is important that each contributor to the effort knows the desired end result. Stephen Covey teaches to "begin with the end in mind." This is clearly important to project team members. By understanding the desired result, you can make better individual decisions and reduce confusion and re-work.

2. **Identify clear roles:** Each person is an important piece in the overall project puzzle. Know your role and the roles of others. If you are a project leader, take the time to clarity these roles for everyone. If you aren't a leader, ask until you really understand how you can best contribute.

3. **Collaborate**: Project work is often fluid and free flowing. Once you understand your role and the roles of others you are in a position to collaborate with them more successfully. This collaboration 1sn't just a nice thing for you to do. It is imperative to the ultimate success of the project. Look for ways and be willing to collaborate.

4. **Recognize interdependencies**: The bigger the project, the more linked and interdependent are the people and the tasks. Certain steps need to be done before others can be completed. If you see only your small piece of the project, you may not realize how you finishing two days sooner might have a huge impact on several other things staying on track. Conversely if you fall two days behind on one of your tasks, the effects on the end results could be much longer delays. You aren't an island. Your work products, decisions and efforts affect many others. Recognize and work with the interdependencies between you and the others involved in the project.

5. **Ask questions:** Projects can be complex. Don't be afraid to ask questions to know more about any of the things mentioned above.

6. **Communicate**: Asking questions is communicating, but so is giving updates. Checking in with others. Co-coordinating schedules. If you are a project leader the importance of communication can't be overstated. If you are any team member other than the leader, communication is just as important. You can't leave it to the leader. Check in with others.

7. **Break it down**: Take the big project steps and break them down into definable tasks that you can get your hands around. By breaking the tasks down the work won’t feel so daunting, you

will find the interdependencies and you will be able to stay on track much more successfully, how do you eat an elephant? One bite at a time. Break down the overall project, and your individual steps into bite sized pieces.

8. **Look at the past**: If a version of this project has been done in the past, look for the lessons learned to improve your results this time. Think too about other projects you have been involved in. Even if the project was smaller or larger and the goals were very different, there are likely lessons you learned that you can apply things out did well that you would want to repeat, and things you could have done better that you can correct on this project.

9. **Look to the future**: Take a little time to document the best practices and ideas that work for you during the project. Whether this is a formal task for everyone on the project, or just your own notes to help you to continuously improve, investing a little time now will make your contributions to all future projects more valuable and efficient.

6.4 Non-Technical outcomes

During the whole month of our internship we had to give presentations almost every alternative day to different people in the company. This had helped me a lot in overcoming the problems that I had faced earlier while giving a presentation.

- I was working with a team of ten people and it was important for us to communicate with one other and constantly help each other if faced with difficulties, so this has helped me to become a better team player.

- I had maintained a schedule to complete tasks and followed it for the whole month. This helped me manage time properly thereafter and has exposed me to difficulties one might face while work-life balance.

- Since I had to work with a group of people and each had a different opinion, it was essential for me understand the mindset of the people in order to work efficiently. This has helped to be a better listener during any conversations.

Chapter 7

CERTIFICATE

TEQUED LABS
INVENT - INNOVATE - ITERATE
RESEARCH AND INNOVATION HUB
No 10 Anjaneya Nagar Banashankari 3rd Stage Bangalore 85

CERTIFICATE ID: SJB20216

CERTIFICATE
OF
COMPLETION

IS PROUDLY PRESENTED TO

B Shamanth Kowshik

FOR SUCCESSFULLY COMPLETING THE INTERNSHIP ON
ARTIFICIAL INTELLIGENCE
CONDUCTED BY TEQUED LABS
FROM 25/03/2021 TO 15/04/2021
AND WORKED ON THE PROJECT TITLED
RESTAURANT PREDICTION FOR ZOMATO

Aditya. S. K.
DIRECTOR
TEQUED LABS

CEO
TEQUED LABS

CONCLUSION

In a nutshell, this internship has been an excellent and rewarding experience. I can conclude that there have been a lot I've learnt from my work at the training &research centre. Needless to say, the technical aspects of the work I've done are not flawless and could be improved provided enough time.

As someone with no prior experience in Data science and Artificial Intelligence whatever I believe my time spent in training and discovering new languages was well worth it and contributed to finding an acceptable solution to an important aspect of machine Learning.

Two main things that I've learned the importance of our time-management skills and self-motivation. Although I have often stumbled upon these problems at University, they had to be approached differently in a working environment.

Working with python and machine learning technology has increased my interest in learning new technologies.

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