"DESIGN ANALYSIS AND IMPLEMENTATION OF EDUCATIONAL – DOMAIN CHATBOT SYSTEM"

A Project Report Submitted to
Rajiv Gandhi Proudyogiki Vishwavidyalaya

Towards Partial Fulfillment for the Award of
Bachelor of Technology in Computer Science & Engineering

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Jan - Jun 2022-23

EXAMINER APPROVAL

The Project entitled ***"DESIGN ANALYSIS AND IMPLEMENTATION EDUCATIONAL DOMAIN CHATBOT SYSTEM"*** submitted by **Nandini Bhavsar (0827CS181127), Sameer Nagar (0827CS181180), Shantanu Dubey (0827CS181189)** has been examined and is hereby approved towards partial fulfillment for the award of ***Bachelor of Technology degree in Computer Science & Engineering*** discipline, for which it has been submitted. It understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn therein, but approve the project only for the purpose for which it has been submitted.

(Internal Examiner) **(External Examiner)**

Date: **Date:**

GUIDE RECOMMENDATION

This is to certify that the work embodied in this project entitled ***"DESIGN ANALYSIS AND IMPLEMENTATION OF EDUCATIONAL – DOMAIN CHATBOT SYSTEM"*** submitted by **Nandini Bhavsar (0827CS181127), Sameer Nagar (0827CS181180), Shantanu Dubey (0827CS181189)** is a satisfactory account of the bonafide work done under the supervision of ***Asst. Prof. Shiv Shankar Rajput and Prof. (Dr.) Praveen Bhanodia***, is recommended towards partial fulfillment for the award of the Bachelor of Engineering (Computer Science Engineering) degree by Rajiv Gandhi Proudyogiki Vishwavidhyalaya, Bhopal.

(Project Guide) **(Project Coordinator)**

STUDENTS UNDERTAKING

This is to certify that project entitled ***"DESIGN ANALYSIS AND IMPLEMENTATION OF EDUCATIONAL – DOMAIN CHATBOT SYSTEM"*** has developed by us under the supervision of ***Prof. (Dr.) Praveen Bhanodia and Asst. Prof. Shiv Shankar Rajput***. The whole responsibility of work done in this project is ours. The sole intension of this work is only for practical learning and research.

We further declare that to the best of our knowledge, this report does not contain any part of any work which has been submitted for the award of any degree either in this University or in any other University / Deemed University without proper citation and if the same work found then we are liable for explanation to this.

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Acknowledgement

We thank the almighty Lord for giving me the strength and courage to sail out through the tough and reach on shore safely.

There are number of people without whom this projects work would not have been feasible. Their high academic standards and personal integrity provided me with continuous guidance and support.

We owe a debt of sincere gratitude, deep sense of reverence and respect to our guide and mentor **Prof. Shiv Shankar Rajput, Assistant Professor, AITR**, Indore for his motivation, sagacious guidance, constant encouragement, vigilant supervision and valuable critical appreciation throughout this project work, which helped us to successfully complete the project on time.

We express profound gratitude and heartfelt thanks to **Dr. Praveen Bhanodia, Professor, AITR** Indore and **Dr. Kamal Kumar Sethi**, HOD CSE, AITR Indore for his support, suggestion and inspiration for carrying out this project. I am very much thankful to other faculty and staff members of CSE Dept, AITR Indore for providing me all support, help and advice during the project. We would be failing in our duty if do not acknowledge the support and guidance received from **Dr S C Sharma**, Director, AITR, Indore whenever needed. We take opportunity to convey my regards to the management of Acropolis Institute, Indore for extending academic and administrative support and providing me all necessary facilities for project to achieve our objectives.

We are grateful to **our parent** and **family members** who have always loved and supported us unconditionally. To all of them, we want to say "Thank you", for being the best family that one could ever have and without whom none of this would have been possible.

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Executive Summary

DESIGN ANALYSIS AND IMPLEMENTATION OF EDUCATIONAL – DOMAIN CHATBOT SYSTEM

This project is submitted to Rajiv Gandhi Proudyogiki Vishwavidhyalaya, Bhopal(MP), India for partial fulfillment of Bachelor of Engineering in Computer Science Engineering branch under the sagacious guidance and vigilant supervision of ***Prof. (Dr.) Praveen Bhanodia*** and ***Asst. Prof. Shiv Shankar Rajput***.

ChatBot can be described as software that can chat with people using artificial intelligence. These software are used to perform tasks such as quickly responding to users, informing them, helping to purchase products and providing better service to customers. In this paper, we present the general working principle and the basic concepts of artificial intelligence based chatbots and related concepts as well as their applications in various sectors such as telecommunication, banking, health, customer call centers and e-commerce. Additionally, the results of an example chabbot for donation service developed for telecommunication service provider are presented using the proposed architecture.

Key words :

Utterance: Anything the user says. For example, if a user types “show me yesterday’s financial news”, the entire sentence is the utterance.

Intent: An *intent* is the user’s intention. For example, if a user types “show me yesterday’s financial news”, the user’s intent is to retrieve a list of financial headlines. Intents are given a name, often a verb and a noun, such as “showNews”.

Entity: An *entity* modifies an intent. For example, if a user types “show me yesterday’s financial news”, the entities are “yesterday” and “financial”. Entities

are given a name, such as “dateTime” and “newsType”. Entities are sometimes referred to as *slots*.

Broadcast: A *broadcast* is a message sent proactively to users. It is not a response to user input. Also referred to as “subscription messaging”, a broadcast is the chatbot equivalent of a push message in a mobile app.

Channel: *Channels* are the medium for chatbot conversations. Examples of channels include Facebook Messenger, Skype, Slack and SMS. Email and web chat windows are also mediums.

Conversational UI: User interfaces based on human speech, either written or spoken. Conversational UIs don’t use buttons, links or other graphical elements. Many chatbots, including Tangowork, mix conversational UI with graphical UI.

Natural Language Processing (NLP): NLP examines an utterance and extracts the intent and entities. NLP software includes Amazon Lex, Facebook’s Wit.ai, and Microsoft’s LUIS.

Pilot: The stage of development where the chatbot is deployed to a small group of users for testing. Pilots are especially critical for chatbots, because unlike a web application, the range of possible user input is unlimited.

Proof-of-concept (POC): The stage of development where the chatbot functions properly so long as the input is artificially constrained. A POC demonstrates the potential. POCs are especially useful for emerging technologies that are not fully understood by stakeholders, like chatbots.

Response: Anything the bot says in response to user input

List of Abbreviations

Abbr1: R- CNN- Regional based Covolutional Neural Networks

Abbr2: COCO – Common Objects in context

Abbr3: OpenCV- Open Source Computer Vision

Abbr4: JSON- Java Script Object Notation

Abbr5: CIF- Count In Frame

Abbr6: GPU- Graphical Processing Unit

Abbr7: YOLO- You Only Look Once

Abbr8: NLP- Natural Language Processing

Table of Contents

Chapter I - Introduction

Introduction

J.A.V.I.I.S. is a Chabot in educational domain. The purpose is focused on the design of the specific architecture and model to manage communication and furnish the right answers to the students. This system detects the questions and answers users using natural language processing techniques. J.A.V.I.I.S. is a chat bot which helps the colleges to have 24*7 automated query resolution. This helps the students to have the right information from the trusted source.

This made administration of information easy. Automation has helped IT keep pace with demand. We're now taking the next step—Cognitive Service Management—to ensure the quality experience students expect in the digital economy. We're embracing cognitive technologies in a big way. J.A.V.I.I.S. is available 24/7 to help students connect to GW's wireless network, register devices, and get assistance with other requests. Students interact with J.A.V.I.I.S. via text or web browser using everyday natural language.

1.1 Overview

Chatbot is an automation system and different formats of chat bots are text based, graphical, web application, and voice based. Chatbots typically provide a text-based user interface, allowing the user to type commands and receive text as well as text to speech response. The functionality of a Chat bot works only on the existing commands. Chatbots usually remember previous commands in order to provide functionality. The term **"ChatterBot"** was originally coined by **Michael Mauldin** (creator of the first Verbot) in 1994 to describe these conversational programs. Chatbots are used in dialog systems for various purposes including customer service, request routing, or information gathering.

1.2 Background and Motivation

While some chatbot applications use extensive word-classification processes, **natural language processors**, and sophisticated AI, others simply scan for general keywords and generate responses using common phrases obtained from an associated library or database. A chatbot is often described as one of the most advanced and promising expressions of interaction between humans and machines. However, from a technological point of view, a chatbot only represents the natural evolution of a Question Answering system leveraging Natural Language Processing (NLP). Formulating responses to questions in natural language is one of the most typical Examples of Natural Language Processing applied in various enterprises' end-use applications. This is the first task that a chatbot performs. It analyzes the user's request to identify the user intent and to extract relevant entities**.** The ability to identify the user's intent and extract data and relevant entities contained in the user's request is the first condition and the most relevant step at the core of a chatbot: If you are not able to correctly understand the user's request, you won't be able to provide the correct answer. Once the user's intent has been identified, the chatbot must provide the most appropriate response for the user's request. Chatbot applications streamline interactions between people and services, enhancing customer experience. At the same time, they offer companies new opportunities to improve the customers engagement process and operational efficiency by reducing the typical cost of customer service. To be successful, a chatbot solution should be able to effectively perform both of these tasks. Human support plays a key role here: Regardless of the kind of approach and the platform, human intervention is crucial in configuring, training and optimizing the chatbot system.

1.3 Objectives

Our objectives are -:

- To develop, analyse and implement chatbot application
- To fulfil the purpose of design of the specific architecture and model to manage communication and furnish the right answers to the students.
- To provide a chatbot that can make the communication easy.

- To help the students to have the right information from the trusted source.
- To make administration of information easy.
- To help the administration and also help students in communicating effectively.
- To try our best to improve the environment for students to help them in every way possible and our chatbot does that.
- To give right answers to questions, it will also help students understand the learning environment.
- To be 24/7 available to help students connect to GW's wireless network, register devices, and get assistance with other requests.

1.4 Scope of the Project

- This chatbot is for students who are eager to get right answers to their questions.
- Chatbots are fully functioning, semi-autonomous systems that can assist customer service experiences and response time.
- If the future demands advanced chatbots that do more than use scripted, single-turn exchanges, then their method of interface will also have to advance.
- A voice interface can assist users with disabilities or those who are skeptical of technology, but it also requires another layer of NLP development.
- While voice interface may be optional, chatbots have been in the enterprise long enough for developers and experts to begin identifying what elements of chatbots are mainstay requirements.
- NLP development, human-like conversational flexibility and 24/7 service are crucial to maintaining chatbots' longevity in enterprise settings.
- Chatbots are AI devices and, looking ahead, they need to keep up with AI trends, such as automated machine learning, easy system integration and developing intelligence.
- As people research, they want the information they need as quickly as possible and are increasingly turning to voice search as the technology advances.
- Email inboxes have become more and more cluttered, so buyers have moved to social media to follow the brands they really care about.

- Ultimately, they now have the control — the ability to opt out, block, and unfollow any brand that betrays their trust.

1.5 Report Structure

The project ***DESIGN ANALYSIS AND IMPLEMENTATION OF EDUCATIONAL – DOMAIN CHATBOT SYSTEM*** is primarily concerned with the **Natural language processing** and whole project report is categorized into five chapters.

Chapter I: Introduction - introduces the background of the problem followed by rationale for the project undertaken. The chapter describes the objectives, scope and applications of the project. Further, the chapter gives the details of team members and their contribution in development of project which is then subsequently ended with report outline.

Chapter II: Review of Literature - explores the work done in the area of Project undertaken and discusses the limitations of existing system and highlights the issues and challenges of project area. The chapter finally ends up with the requirement identification for present project work based on findings drawn from reviewed literature and end user interactions.

Chapter III: Proposed System - starts with the project proposal based on requirement identified, followed by benefits of the project. The chapter also illustrate software engineering paradigm used along with different design representation. The chapter also includes block diagram and details of major modules of the project. Chapter also gives insights of different type of feasibility study carried out for the project undertaken. Later it gives details of the different deployment requirements for the developed project.

Chapter IV: Implementation - includes the details of different Technology/ Techniques/ Tools/ Programming Languages used in developing the Project. The chapter also includes the different user interface designed in project along with their functionality. Further it discuss the experiment results along with testing of

the project. The chapter ends with evaluation of project on different parameters like accuracy and efficiency.

Chapter V: Conclusion - Concludes with objective wise analysis of results and limitation of present work which is then followed by suggestions and recommendations for further improvement.

Chapter II - Review of Literature

Review of Literature

A chatbot only represents the natural evolution of a Question Answering system leveraging Natural Language Processing (NLP). Formulating responses to questions in natural language is one of the most typical Examples of Natural Language Processing applied in various enterprises' end-use applications. This is the first task that a chatbot performs. It analyzes the user's request to identify the user intent and to extract relevant entities. The ability to identify the user's intent and extract data and relevant entities contained in the user's request is the first condition and the most relevant step at the core of a chatbot:

2.1 Preliminary Investigation

2.1.1 Current System

MARTHA is a chat bot which is created and being used at George Washington University.

This chat bot has the functionalities of answering the queries of students but this system do not have any access privileges. Later it was updated and used for teaching and displaying academic results.

The education industry has been technologically advanced long before the pandemic. In fact, research shows that education is among the top five business sectors widely using and making profits with chatbots. They are being deployed over every platform on the internet, be it social media or business websites and applications. Tech-savvy students, parents, and teachers are experiencing the privilege of interacting with the chatbots and in turn, institutions are observing satisfied students and happier staff.

There are multiple business dimensions in the education industry where chatbots are gaining popularity, such as an online tutor, student support, teacher's assistant, administrative tool, assessing and generating results. In this article, we will

analyze all the possible applications of educational chatbots, the benefits of chatbots in education and build a future perspective about chatbots in the education industry.

here are a few industry-specific applications of educational chatbots. Institutes that need assistance with any of the following use-cases can deploy chatbots and expect tremendous results.

1. Virtual personal tutoring

AI chatbots can have personal attention on students and their learning habits. They can closely observe the pattern of studying and content consumption and based on that they can help students excel in their streams.

With intelligent tutoring systems schools can deliver personalized learning experiences. Not all students understand and learn in the same way, some even have disabilities. To cater to the needs of every student in terms of the trouble-making topics or subjects, chatbots can customize the learning plan and make sure that students gain maximum knowledge- in the classroom, and even outside. They help students with all study material as and when they need it.

2. Student engagement

Amidst virtual learning during the pandemic, student engagement has reduced to hit the rock bottom. Student-teacher interaction and student-student engagement, both have taken a back seat. Teachers are trying to bring out their best so that the students gain knowledge and understand subjects.

Chatbots can help in this scenario by continuously interacting with students and clarifying their queries instantly. Students can take their help during and after their classes and make sure that they do not compromise on learning through a virtual platform.

Interaction between students is now exchanging messages over social media platforms once in a while. Chatbots can alter the situation and improve student engagement for good.

Students can create alumni groups or project groups on chatbots for students to exchange information about projects, assignments, deadlines, presentations, events and activities. Engaging with each other using conversational AI can help them create a better environment for studying and learning.

3. Student support

Global e-learning is expected to expand at a compound annual growth rate of 9.1% by 2026. People are opting for distance corporate training and courses so that they don't need a break from their job and family to upskill.

This growth calls for a strong student support strategy for educational institutions. Queries of students before the enrollment, during the course and after the course must be prioritized and solved instantly.

Educational chatbots can be a great help in providing excellent student support and delivering instant solutions to students' doubts.

4. Teacher's assistant

Institutional staff, especially teachers, are overburdened and exhausted working beyond their office hours just to deliver excellent learning experiences to their students. Most of the tasks done by teachers are repetitive and mundane. For example, tracking student attendance, scoring tests or sending out assignments to students.

Repetitive tasks can easily be carried out using chatbots as teachers' assistants. With artificial intelligence, chatbots can assist teachers in justifying their work without exhausting them too much.

For example, if an institution automates the attendance recording of students, they have to make sure that the chatbots in school send them the notes and recordings of the lectures that were recorded during their absenteeism.

5. Administrative companion

For prospective as well as existing students, educational chatbots can be their administrative companions. Instead of visiting the office and waiting in long

queues to find some answers, texting via chatbots to resolve queries is a better option.

6. Proactive assistance

Chatbots in the education industry can be thoroughly trained to proactively help students with answers even before they ask. Assistance regarding the payments, or addition of a new module to the syllabus, or a deadline, all this can be proactive and can prove to be helpful for a better student experience.

Schools can even send personalized messages like “Bring your water bottles, there is some issue with the school water tank” or “due to the storm, the school will remain off today” and build a communication bridge between students and institutes.

7. Feedback collection

A renowned quote by Ken Blanchard, “feedback is the breakfast of champions” can never go wrong. Collecting feedback on a daily basis is extremely important, no matter which industry you belong to.

For educational institutes, there is a lot to collect feedback on. From teachers to syllabus, admissions to hygiene, schools can collect information on all the aspects and become champions in their sector.

Chatbots in the education sector can help collect feedback from all the stakeholders after each conversation, or completion of every process. This can help schools in extracting useful information and attending to the matters with poor results.

8. Assessment and evaluation

Assessment is crucial for both students and educational institutions. Although MCQs and one-word answers are easily assessed by various software, subjective answers still need human assistance.

With artificial intelligence and machine learning, all student responses can be automatically evaluated and scored. Teachers can completely rely on technology and fill students' scorecards as per the results generated by AI chatbots.

As per the results, education chatbots can share study material and reference links to students for subjects that need attention. With this advancement, teachers can be relieved of the assessments and evaluations and work on giving this extra time to their students.

9. Data repository

Chatbots act as a data collection tool as well as a data distribution tool for the education industry. Students can upload all their details and feed data to get desired results. At the same time, teachers can use them to distribute lessons and other important information to all their students at once.

With automation in data collection and data distribution, the chances of mistakes reduce, and also the process can take place 24/7.

All data in a single place can ease the process of decision-making and problem solving for institutions and can be used to derive insightful conclusions.

10. Student sentiment analysis

Understanding student sentiments during and after the sessions is very important for teachers. If students end up being confused and unclear about the topic, all the efforts made by the teachers go in vain.

Chatbots understand sentiments and thus they can help teachers in modifying and improving their teaching practices to provide better learning experiences and clarify students' doubts right off.

Now that we know the efficiency of chatbots in the education sector and how can they be used, let us look at some of the business benefits obtained by deploying chatbots.

2.1.2 Limitations of Current Systems

1. Existing Chatbots don’t understand human context.
2. If Query is not related to inbuilt query they can’t provide related query suggestions.
3. Existing Chatbots are not able to generate graphical reports.

Chapter III - Proposed System

Proposed System

3.1 The Proposal

The main aim is to reduce the manual work in generating the reports either student wise or batch wise based on the inbuilt queries which are embedded using Chabot and also to generating the comparative graphical chart reports.

Proposed chat bot system will provide additional features like flexibility, and also friendly environment.

The flexibility features are used to retrieve the information like related query suggestion, entire information display of a particular candidate and additional query submission to the admin, computed data display.

Friendly environment is provided by an interface that is easy for user to enter the queries in natural language with out any particular format.

24/7 available to help students connect to GW's wireless network, register devices, and get assistance with other requests.

3.2 Benefits of Proposed System

- The purpose is focused on the design of the specific architecture and model to manage communication and furnish the right answers to the students.
- It provide a chatbot that can make the communication easy.
- This helps the students to have the right information from the trusted source.
- This made administration of information easy.
- not only help the administration but will also help students in communicating effectively.
- always trying our best to improve the environment for students to help them in every way possible and our chatbot does that.

3.3 Block Diagram

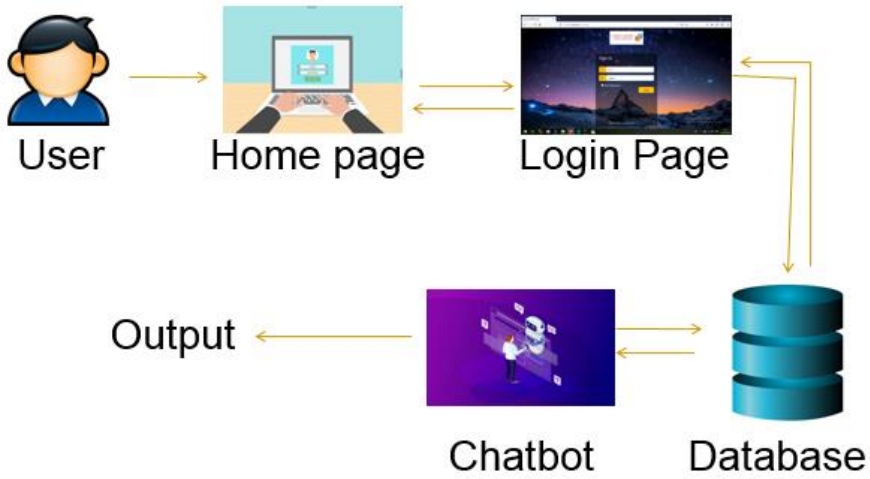


Fig 3.1 : Block Diagram of the proposed chatbot

The block diagram (Fig 3.1) represents the working of the proposed chatbot system wherein it shows the various phases under which a user would be accessing the chatbot. The block diagram shows the following phases -:

1. Homepage

The user accesses the chatbot through the homepage.

2. Login Page

The user logins into the chatbot through login page.

3. Database

The database stores user credentials and other informations that will be verified and validated so that user can be authenticated and authorized to access the chatbot system.

4. Chatbot

User will use the chatbot system and can perform different functions.

3.4 Deployment Requirements

There are basic requirements (hardware, software and services) to successfully deploy the system. Advanced versions are also compatible. These are mentioned below :

3.4.1 Hardware

1. Intel Core i3 processor – For fast processing of data and accurate results of queries
2. RAM: 4GB or more for data storage and easy access of data
3. Operating System: Windows 10 (Recommended), Linux (Ubuntu)
4. Hard Disk (Generalized configuration)

3.4.2 Software

1. Python Artificial Intelligence Mark-up Language
2. Natural language processing tool kit
3. Python –flask
4. SQL alchemy

Chapter IV - Implementation

Implementation

Data Collection and Loading

The Students details from 2nd year to 4th year are collected and loaded into the database.

Creating User Modules

The different modules of this chatbot system are student, faculty, HOD, clerk, admin, attendance, marks, profile, graphs, chatbot.

Providing permissions

The access permissions are provided to different users based on their roles.

Implementing chatbot

The chatbot is developed in python keeping in view of its users for more flexibility.

It receives the queries from the user processes it and fetches the data from the database.

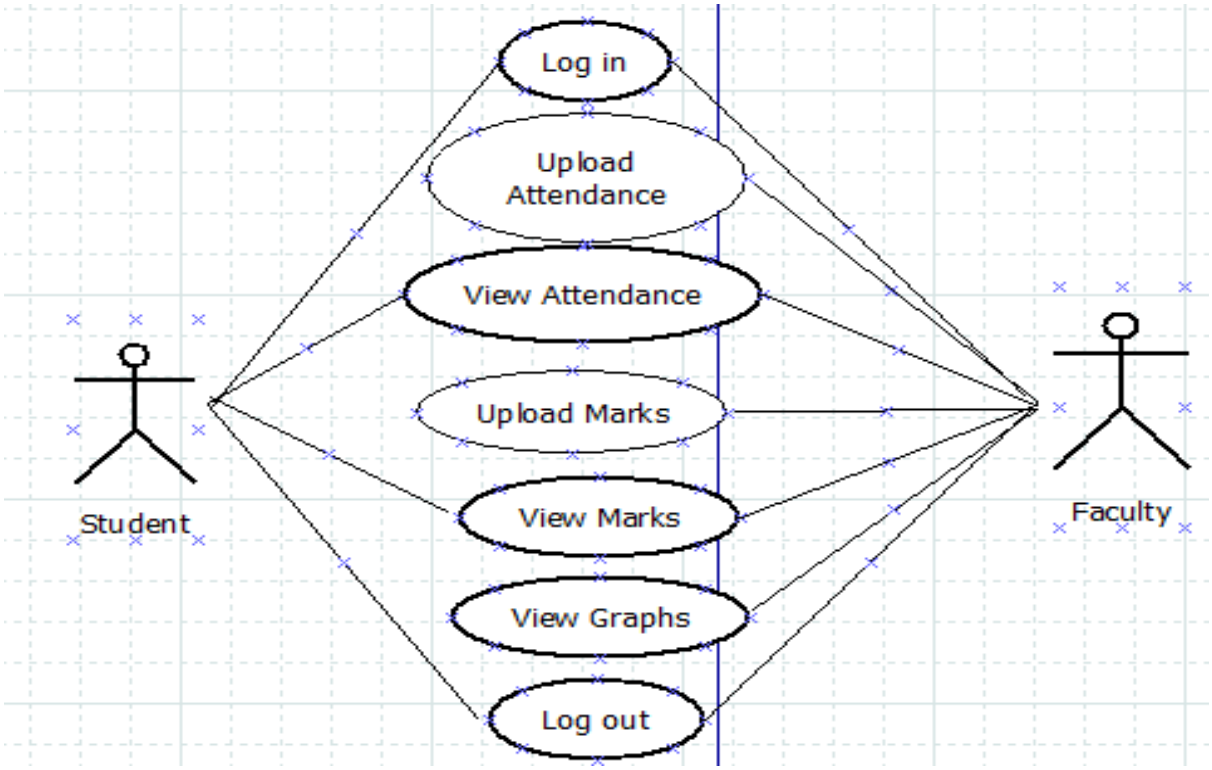
Python RegEx and NLP is used to provide flexibility to the user to communicate in natural language.

Web application

It is designed using html for the user interaction with the bot at front end.

Figure 4.1 – Screenshot of the login page of chatbot system

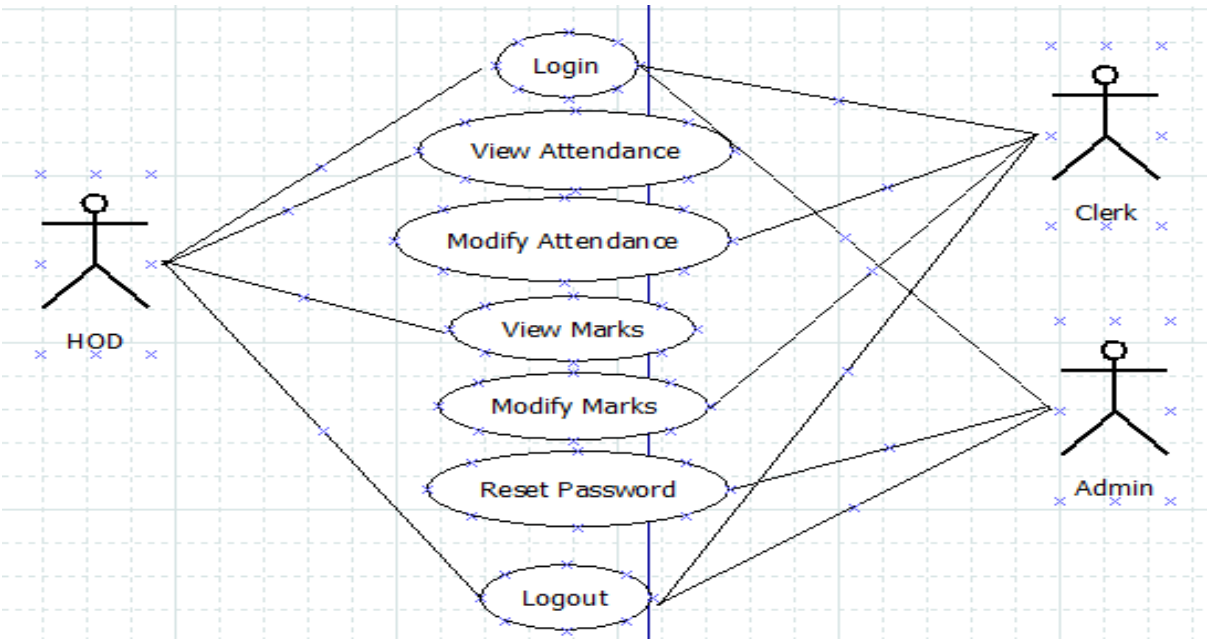
4.1 Models/Diagrams



4.1.1 Use Case Diagram for Student and Faculty

It can be described as-:

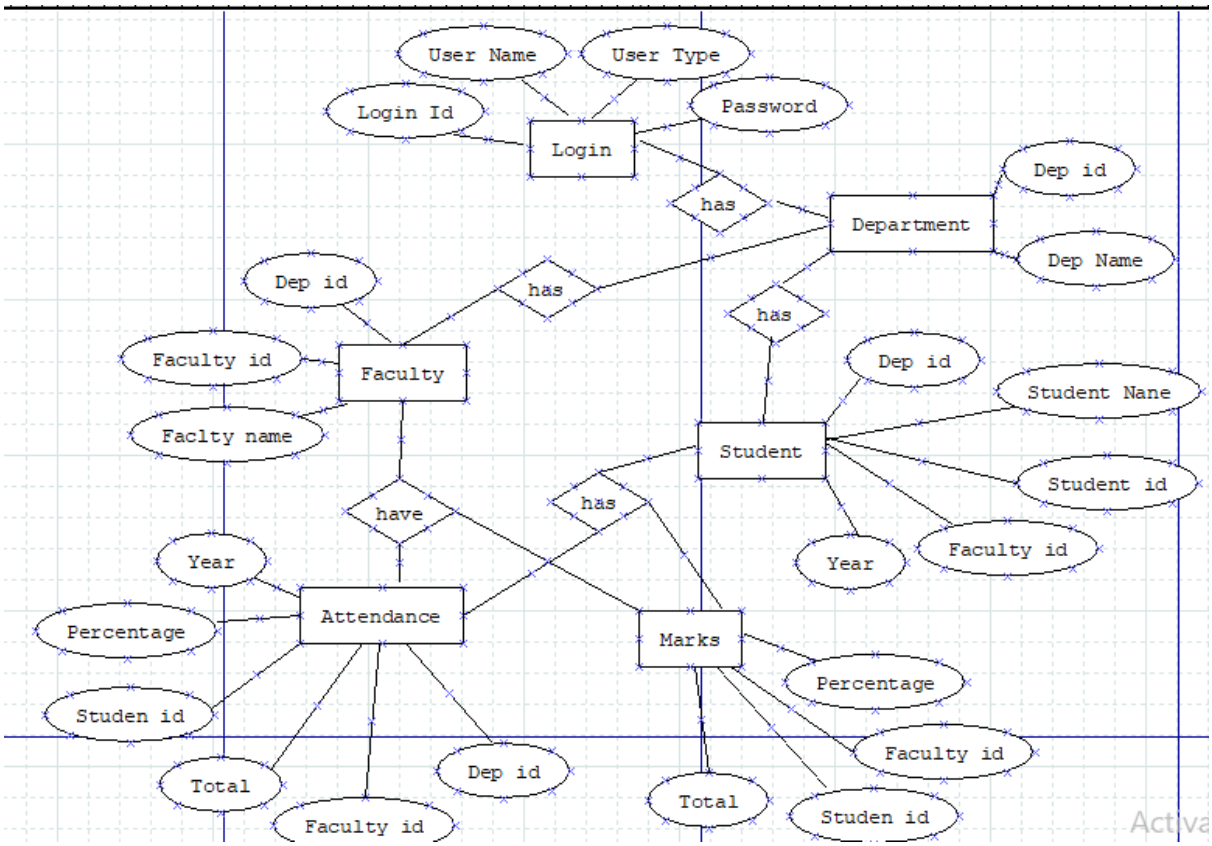
1. Functions – It has various functions like the actor can log in to chatbot, upload attendance, view attendance, upload marks, view marks, view graphs and log out of the chat system.
2. Actors – The actors are students of the college and Faculties of the college.



4.1.2 Use Case Diagram for HOD, Clerk and Admin

It can be described as-:

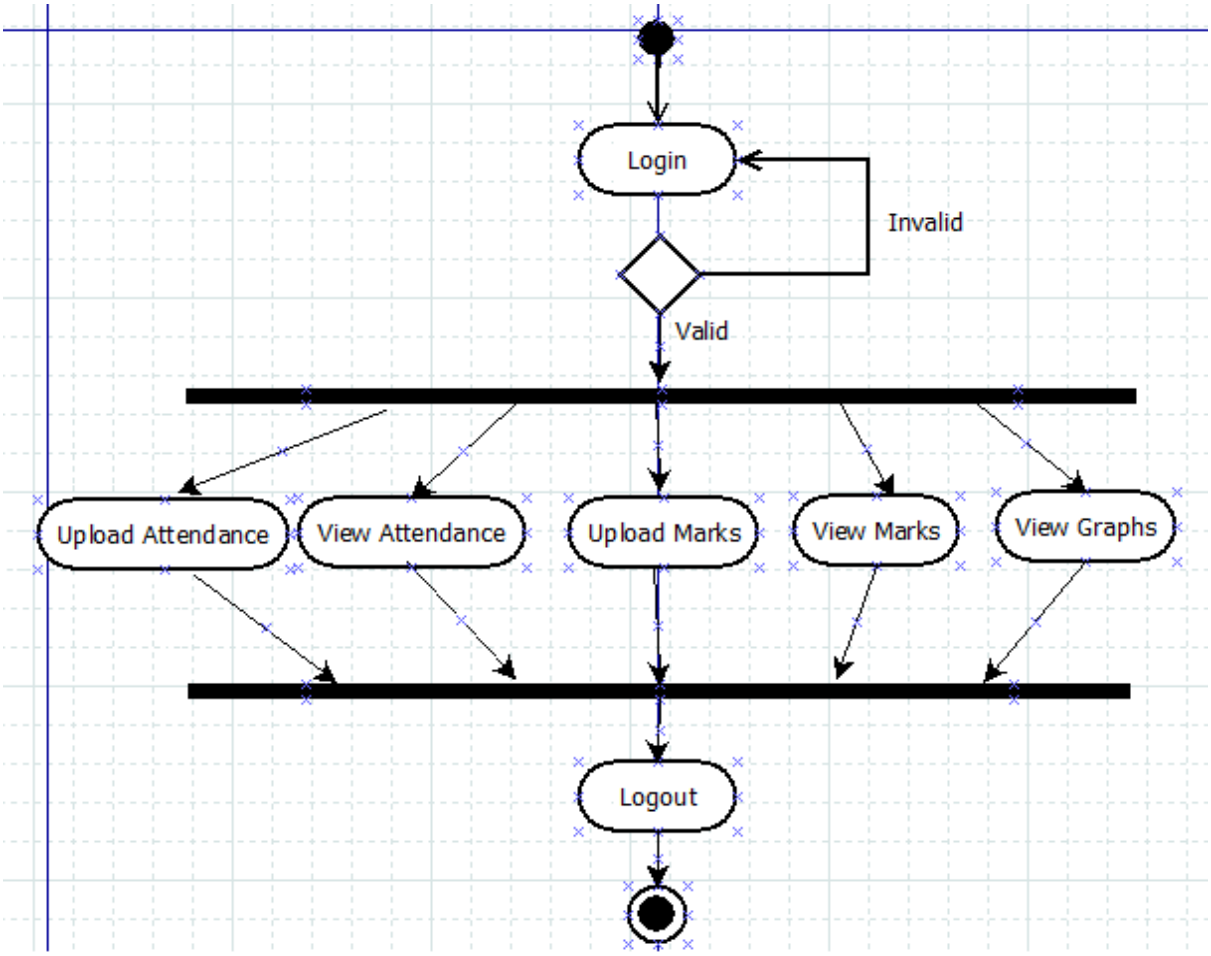
1. Functions – It has various functions like the actor can log in to chatbot, view attendance, modify attendance, modify marks, view marks, reset password and log out of the chat system.
2. Actors – The actors are HODs, clerks and admins of the college.



4.1.3 ER Diagram

It can be described as-:

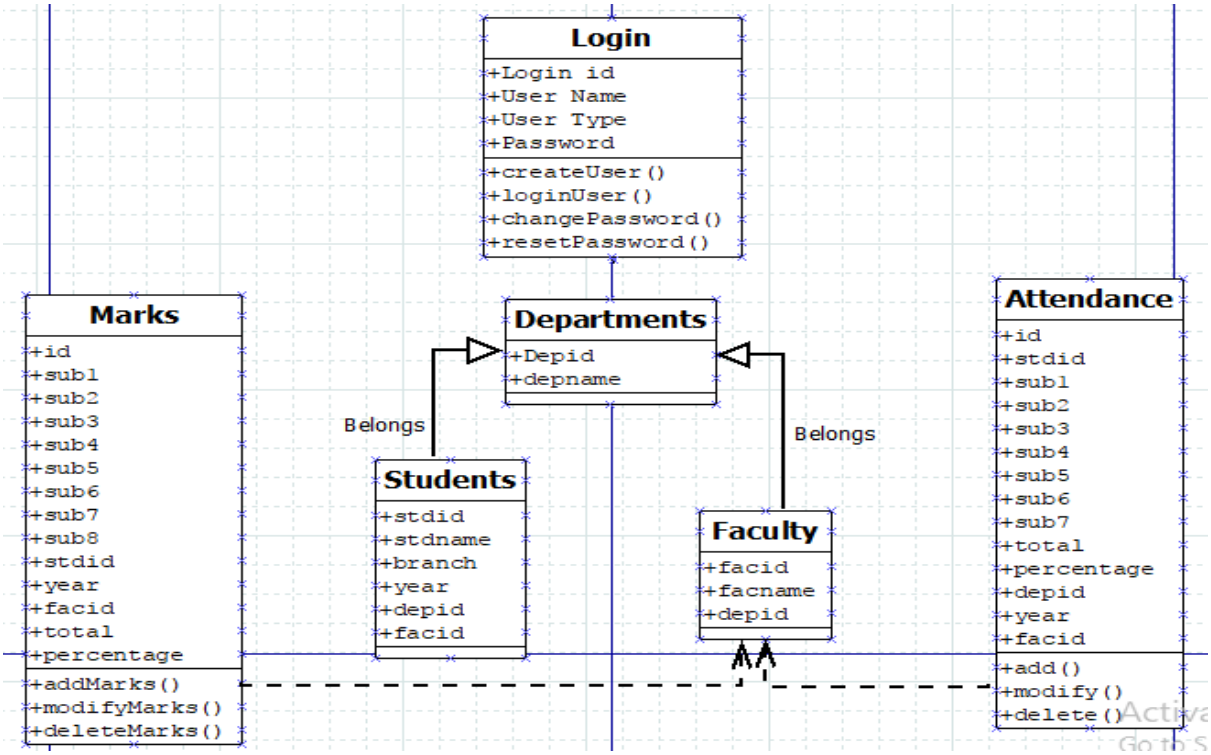
1. Entities – The entities are Faculty, Login, Department, Student, Attendence, and Marks.
2. Attributes – They have various attributes such as percentage, Name, address, mobile no, Id etc.
3. Relationship – There is many to many relationship where various students are related to various faculties and so on.
4. Primary Key – The ID is the primary key for all entities and the contributing factors are all candidate keys that can play the role of primary key.



4.1.4 Faculty Activity Diagram

It can be described as-:

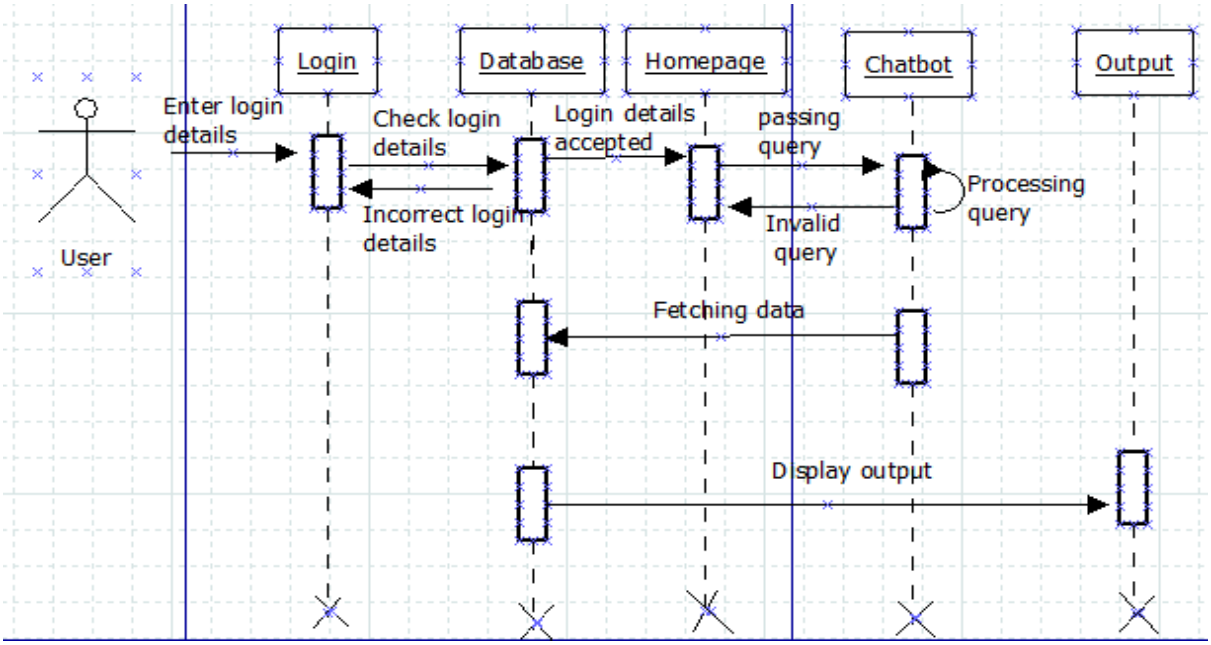
1. Functions – It has various functions like login, upload attendance, upload marks, view marks, view graphs and log out.
2. Conditions – The login credentials must be valid



4.1.5 Class Diagram

It can be described as-:

1. Functions – It has various functions like the actor can log in to chatbot, upload attendance, view attendance, upload marks, view marks, view graphs and log out of the chat system.
2. Classes – There are classes like marks, students, departments, login, faculties and attendance.
3. Attributes – They have various attributes such as percentage, Name, address, mobile no, Id etc.
4. Relationship – There is many to many relationship where various students are related to various faculties and so on.

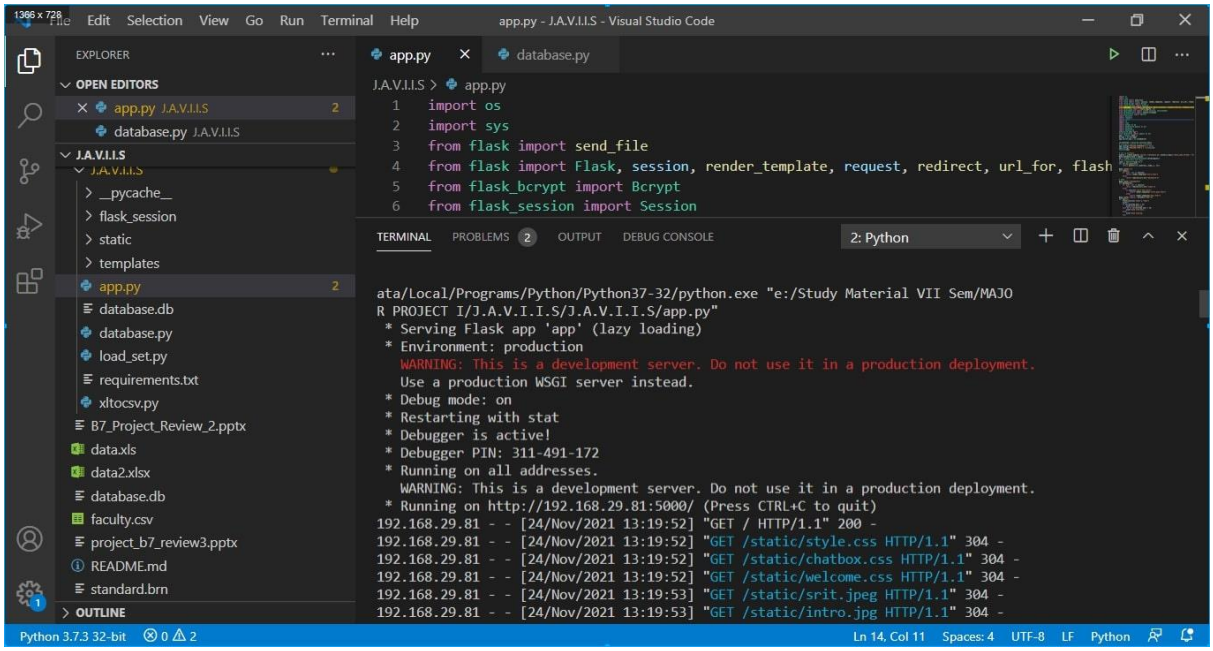


4.1.6 Sequence Diagram

It can be described as-:

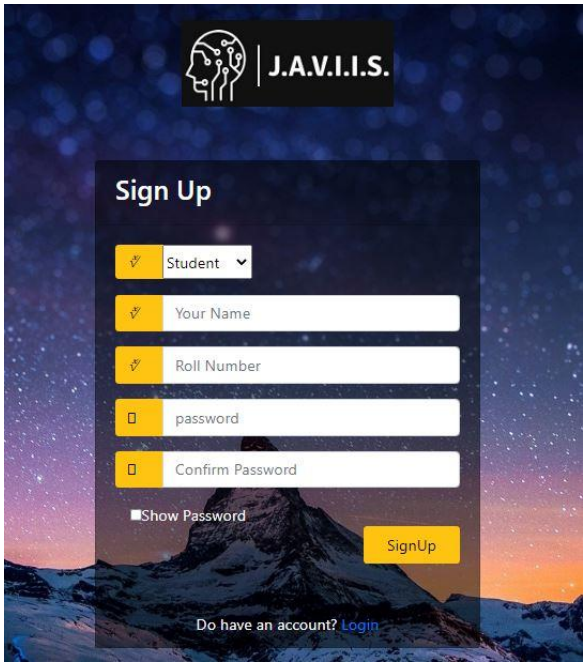
1. Functions – It has various functions like the actor can log in to chatbot, upload attendance, view attendance, upload marks, view marks, view graphs and log out of the chat system.
2. Classes – There are login, database, homepage, chatbot and output.
3. Sequence – The sequences consist of enter login details, checking, login accepted, query processing and result.

4.2 Screenshots

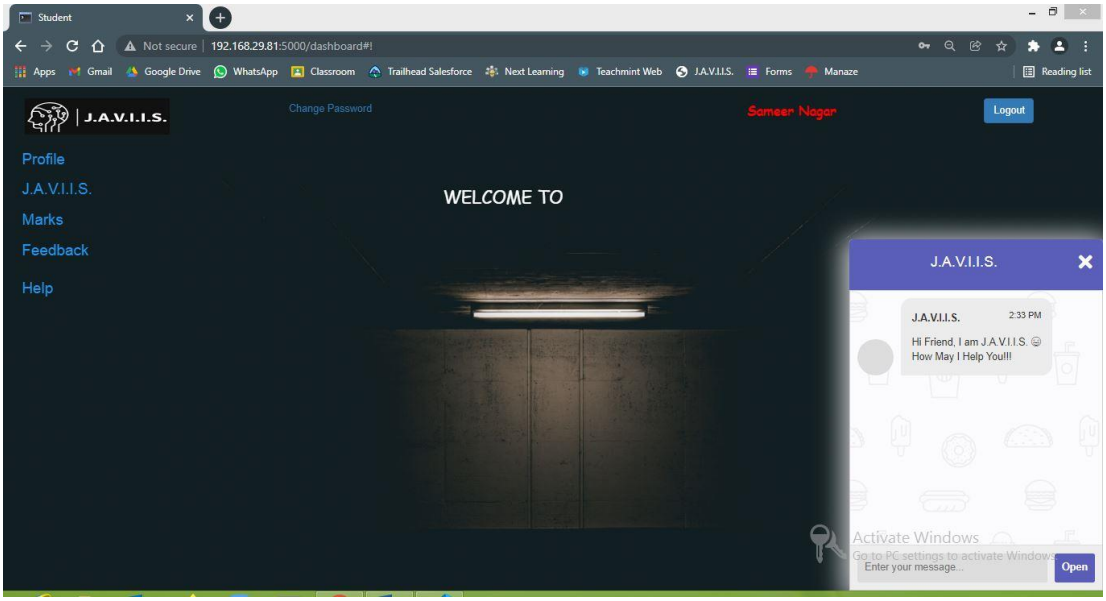


4.2.1 Code Screenshot of the Visual Code Studio for chatbot system

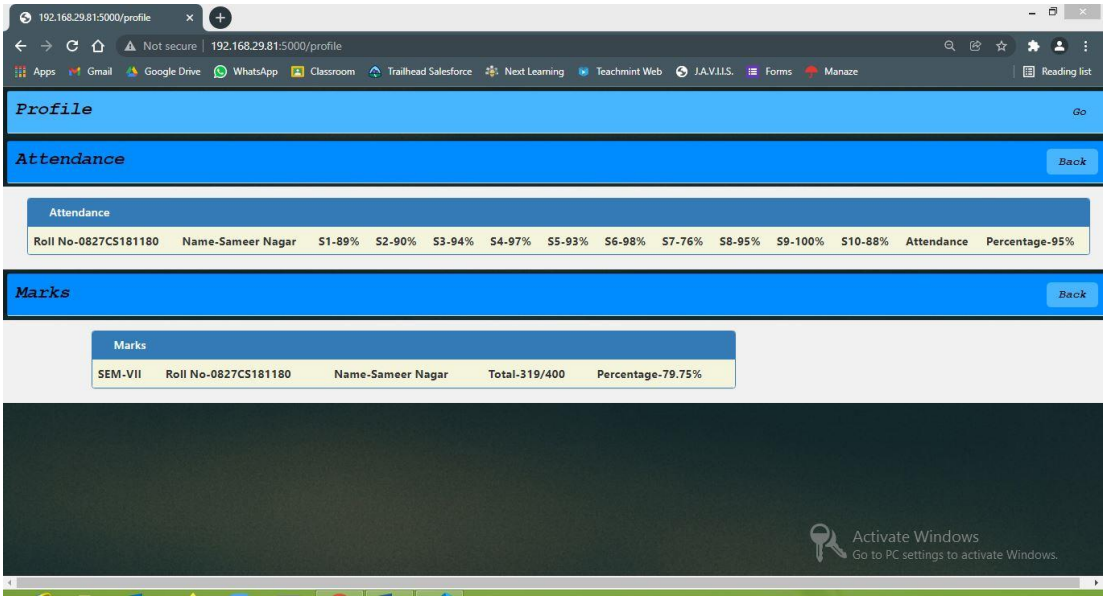
4.2.2 Homepage of the chatbot system



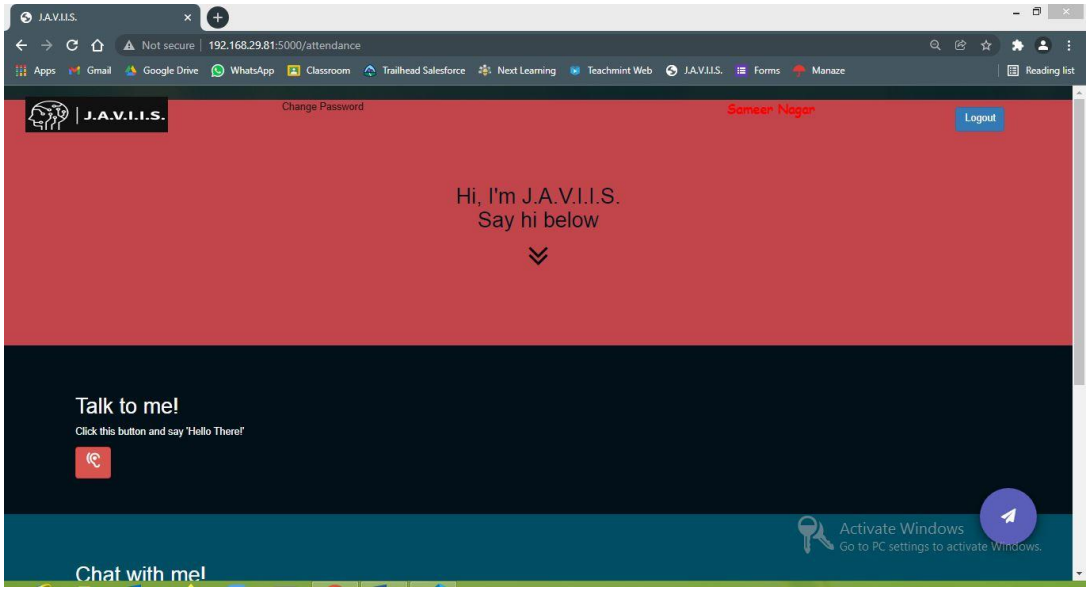
4.2.3 Login Page of the chatbot system



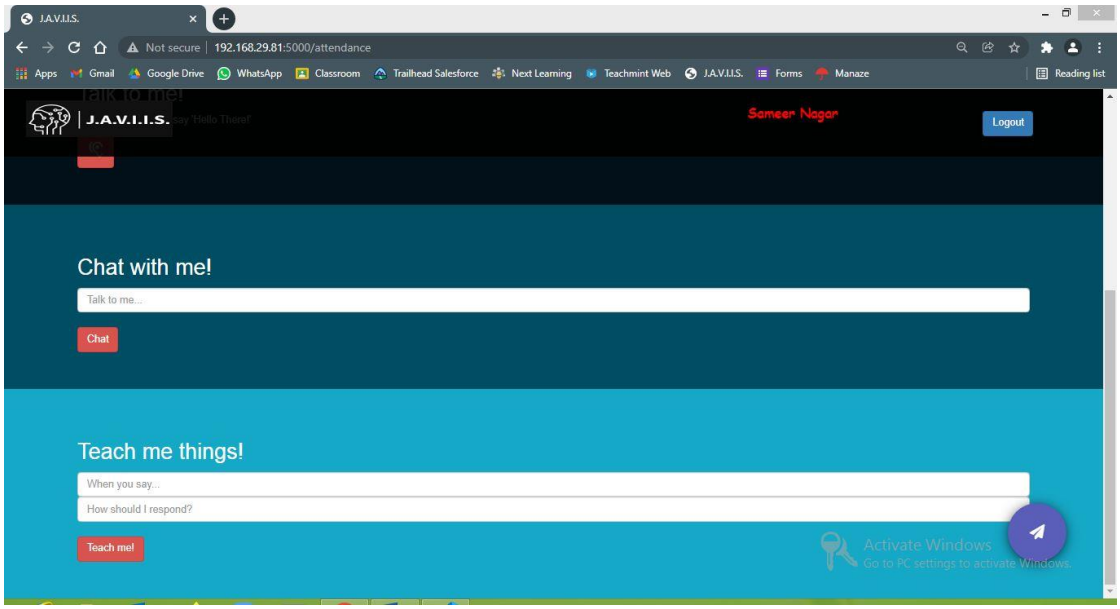
4.2.4 Dashboard of chatbot system



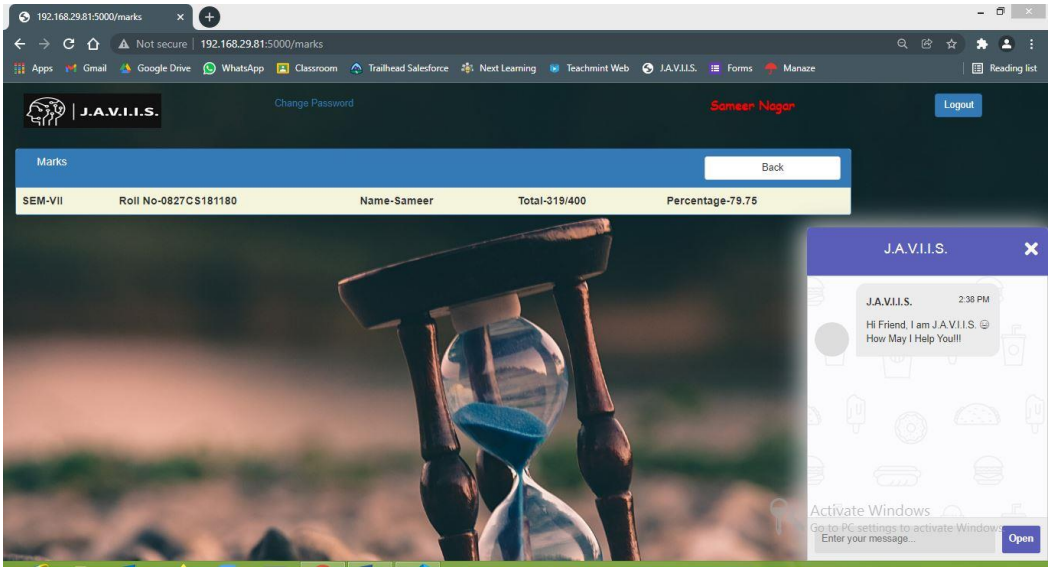
4.2.5 User Settings page of chatbot system



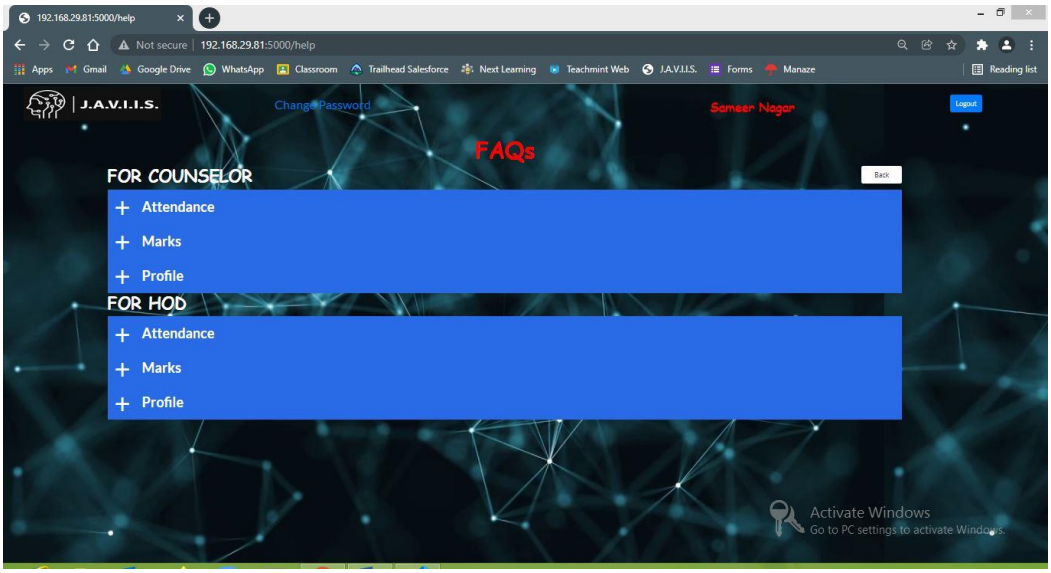
4.2.6 Chatbot J.A.V.I.I.S.



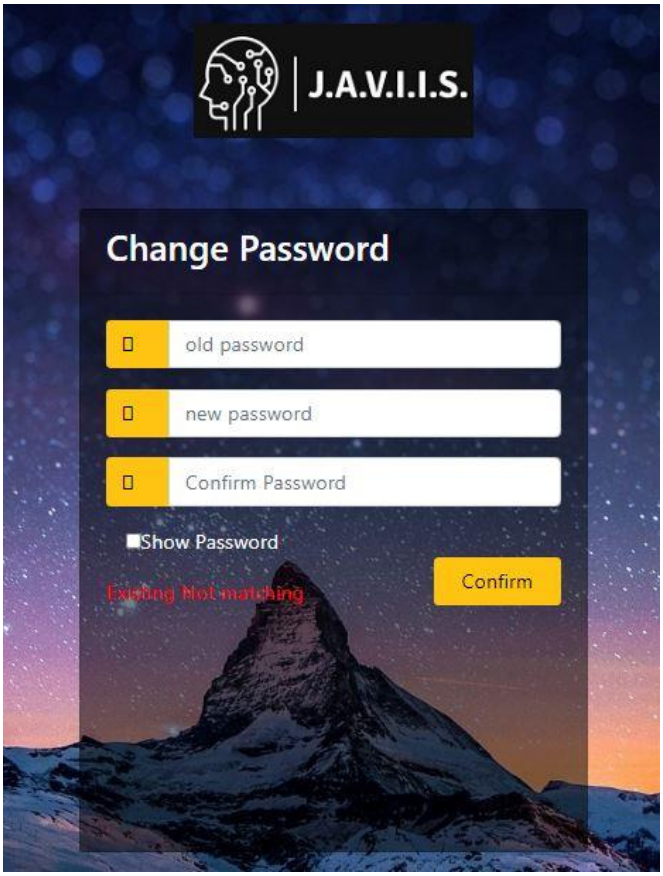
4.2.7 Customized chatbot J.A.V.I.I.S.



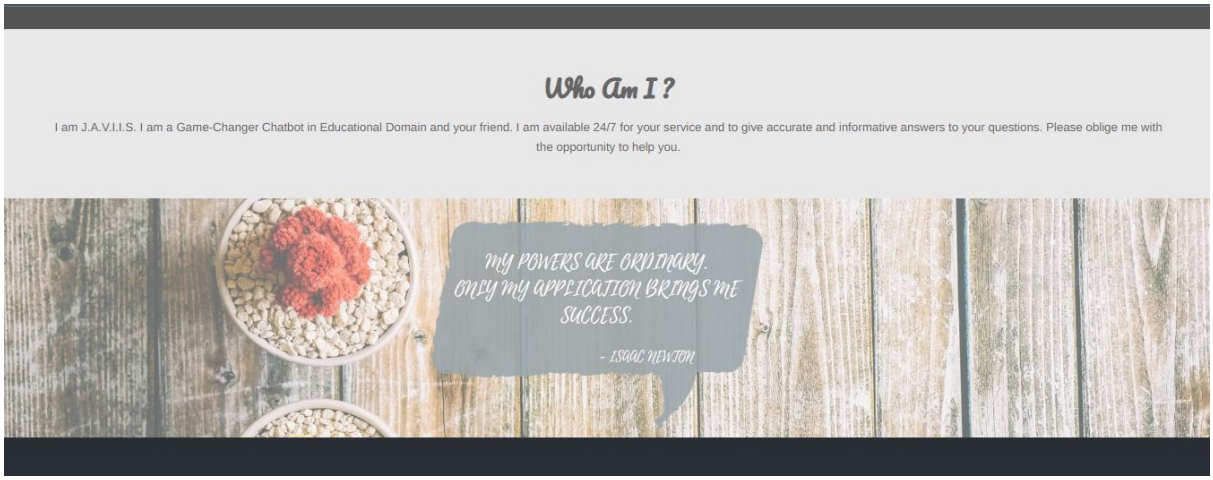
4.2.8 Marks of the User



4.2.9 FAQs for the student's help

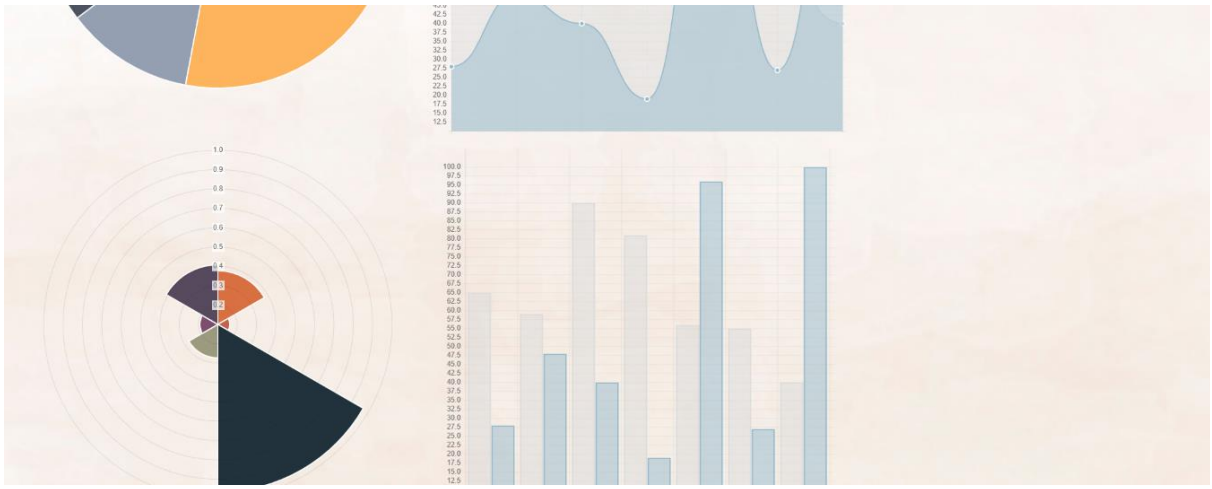


4.2.10 Change password for the user



4.2.11 Website for the chatbot system

4.2.12 Quality Assurance for the chatbot system



4.2.13 Graphs for the User of the chatbot system

4.3 Software Model

4.3.1 Agile Software Model

The meaning of Agile is swift or versatile."Agile process model" refers to a software development approach based on iterative development. Agile methods break tasks into smaller iterations, or parts do not directly involve long term planning. The project scope and requirements are laid down at the beginning of the development process. Plans regarding the number of iterations, the duration and the scope of each iteration are clearly defined in advance.

Each iteration is considered as a short time "frame" in the Agile process model, which typically lasts from one to four weeks. The division of the entire project into smaller parts helps to minimize the project risk and to reduce the overall project delivery time requirements. Each iteration involves a team working through a full

software development life cycle including planning, requirements analysis, design, coding, and testing before a working product is demonstrated to the client.

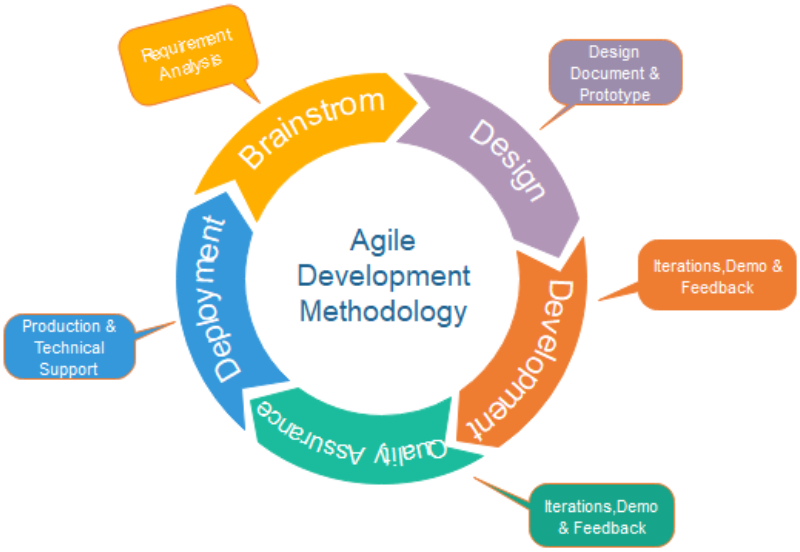


Fig. Agile Model

Following are the phases in the Agile model are as follows:

1. Requirements gathering
2. Design the requirements
3. Construction/ iteration
4. Testing/ Quality assurance
5. Deployment
6. Feedback

1. Requirements gathering: In this phase, you must define the requirements. You should explain business opportunities and plan the time and effort needed to build the project. Based on this information, you can evaluate technical and economic feasibility.

2. Design the requirements: When you have identified the project, work with stakeholders to define requirements. You can use the user flow diagram or the high-level UML diagram to show the work of new features and show how it will apply to your existing system.

3. Construction/ iteration: When the team defines the requirements, the work begins. Designers and developers start working on their project, which aims to deploy a working product. The product will undergo various stages of improvement, so it includes simple, minimal functionality.

4. Testing: In this phase, the Quality Assurance team examines the product's performance and looks for the bug.

5. Deployment: In this phase, the team issues a product for the user's work environment.

6. Feedback: After releasing the product, the last step is feedback. In this, the team receives feedback about the product and works through the feedback.

4.3.2 SCRUM

It is an agile development process focused primarily on ways to manage tasks in team-based development conditions.

There are three roles in it, and their responsibilities are:

- **Scrum Master:** The scrum can set up the master team, arrange the meeting and remove obstacles for the process
- **Product owner:** The product owner makes the product backlog, prioritizes the delay and is responsible for the distribution of functionality on each repetition.
- **Scrum Team:** The team manages its work and organizes the work to complete the sprint or cycle.

Advantages -:

- Frequent Delivery
- Face-to-Face Communication with clients.
- Efficient design and fulfils the business requirement.
- Anytime changes are acceptable.
- It reduces total development time.

Limitations -:

1. Due to the shortage of formal documents, it creates confusion and crucial decisions taken throughout various phases can be misinterpreted at any time by different team members.
2. Due to the lack of proper documentation, once the project completes and the developers allotted to another project, maintenance of the finished project can become a difficulty.

4.3.3 How we used Aglie Model in Project?

Chatbots do not solely depend on technology but also on the content

The end goal with the chatbot is to achieve high-quality customer experience and service staff assistance. The noticeable element of chatbots is obviously the technology. However, content plays an important part in its success as well. Creating knowledge assets is a noteworthy investment, but in the shadow of high-end technology components like Artificial Intelligence (AI), the important role of content creation and curation often gets overshadowed.

4.3.4 Content reuse and repurposing

Most of the content that chatbots require is already being created and used extensively by customer service teams, be it in telephone conversations, in web chats, online or social media messaging or in emails. Re-purposing this existing content is in a format that is understood by chatbots and can be served by them upon request triggering.

The goal should be to generate the content once and reuse after that. Accomplishing this needs close links between whoever is curating the content which can be your service teams and the digital marketing department.

4.3.5 Analyse customer touchpoints to create relevant content

The commencing point is to build content that will have the maximum effect — where content can tone down the motive for calling, and the volume of calls is higher. To understand why people are connecting with your business needs a deeper analysis that can be made effective by assessing who is calling — for what, when and why, breaking down the overall customer journey, testing of contacts across channels and research activities like customer surveys, online as well as offline conversations and e-mail content.

4.3.6 Create a channel pyramid and flip it in order to migrate

While creating a channel pyramid, at the topmost part would be the chatbots. In the beginning, these would resolve only a small portion of overall queries, acting as a preliminary step or an online IVR and directing customers to the digital teams who are more suitable to manage the interactions.

The digital teams will cover web chat and messaging platforms as the center layer, assisting the migration to the digital conversation which is lower in cost as compared to voice at the absolute bottom of the pyramid which entails maximum cost and higher volume channel.

Using all the analysis carried out and the generation of applicable online content, we can then flip the pyramid with chatbots dealing with more and more complex queries — final objective being that they will manage the majority of the cases shortly.

4.3.7 Trim down risks by piloting and involving practiced agents

Chatbots are not readily developed technology tools, so the risk of a deprived experience is something one must take into consideration. A few forms of AI can be tested with the internal teams rather than direct exposure to the customers or prospects. It would be prudent to locate these trials in an innovation hub with the added support of the contact center. This contact centers will have the precise mix of skill-sets to make it workable and later try in real-time.

4.3.8 To build a bot with a chatbot development company

Before initiating any project, it's essential to characterize goals & the roadmap along with the ways to quantify success.

Being a chatbot development company, we use agile methodologies, and our procedures are influenced by Kanban, XP, and Scrum. We customize our processes for the different projects and customers that we work with.

Our processes are collaborative, transparent, user-centered and iterative. Being agile assists us to reduce overall project risks, handle change and maximize customer value.

4.3.9 Chatbot development Process

Every project starts with a discovery phase and is pursued by iterative development cycles. Each sprint or cycle is of 2 to 4 weeks.

4.3.9.1 Discovery

The discovery phase is undertaken at the commencement of the chatbot development project. It consists largely of requirements collection workshops, stakeholder interviews and analyzing key end-user needs. The backlog is the prime output of this phase with recognized requirements written as 'user stories'. Identifying the use-case and type they're looking for (sequential bot or NLP based) helps in listing out the various intents and actions that are to be carried out the chatbot. Discovering the requirements from the end user viewpoint leads the project team to explore the product features with depth.

For example, selecting the precise messaging platform (Facebook Messenger, Slack or your Website) is the key point of the discovery phase. Ultimately the preference should be focused as per your target audience, and you need to meet them where they are.

We use precise tools to analyze the requirements and host the backlog for issue tracking. A product member from the client's side is in charge of prioritizing the backlog stages. The backlog is a project execution document and can be revised at any time all through the project.

4.3.9.2 Plan

Before we get to the bot's personality, it is important to create user journeys, and conversation design flows that empower the process for our clients. This could be seen as the counterpart of user journey mapping along with wireframes for visual UI projects.

For conversational flow ask yourself these questions:

- What are the queries the bot has to solve or execute to steer the visitor to the desired endpoint?
- What details will the visitor have to provide to get the best possible reply?
- What are all the steps to reach that final objective?

The number of conversations or interactions required in order to reach out and satisfy the user's purpose is critical and significant.

Even though there are a myriad of techniques that can help achieve the bot's personality, the best and the easiest way is to conceptualize and develop the character of the AI chatbot such that it was an actual person doing their job by responding to user queries complete with their own set of quirks.

Coming back to the sprint, at the opening of every sprint, we conduct a 'Sprint Planning' session. The entire team attends the Sprint Planning meeting, and it is where we go through the utmost priority stories in the backlog, state them in detail, plan the tasks and assess them. Every user story is given an approval criteria to be considered as completed.

We assess and analyze how many points can be accomplished in a sprint by utilizing the velocity metric while deploying techniques to average the precedent performance across sprints and enhance the precision of our approximation with time.

4.3.9.3 Build

We intend to build and deliver a working product which is ready to use by actual users. The thought is to then iterate on this product, accumulating more features until we start off to meet the objectives we set out right at the initial stages.

Starting with interior functionality and then delving into chatbot personality, the bot scripts are coded and developed cumulatively.

Conversation design incorporates training the natural language processor to be aware of your users intent and then amplifying the same as more user data becomes obtainable.

4.3.9.4 Testing and Review

If you are developing a bot for a customer, it's vital to build UATs: User Acceptance Tests. It's a conversation set that characterizes the conversation flow. Write diverse conversations: one that thrives where the bot is handling the false user input and one when the user isn't discussing in regards to the bot's use-case. Ensure that all conversations are practical!

At the end of every sprint, we conduct a demo. We run across all the created user stories and try to display its implemented process. The product owner who is from the client's team reviews and decides whether to allow the implementation on the basis of the determined criteria.

If the user story is 100% accepted, it is given the status as done.

4.3.9.5 Technology

We're continuously improving our technology offerings and have developed a chatbot platform that meets the needs of cross-domain customers. Additionally, we also offer:

- Support for key messenger apps and SMS
- A robust engine that allows for multifaceted conversation workflows
- NLP integration
- RESTful API for swift integration with any of the required web services
- A completely managed solution that we can host and sustain for you

4.3.9.6 Conclusion

Chatbots are not exactly different from other applications; you have multiple integrations that back the application, with the involvement of all the diverse dynamics. Given that a chatbot is needed to engage rapidly with an end-user, it requires being clear whether the information offered by the different integrations, are critical for the conversation or can be deferred until a later moment. Consistency in the integrations through APIs not only assists the agility but also helps in creating perfect conversations.

Customers today are more insistent than ever, with higher expectations and lower tolerance. A chatbot solution can assist you in meeting those expectations, however, every enterprise doesn't have the time or resources to come up with a solution that is tailored to their core business — trained and deployable in just a couple weeks time.

We offer end-to-end chatbot development services and assist enterprises & brands in streamlining the way they interact with customers. We deploy highly intelligent,

sophisticated and scalable chatbot solutions across multiple domains such as Finance, E-Commerce, Real Estate and Insurance to name a few.

Being well-versed in AI, NLP and ML, we provide bot solutions, customized to your requirements, across multiple different channels (Facebook, Twitter, Slack, Telegram, Website or your enterprise's Intranet). Get in touch with us today to deploy bots that fit your business specific needs while matching your brand's voice and tone.

4.4 Updations

The updates made in the software are as follows:-

- **UI Updation** – We introduced a theme system to make the interface more user friendly. It has Violet and Brown Themes. We have made our software more easy, better and efficient and have added creative automation to the interface.
- **J.A.V.I.I.S. OFFICE** – We have created a space for students to write the data and save it with any extension (.txt, .xls, .ods, .zip etc). It is open-source and doesn't require license to work on. Its very user-convenient and very easy to learn and work on. You can also upload files into it.
- **Feedback** – We have introduced a feedback system to improve our software. Students can give feedbacks to admins and we can see your views.
- **J.A.V.I.I.S. Website for Students** – It has Speech Trainer and Graphs/Charts for students to practice and learn.

Chapter V - Conclusion

Conclusion

5.1 Conclusion

All this difficulties can be minimised, computation time and effort are reduced by automating the entire process by using student informative Chatbot J.A.V.I.I.S.
It is 24/7 available to help students connect to GW's wireless network, register devices, and get assistance with other requests.
The purpose is focused on the design of the specific architecture and model to manage communication and furnish the right answers to the students.
It provides a chatbot that can make the communication easy.
This helps the students to have the right information from the trusted source.
This made administration of information easy.
It will not only help the administration but will also help students in communicating effectively.
We will always trying our best to improve the environment for students to help them in every way possible and our chatbot does that.

5.2 Future Scope

While most businesses will have chatbots for customer service and support functions, many will develop bots for their internal processes.

Human resources is being positioned as the next quick win for many businesses with chatbots handling first-stage interviews to find promising candidates. Video avatars can make the process more friendly, while AIs can process resumes to find high-quality candidates and spot telltale mistakes, helping speed up traditionally slow recruiting processes and managing cost.

When hired, bots can manage and provide information for most of the onboarding

process, allowing workers faster access to key information, forms and house-management tasks like permissions, time off and absence requests.
Bots can also boost collaboration, working as part of SharePoint, intranets and similar tools to provide key information, live updates and messages from both workers and other applications, warning of required approvals or actions to be taken.

Virtual agents can be deployed across the business to handle internal requests and processes, from risk management to planning and budgeting. All of these can be acquired or developed in-house to meet a specific need.

Partnerships and industry-specific solutions will be commonplace, take for example, Schlumberger and Dataiku who have entered into a technology partnership for the oil exploration industry to build and deploy AI solutions across upstream workflows to deliver capabilities to petrotechnical domain experts in response to the global demand for AI. Other examples include machine learning for financial trading, roping in blockchain and other technologies to build new ways of performing transactions.

As digital business speeds up, so more companies will follow suit to keep pace with further deep AI technologies helping companies design and build entire new product or service categories toward the end of the 20s.
Customer service is a deeply mature and embedded part of most businesses, essential for growing the company's opportunity and maintaining customer loyalty. The drive to digital service solutions and the rise of AI-based agents is key to future success.

Customer service is increasingly an automated one, and customer relations management tools are adopting AI to build a better way of handling and expanding what we currently think of the life of that relationship. With the growth in customer service suites, larger businesses can afford to put all their eggs in one CRM basket, as long as it is the right one. Smaller businesses can pick and choose the services and features that best suit their needs, expanding as they grow and using as-a-service products to minimise outlay and capital costs.

One of the ways vendors are improving their CRM offerings is through increased use of AI. Analysis and transcription of sales and service calls. The key to the business is the return on investment of whatever product they chose, and measurable benefits in customer service. An ROI calculator provides an easy way to measure the former in terms of both time and budget saves. But careful analytics and listening to customers is the only way to find out if their experience is improving, and if they are aware that AI is part of the reason for that improvement. While AI rolls out into more products many businesses face a host of real-world issues that can leave the idea of new technology firmly behind. The ramifications of an actual Brexit, changes in privacy laws, staffing turnover issues and the real risk of a massive downturn all persist.

Any customer service tool must be able to scale with the company and its products, work to an increasingly cyclical nature, while operating 24/7 and in multiple languages, as businesses start reaching out globally, and dealing with a growing range of queries.

Whatever the personal preferences of the leadership, IT can prove beyond doubt that a chatbot or AI CRM can function 24/7, in multiple languages and be easily updated. The trick comes in proving that customers are satisfied. There are many metrics to prove this point, but if a business is outside banks, airlines or hotels where bots have had the most impact, this can be a tougher sell to get leaders on side.

Therefore the key aspect of 2020 that the business will look out for is bots and AI services that come with live trials and customer success measurements built in to help businesses test the water. Measurement results may not start out great, depending on the sector the business operates in, but most well thought out bot launches achieve good results in short order.

Success ratings can be tracked by CRM across social media and other areas to get the company working ahead potential issues, rather than letting a major problem build and creating a backlash. And, as the whole of the customer service department or team become used to dealing with feedback faster, seeing where

success lies and learning from failures or problems faster it can increase motivation.

Another benefit of chatbots and AI is that agents can work on the more important calls or clients, adding value, creating a better balance within the business and boosting the importance of the service organisation. As we move beyond 2021, these teams will certainly change with the arrival of AI, with more focused roles and responding to different sets of metrics, but the grim headlines over jobs being wiped out will likely be overblown.

From GPs to dentists, admissions to the hospital ward, automation in many forms is taking over. In some hospitals, robots patrol the wards delivering medicines, meals and fresh laundry. Anyone calling for an appointment is likely to face an automated appointment system that can function across chatbots, instant voice response or an on-screen web application.

Automated GP services are on the rise, with the likes of Babylon GP creating positive and negative headlines for their exuberant early claims. And behind the scenes, AI applications can scan thousands of mamograms far faster than professional radiologists. Even so, the results, while promising require some caution:
"The evaluated AI system achieved a cancer detection accuracy comparable to an average breast radiologist in this retrospective setting. Although promising, the performance and impact of such a system in a screening setting needs further investigation."

Chatbots and automated diagnosis can also play a role in mental health care. Many people are afraid to talk to their doctor, counsellor or a charity about issues, but are happy to discuss them with a chatbot. This opens up the possibility of them seeking further help, with the bot able to provide them with a direct contact who will already be able to understand the case thanks to the chat transcript.

A range of mental health chatbots are seeing positive results, helping people start that all important conversation about their issues While virtual nurses like

Sensely's Molly can guide patients through management of chronic conditions. Using a mix of machine learning, body recognition and speech understanding, Molly can provide patients with customized monitoring and follow-on advice.

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