

# **Internship Report At Paxcom India Pvt. Ltd.**

Project report submitted in partial fulfillment of the requirement for the degree of

Bachelor of Technology in  
Computer Science and Engineering

By

Ashish Gupta (171336)

Under the supervision of

Mrs. Pallavi Vasishta

to

Dr. Ruchi Verma



Department of Computer Science & Engineering and Information Technology

**Jaypee University of Information Technology Waknaghat, Solan- 173234, Himachal Pradesh**

## CERTIFICATE

I hereby declare that the presented report entitled "Internship report at Paxcom India Pvt Ltd" in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from February 2021 to May 2021 under the supervision of Mrs. Pallavi Vasishta. The matter embodied in the report has not been submitted for the award of any other degree or diploma.



(Student Sign)

Ashish Gupta, 171336

This is to certify that the above statement made by the candidate is true to the best of my knowledge.



Mrs. Pallavi Vasishta  
Assistant Vice President- Technology  
Paxcom India Pvt. Ltd.

## **ACKNOWLEDGEMENT**

This report is not just a result of hard work by me but there has been a joint contribution by a lot of other people who I would like to thank.

I am highly indebted to my manager Mrs. Pallavi Vasishta, for her continuous monitoring, providing details and her assistance in the completion of the training.

I also want to thanks my guide Dr. Ruchi Verma for her guidance without which this report would not have been completed.

I want to express my appreciation for Mr. Pankaj Kumar, my parents and for Jaypee University of Information technology for their kind cooperation and assistance in the completion of the training.

I also thank and appreciate my mentor and colleagues for helping in completing the Internship and people who have voluntarily helped to understand the technologies.

## **ABSTRACT**

The internship was focused on learning various aspects of backend development and chatbot development. During the course of my Internship with Paxcom I was able to learn many new technologies. I created 2 projects during my internship period.

The very first was a POC for backend development where I developed a basic Email application called P-Mail which has various functionalities like new user registration, login, logout. Through this application a user can send or receive Emails. Every user has his/her inbox. Through this project I was able to learn Django framework, MongoDB as I used it for the database, and some basics of HTML, CSS and Javascript.

The second project was creating a chatbot. The chatbot was a simple store management chatbot and is built using IBM cloud services called Watson Assistant. Using the dialog skills of watson I was able to create this bot. The bot is able to solve some basic queries of incoming users like pass creation for the visit, pass cancellation, query for timings of operation, item enquiry and other general FAQs. The bot transfers customer to a human agent in case it is not able to solve the query.

I integrated the chatbot with Slack by creating a slack app and also with a web chat application. The report contains details of my learning during these 12 weeks of internship.

# Table of Contents

<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 INTRODUCTION .....	1
1.2 ABOUT COMPANY .....	1
1.3 CORE VALUES.....	2
1.4 EXPERIENCE .....	2
<b>2. LITERATURE SURVERY .....</b>	<b>4</b>
<b>3. SYSTEM DEVELOPMENT .....</b>	<b>10</b>
3.1 CHATBOTS.....	10
3.2 NATURAL LANGUAGE PROCESSING.....	12
3.3 EMAIL APPLICATION .....	14
3.4 SOFTWARE REQUIREMENT.....	19
3.4 DEVELOPMENT METHODOLOGY .....	19
<b>4. PERFORMANCE ANALYSIS .....</b>	<b>21</b>
4.1 CHATBOT PERFORMANCE ANALYSIS .....	21
4.2 EMAIL APPLICATION PERFORMANCE ANALYSIS.....	24
<b>5. CONCLUSION .....</b>	<b>28</b>
5.1 CONCLUSION .....	28
5.2 FUTURE SCOPE.....	29
5.3 APPLICATIONS OF CHATBOTS.....	30
<b>6. REFERENCES .....</b>	<b>34</b>

## List of Figures

Figure 2 1 Django project architecture .....	5
Figure 2 2 MongoDB stores data in the form of collections .....	6
Figure 2 3 Git and github architecture .....	7
Figure 2 4 Watson Architecture and Workflow[1].....	8
Figure 3 1 A flowchat representing rule-based chatbot for picking calls. ....	11
Figure 3 2 Watson Architecture[1] .....	14
Figure 3 3 Django Architecture[2].....	15
Figure 3 4 Model View Controller Architecture[3] .....	16
Figure 3 5 User login collection.....	18
Figure 3 6 Pmail Use Case diagram .....	18
Figure 3 7 Agile development process flowchart[4] .....	19
Figure 4 1 Chatbot integrated into the website for inquiries related to booking pass .....	22
Figure 4 2 Chatbot state after the pass has been booked successfully .....	22
Figure 4 3 Chatbot state when asking general FAQ questions .....	23
Figure 4 4 Chatbot is integrated with a slack app.....	24
Figure 4 6 Pmail login page .....	25
Figure 4 7 Pmail compose email functionality .....	25
Figure 4 8 Pmail inbox functionality .....	26
Figure 4 9 Pmail logout functionality .....	27
Figure 5 1 The Wallstreet Journal Chatbot[5].....	30
Figure 5 2 TacoBot is a food ordering bot of Tacobells[5] .....	31
Figure 5 3 Endurance firm Chatbot to help people with Alzheimer's Disease[5] .....	32
Figure 5 4 Healthcare Chatbot called florence[5] .....	32
Figure 5 5 Ebay chatbot to help customers shop[5] .....	33

## List of Graphs

Graph 4 1 Watson assistant performance using coverage matrix.....	24
---	----

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 INTRODUCTION**

I got placed at Paxcom India Pvt. Ltd. and carried out my 12 weeks of mandatory internship in the company. I was put in Mrs. Pallavi Vasistha's team. This is basically the chatbot team comprising of software engineers for backend and frontend, business analyst, Quality Assurance and full stack developers. My title during the course of internship was of Software Engineer- Trainee. I was mainly responsible for model training and backend development. The team organizes scrum calls regularly to discuss various blockers. The functioning of team is very smooth due to the core values followed and is also highly productive. We have good number of projects which are operational simultaneously and the outcomes are really impressive.

### **1.2 ABOUT COMPANY**

Paxcom has the trust of some of the world's major brands and distributors, such as Britannia, Wipro, Mondelez and Pepsico, among others. In addition, Paxcom offers e-commerce solutions for product sales on India's biggest ecommerce sites like amazon, lazada, flipkart, etc. We serve a huge range of options including product intelligence, business intelligence and audit and compliance. We assist customers with data-driven decisions on pricing, advertising strategy, positioning, and other aspects of a product. Since 2019, Paxcom has been a member of the Paymentus Corporation. Paymentus, headquartered in North America, is a leading provider of e-billing and payment solutions. Paymentus enables customers to make real-time payments to businesses through any payment channel. It offers consumers a full and comprehensive payment suite, including premier collaborations such as Amazon Pay, PayPal, and Walmart.

Paxcom makes it easier for both brand owners and dealers to simplify day-to-day operations by focusing on optimizing the market, item content/perceivability, and limited-time methodologies of data-driven examination and bits of knowledge.

Paxcom's goal is to be your trusted team with a diverse range of abilities – your analysis consultant, product expert, advancement administrator, web-based industry researcher, data analyst, and expert specialist.

The organization's mission is to provide beneficial interactions to our customers that will allow them to track their competitors, screen their products, advance their content through



commercial centers, increase perceivability, and promote their offers, among other things. Paxcom was acquired by the Paymentus group a few years back, and the company's name was changed from "Paxcom" to "Paxcom India - A Paymentus Company."

Paymentus was established in 2004 as a result of a desire to change the way people pay their bills. Paymentus has grown from a vision to becoming the leading paperless electronic billing and installment arrangement available, with over 1,500 customers including some of North America's largest billers.

Paymentus consistently strives to grow stronger, faster, increasingly safer, cost-effective charging and installment phase and is identified by Deloitte as one of the fastest growing North American entities in 2011, 2013, 2014, and 2016. We are constantly on the lookout for more value for our customers, both in terms of contracts and management.

### **1.3CORE VALUES**

There are 3 main core values which helps identify what Paxcom actually is. These are the pillars on which we employees stand on. The huge increase in number of clients has been made possible due to these values - Integrity, Fun and Ownership.

Integrity - this is one of the most important values that employees at Paxcom possess as a person with integrity draws others to them and helps identify one as dependable and trustworthy.

Fun - this is depicted in the Paxcom work culture. We believe in hard work and fun. Events take place from time to time in which all the employees participate with enthusiasm. This helps in increasing the productivity and creates a better work environment for everyone.

Ownership - Every employee is responsible for his/her success and failure. Ideas are openly welcomed. Company culture discourages use of Sir/Madam within the office.

### **1.4EXPERIENCE**

I started my internship with Paxcom India Pvt. Ltd. on 8th February, 2021. I am posted at the New Delhi office but due to the current pandemic we are following work from home. I joined the Chatbot team and was successfully able to understand the work pattern and structure. I was given multiple technologies to explore and learn during my internship like Python, Django framework, Git/Github, NoSQL based database like MongoDB, project development life cycle and softwares used for implementing the methodologies. I was also provided with multiple projects to understand the project structure and also have idea

about its flow. I also got to learn soft skills like working in a team, communication within a corporate firm. Because of this training I was able to understand about some of company's products.

## **CHAPTER 2**

### **LITERATURE SURVEY**

During my internship at Paxcom I learnt about various technologies like Python, Django Framework, FastAPI, MongoDB, Github. I also learnt about IBM cloud services like Watson Assistant. Also learnt about agile methodologies of software development.

#### **Python**

Python is a high-level, object-oriented language for dynamic semanticization of our programming. Its high-level integrated data structures and dynamic typing and dynamic linking are highly appealing to the rapid development of applications as well as for use as a scripting and glue language for connecting existing components. The simple, easy to learn syntax of Python emphasizes readability and reduces the maintenance costs of the software. Python promotes modules and packages that facilitate the modularity of the programme and the reuse of code. The Python Interpreter and comprehensive standard library can be freely distributed on any major platform in source or binary form, free of charge. Often because of its improved productivity programmers are in love with Python. The edit-test-debug cycle is amazingly quick, because no compilation stage is possible.

The benefits that Python is ideally suited for AI and AI companies include performance and consistency. Appropriate adaptation, Platform Independence and a global network that contributes to the overall prestige of the language. Some of the libraries I learnt about in python include numpy, pandas, os.

#### **FastAPI**

Fast API is basically a high speed and modern web development framework which is used for building Application Programming Interface or APIs and is compatible with Python 3.6+. It is one of the fastest python frameworks available. FastAPI reduces approximately 40% of the errors which are caused by developers. It is highly intuitive as it has got great support for the editor. Everywhere completion. Debugging takes a lot less time. It is simple, very easy to use and understand. Docs are very easy in reading .FastAPI is brief as it reduce duplication of code. Every parameter declaration contains several characteristics, bugs are very less. It is sturdy and we get code ready for production. We get a interactive documentation automatically without any external efforts. It is based on open-standards for the APIs. A lot of people have been these days. Some of the biggest examples include Netflix's crisis management system, Microsoft, etc. Some topics I learnt

in FastAPI are - Path Parameters, Query Parameters, Request Body, Query Parameters and String Validations, Path, Parameters and Numeric Validations, Body - Multiple Parameters, Body - Fields, Body - Nested Models, Schema Extra - Example, Extra Data Types, Cookie Parameters, Header Parameters, Response Model, Extra Models, Response Status Code, Form Data, Request Files, Request Forms and Files, Handling Errors, Path Operation Configuration, JSON Compatible Encoder, Body - Updates.

## Django Framework

Django is a high level Python web development system that promotes rapid development and clean, practical design. Built by seasoned designers, it deals with a great deal of web development problems, so we can concentrate on writing our app without reinventing the entire design. It's transparent and secure. Django has been developed to allow developers to complete applications as soon as possible from the idea to the end. Django seriously takes protection and helps developers avoid making a lot of mistakes. Some of the most busy websites on the Internet use the power of Django to scale fast and flexibly.

In django I studied about how to build a project and how to create a app. Also I studied about different type of files - manage.py, settings.py, views.py, apps.py, urls.py, models.py, forms.py.

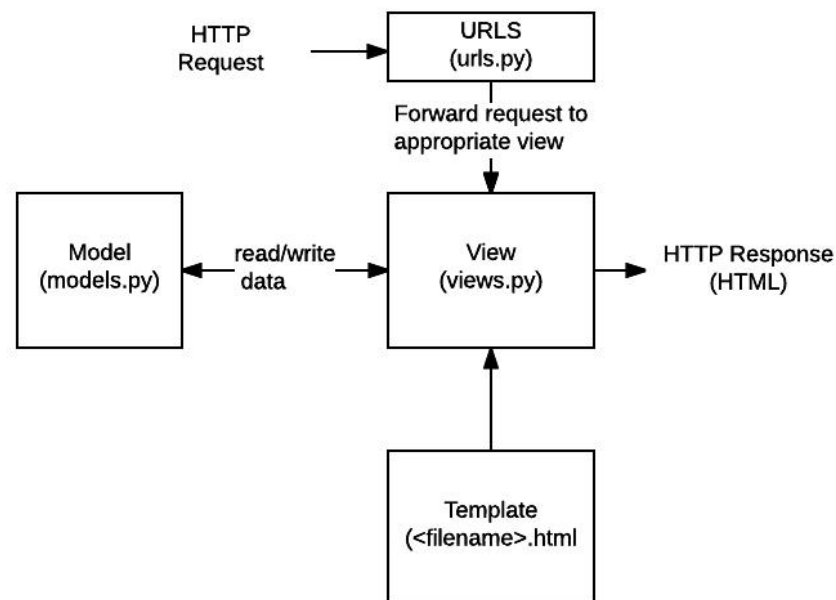


Figure 2 1 Django project architecture

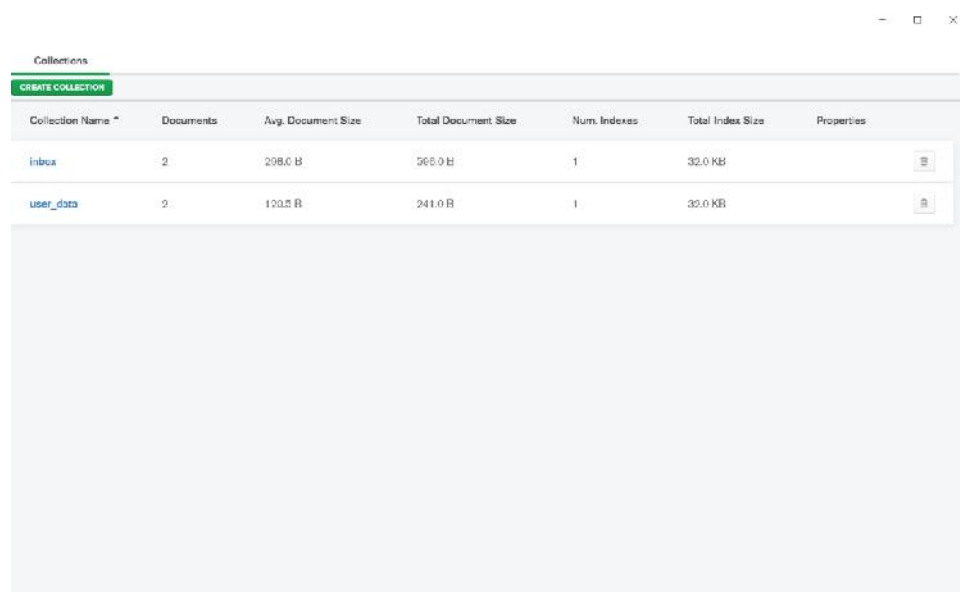
## MongoDB

MongoDB is a object based database. It is a NoSQL based database. It stores the data in JSON like format. This format is now one of the most used format for data transfer. MongoDB is a document-oriented, high performing, cross-platform, scalable database. It works on the concept of records and collections. Collection is a group of documents. It will exist in a singleton record. They do not implement any schema.

Documents which are inside our collection can have different fields. But generally the documents inside of a collection are used for storing same kind of data from a source. Any document is like a dictionary in python with key-value pair. MongoDB is better then the conventional row column model in many use cases. Use of such records has its own advantages: In several programming languages, documents (ie objects) match native data types. The embedded documents and arrays eliminate high cost joins. Fluent polymorphism is supported by dynamic schema.

In mongoDB my main focus was on creating a database, adding and dropping a collection, basic insert, query, update and delete operations. I also familiarized myself with the aggregation pipeline and how to use it. I also came across projections and sharding.

Compass is a MongoDB graphics interface. Enables users without previous knowledge of MongoDB query syntax to explore the quality of their stored data. If we explore data in the visual world, Compass GUI can be used to maximize results, manage indexes and apply document validation. The complete MongoDB Compass version is available. It contains all of MongoDB's features and features.



The screenshot shows the MongoDB Compass interface. At the top, there's a 'Collections' tab with a 'CREATE COLLECTION' button. Below this is a table listing collections. The table has columns: Collection Name, Documents, Avg. Document Size, Total Document Size, Num. Indexes, Total Index Size, and Properties. Two collections are listed: 'inbox' and 'user\_data'.

Collection Name *	Documents	Avg. Document Size	Total Document Size	Num. Indexes	Total Index Size	Properties
inbox	2	298.0 B	566.0 B	1	32.0 KB	
user_data	2	120.5 B	241.0 B	1	32.0 KB	

Figure 2 2MongoDb stores data in the form of collections

## Git/Github

Git is a version control system or we can say VCS. Git lets us handle our project and the primary reason to use it is to keep track of the history of items that we have worked upon. During creation of a project it is easy to make errors or work on introducing a new feature into the app without disturbing the stable application or one wants to introduce a new version of the application. Here is where git comes into play. Git offers us features like branching, merging, rollback, etc which are very useful when working for a large scale project. Git also helps people to work together on a single project without disturbing each other's files. Working together as a team with Git is all the simpler. Team members can work on various features and combine modifications quickly

GitHub is nothing but a remote storage for repositories. Repositories act as a storage for our application code. It is the best place to share our application code with friends, teammates, and even unknown developers around the globe. Over 31M people currently use GitHub to build awesome applications across 97M + repositories. There are numerous open source projects available on github with enormous community of developers contributing towards different projects. One such big project is the Android project which google made public and is now getting contributions from a large number of developers.

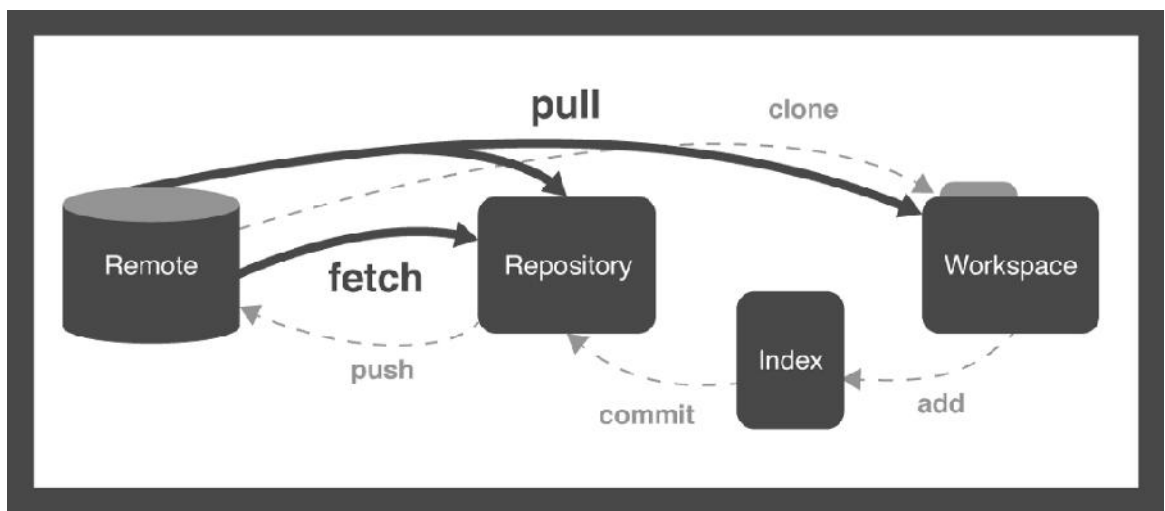


Figure 2 3 Git and github architecture

In git and github my major focus was to learn git clone, commit, branching, log, pull, fetch, merge, rebase and squashing commits and cherry-pick.

## Watson Assistant

Watson Assistant is a AI-based conversation tool to help customers answer their questions

quickly, easily, and accurately across all applications, devices and channels. Watson decreases the workload on agents and the chance of interruption in peak periods by automating responses to popular inquiries. This allows the agents to concentrate on complicated cases and helps customers solve issues 24\*7.

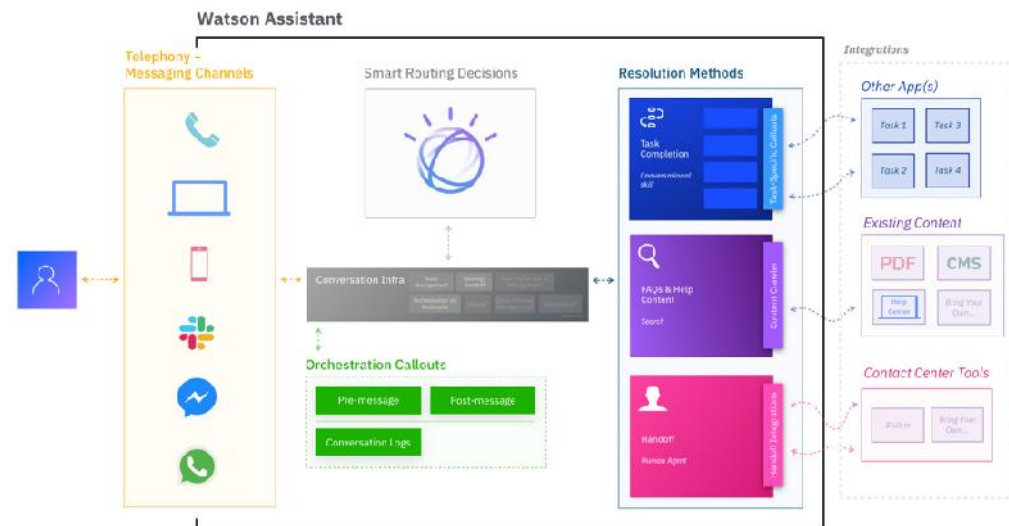


Figure 2.4 Watson Architecture and Workflow[1]

With the help of a powerful service like Watson we can construct conversational flows powered by AI, put content of existing aid, connect with our client support teams, bring the bot to our customers wherever they are, or we can keep track of commitment and satisfaction of our customers. I learned about how Watson works, what is meant by Named-Entity Recognition models and also how to train Watson on user examples. I also created a dialog skill based chatbot which I integrated on SLACK and a website.

## JSON

Python has an integrated package called json that can be used for JSON data activity. JSON has quickly become the de facto standard for data sharing since it was first created. We can collect information through an API or store your information in a document database. JavaScript Object Notation is a complete version of JSON. This means, for saving and transmitting the details, a script. The built-in package known as json is provided by Python. We import the json package into the Python script in order to use this function. The text in JSON is done via cited string containing value in the mapping of key values in dictionaries. It's like the Python dictionary. JSON displays an API that is like standard library users and Python supports JSON functions in a native context.

Serialization is the process of encoding JSON. This term means that data are converted into a set of bytes that are to be saved or transmitted through a network. The JSON library in Python uses a `dump()` feature to control the flow of data in a file, so that the Python objects can easily be translated to their respective JSON objects.

The deserialisation is contrary to serialisation, that is the conversion into their respective Python objects of JSON objects. This is using the `load()` form. If you use Json data from another programme or have it retrieved by Json string format, then `load()` may easily be used to deserialize it, otherwise the root object is in a list or dict.



## **CHAPTER 3**

### **SYSTEM DEVELOPMENT**

I created 2 projects during my internship one is a email website called PMAIL and another is a chatbot based on Wastson Assistant. I integrated the chatbot on slack and the email website. The email website is built on Django framework and used MongoDB as storage.

#### **3.1 CHATBOTS**

Chatbot Development has been a growing field in the world of Aritifical Intelligence. There have been numerous models, architectures and types. The chatbot must be able to provide a conversation and understand the user. We can also call this a comprehensive feature for any chatbot development. Purpose and entity identification are included in this understanding. It is important to see intents as verbs and entities as nouns. Chatbots that are text based have a component of Natural Language Understanding (NLU). Only the knowledge gained from NLU cannot be enough for the task and therefore it is required by them to use a large amount of external API's or an external database. A chatbot must process the input from user and then generate a reply. This is done using Natural Language Generation. How effectively a chatbot understands that is preprocess the input and generates the output defines how good a chatbot is.

#### **TYPES OF CHATBOT DEVELOPMENT**

##### **Rule based**

Some chatbots are built only to serve for a certain pre-defined tasks like taking a survey or taking user information. There are some already set questions which a chatbot needs to ask from the user after which it sends the collected information to the business using it. These type of chatbots do not use any AI. They do not use any pre existing knowledge and are built using any web development tools. Now a days we often come across survey chatbots which are the best example of rule-based chatbots.

##### **Natural Language Processing**

For several people the definition of artificial intelligence remains elusive. The philosophy behind this is think like humans to make robots. That involves several elements and that's why it's such a broad idea. After learning a number of examples, we can relate questions that are asked in a variety of ways. Thus, without the specific programming for this problem, the bot understands how the question is and can provide a suitable answer. This

is also called conversational AI.

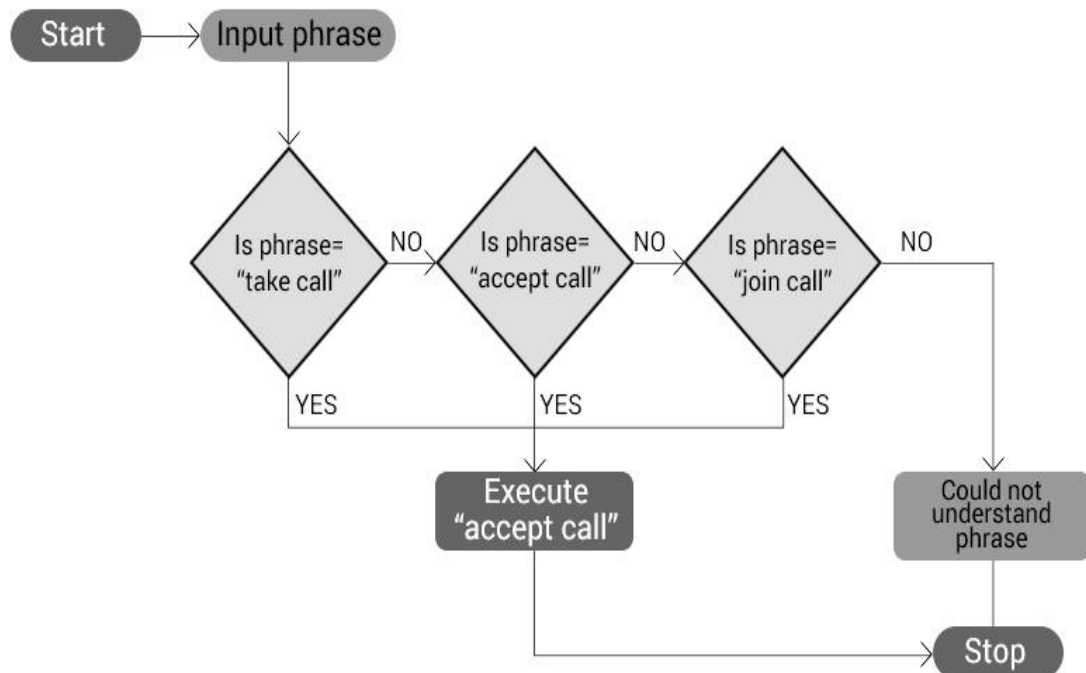


Figure 3 1A flowchat representing rule-based chatbot for picking calls.

## CONSTRAINTS TO DEVELOPMENT

There is a large range of frameworks and tools to build a chatbot with various levels of sophistication, expressive capabilities, and integration abilities. To understand this a little better we must see how the chatbots work:

The chatbot must first understand the details. This can be accomplished by two main techniques: pattern matching technique and intent classification technique.

Machine learning methods offer an alternative to the classification of attempts. To train a classifier you need a series of examples that choose between all possible efforts in the light of a user input. In any event, understanding the feedback is crucial and returning an adequate response. Possibly the chatbot will conduct a database scan. So the chatbot needs to extract the important entities previously with knowledge about the input.

### Static Reply

A static reply finally with a list of variants is the easiest way for each user entry. This static answer can be models.

### Dynamic responses

Another solution to this would be to use tools like a knowledge base to obtain a list of

possible responses and then choose the best answer from this collected database. If our chatbot behaves primarily as an inquiry device this is especially relevant.

#### Responses Created

We can use deep learning techniques to create a generative model that will provide response whenever it is given an input. If we have massive examples of conversation. It takes millions of examples in order to achieve a satisfactory standard and the outcomes often are unforeseen, but to try out the solution to see what happens can be fascinating and enjoyable.

### **3.2 NATURAL LANGUAGE PROCESSING**

It is the method of creating, in the context of natural language, coherent phrases and sentences. Text Preparation, Sentence Planning and Text Realization are included. In text preparation, the appropriate material is extracted from the knowledge base. Sentence preparation entails selecting the vocabulary needed, constructing meaningful sentences, and setting the sentence's tone. The process of mapping the sentence plan into the form of sentences is Text Realization. There are two broad types of algorithms for Natural Language Processing (NLP): conventional and deep learning.

A lot of coding is required in conventional NLP. In each case, you have to predict the terms and phrases a user might utter, understand speech habits, extract predefined keywords, and so on. There are a lot of rules, a lot of regular expressions, and a lot of rough coding, in other words. Writing and when the algorithm starts parsing a text, a new graph is generated, spanning the text. It then incrementally adds new edges to a map, where the conditions under which new edges should be added to the chart are defined by a set of determined or discovered grammar rules. If the chart reaches a stage where none of the rules permit the inclusion of any new edges, parsing is completed debugging these programmes takes a lot of time. And when the consumer deviates from the anticipated course, the rules easily break down. This is why many bots sound so stupid.

We have to create millions of smart virtual assistants that are capable of sustaining dialogue in natural language. Can we use conventional NLP to do that? It seems the answer is no. It is too complicated and too time-consuming. There are not enough programmers in the world to do it.

A subject in progress is Deep Learning. Deep Learning has come closer to being a

reality with the introduction of GPUs. As of today, though the standard methods of natural language processing still have to be used.

In the process, the central approach is the use of dynamic programming to effectively parse/tag a piece of text. Thus by iteratively adding edges to the graph or graph, the algorithm derives the parse tree for a text, where each edge represents a hypothesis about the structure of the parse tree for a text subsequence, and the graph itself represents a substratum for composing and merging the data provided and generating an answer.

When the algorithm begins parsing a text, it creates a new chart, spanning the text. It then incrementally adds new edges to the chart, where a set of the determined or discovered grammar rules specifies the conditions under which new edges should be added to the chart. Parsing is completed once the chart reaches a stage where none of the rules allow the addition of any new edges.

## MODEL DEVELOPMENT

### Pre-processing

The following are the standard preprocessing techniques used in natural language (NLP) tasks:

- Delete punctuations and special characters in the Tweets like @ and #.
- Tweets should be made fewer.
- Every tweet tokenizing.
- Tap each word to make each word's shape as short as possible. For instance, "recovery" and "recover" and "recovers" reduces to "recovery" the stem.
- Create a model bag with one hot tweet encryption. We have a 7578 single word pack. We use a one-hot encoding method for our data i.e. we have a 7578 longitudinal vector and put 1 where a tweet word suits words and 0 elsewhere.
- Finally, the dataset was mixed and data were divided into a training set of 80:20: test set divided.

### Tokenization

We already have pixel values that are numbers when working with images. However, it must be encoded to quickly be interpreted by a neural network when dealing with text.

We may use its ASCII values to encode the words. However, our semantic interpretation of the sentence is constrained by using ASCII values. Using ASCII values is not a feasible technique as many two words may have same letters but a whole new different

meaning. Therefore instead of using ASCII values we use encoding techniques like tokenization. The heavy code lifting is done by Tokenizer. Likewise, padding is used to maintain continuity in phrases when feeding training data in the form of sentences.

### Word Embeddings

In a multi-dimensional space, the terms and related words are grouped as vectors. Words are found in a sentence and sometimes related words are close. In a negative review, similar terms appear a lot to suggest it's a similar feeling.

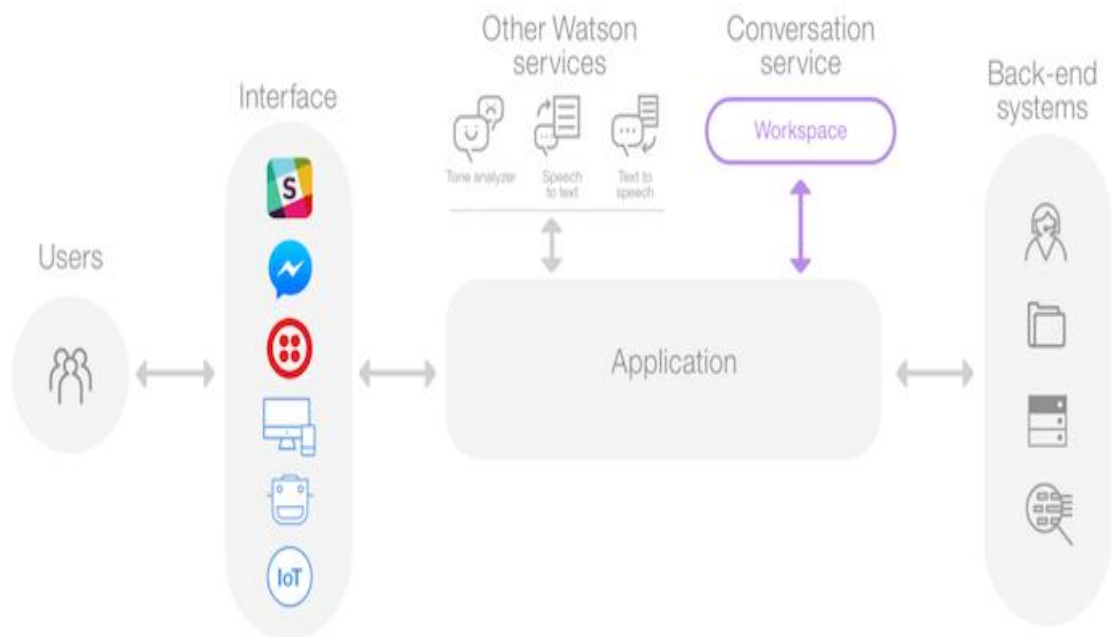


Figure 3.2 Watson Architecture[1]

### 3.3 EMAIL APPLICATION

An email application helps us in sending and receive Electronic mails. My email application is named "P-MAIL". Currently I have implemented a subset of functionalities like register for new user and login functionality for existing users. I have not used any existing authentication tools like OAuth 2.0 or OPENID.

For this project I have implemented my own authentication logic. A user can register and login and will be able to send emails to users who are already register with the application. A user when logged in is able to view his/her emails through inbox and can send emails. Some of the tools I have used for the implementation of this application are:

- Django - for backend

- MongoDB - for database
- HTML, CSS and Javascript - for frontend

## BACKEND

It's a huge deal to choose a platform for web creation. There are several industry frameworks, each structured to meet particular project requirements. The Django platform, one of the most common Web Development Frameworks for many businesses and independent projects, is an obvious option.

Django is a backend development open-source architecture built on Python — one of the top web development frameworks. Simplicity, versatility, efficiency and scalability are its key objectives. In all functions and modules Django has its own naming scheme like we generally put our HTTPResponses in a file named as views.py. It also has a admin panel and other technical features which is considered to be simpler to deal with:

- In-built ORM or object relation mapper
- Follows a MVC architecture.
- we have in-built http libraries
- We have middleware support
- unit test functionalities
- has its own server

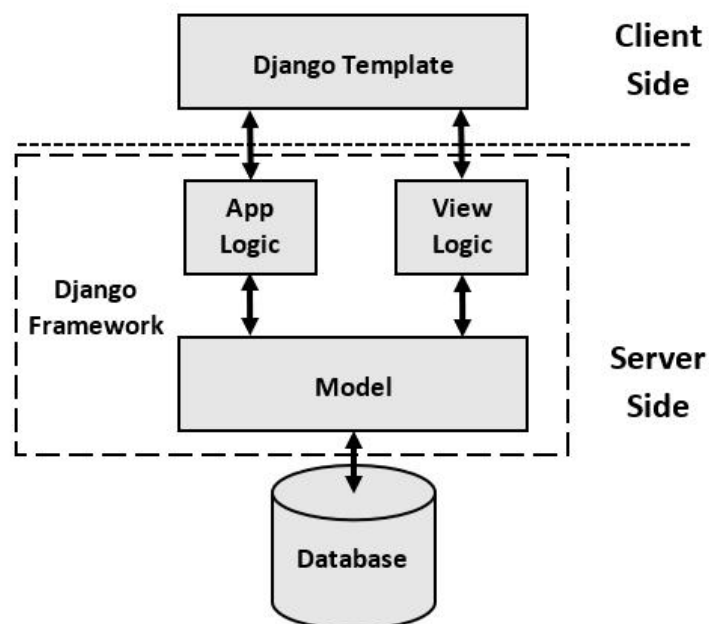


Figure 3 3Django Architecture[2]

The accelerated development rules that suggest that developers should perform more than one version at a time without beginning the whole schedule from scratch. For Django, safety is also high on the agenda. It has one of the best safety mechanisms out of the box out there and lets developers prevent problems with popular protection. We can tackle any tasks in Django, be it a small website or a high-load web application, of any scale and capability.

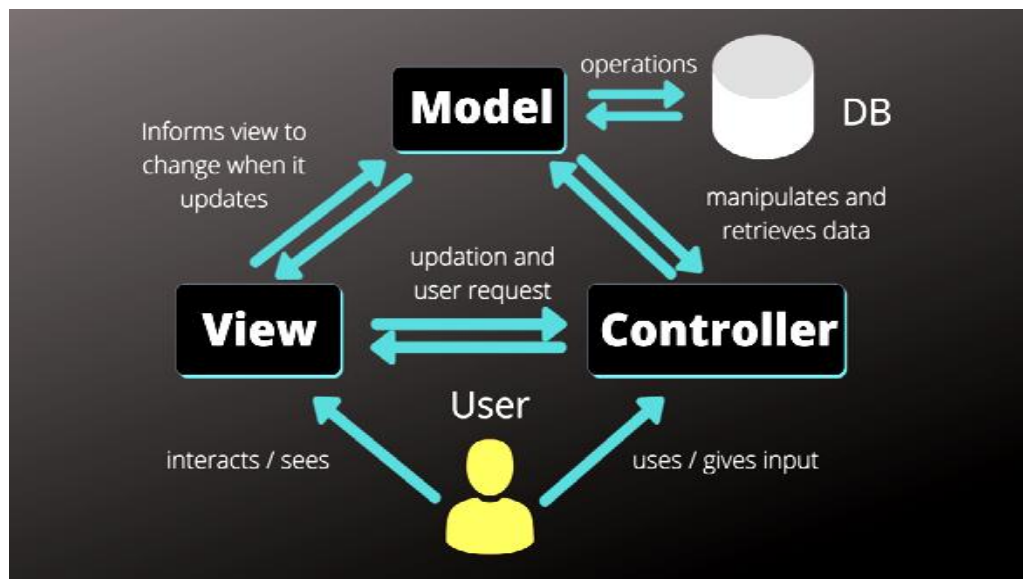


Figure 3 4Model View Controller Architecture[3]

## FRONTEND

HTML, CSS and Javascript are being used in the email project. There are also various languages in the front-end stack. Although these differ from application to application, all web browsers understand only a few common languages. The HTML, CSS and JavaScript are the top three code languages. These are used together to create the primary structure which can then be rendered using any web browser. A browser uses a v8 engine to compile the javascript. These are the three main languages which make all other libraries and front end engineering comprehensive and necessary for any front-end developer.

HTML acts as the basic website layer that provides a 2D skeletal code on a website. This exists for both CSS and Javascript which are used for designing and functionality. HTML stands for Hypertext Markup Language. The most critical thing to note is the word markup, since markups are the proper name for HTML items, also known as HTML tags. HTML in its entirety is the markup that produces the essential items on a website.

A recent styling pattern is to use a pre-processor. This includes SaaS, designers and Less. Pre-processors script languages which are very common for browser compilation to CSS as the development process is expedited. Some programming logic can be adapted.

JavaScript is a web browser execution language. This means the website loads the usual basic JavaScript for a website and any additional JavaScript placed to a page when you open a web page. Parallel to it is loaded by the latest JavaScript, which will take action and decide.

In JavaScript, the back-end languages like Java or Ruby vary, because it is transparent and is not compiled in advance for the curtain to run secretly. It is true front-end engineering programming language and the fundamental language that connects it all.

## DATABASE

Most people switch to MongoDB, but many also tend to use a conventional relationship database. This is why it has multiple explanations for using MongoDB as a NoSQL database. This lead to the foundation of MongoDB's global fame. Some of the many features offered by mongoDB include -Aggregation Framework, BSON Format, Sharding, Ad-hoc Query, Capped Collection, Indexing, File Storage, Replication, MongoDB Management Service (MMS).

NoSQL is also known as "Not just SQL." NoSQL enables unstructuring, less data scheme in various collections and nodes to be stored, and has no set table sequences, minimal link queries and a horizontal scale. It has not been specified in many NoSQL databases, because no two NoSQL databases are equivalent. Thus, it has been defined that there are not many defined criteria for both Open Source and Open Source bases. No Stored MongoDB procedures The NoSQL data bases can work in a way that relational databases cannot to prevent the database from being a system-wide bottleneck, in particular in high volume environment

- Save high data volumes without structure
- Use of cloud and storage computing
- Fast evolution.

Pymongo has been used for database connectivity in this project. The procedure on the database is carried out by each module within PyMongo. Generally speaking, PyMongo offers a rich range of methods to interact with a MongoDB node. It offers querying, finding results, writing and removal of records, and executing database commands. You need a MongoClient instance to construct a link to a database. This class offers an



instance or server client for MongoDB. Per client object has an integrated communication pool that uses up to 100 server links by design.

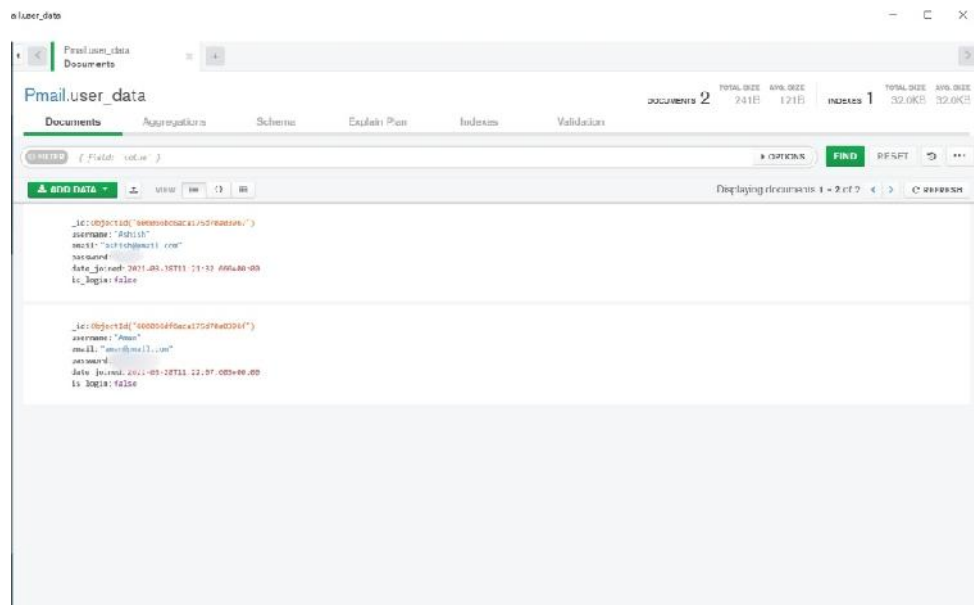


Figure 3 5 User login collection

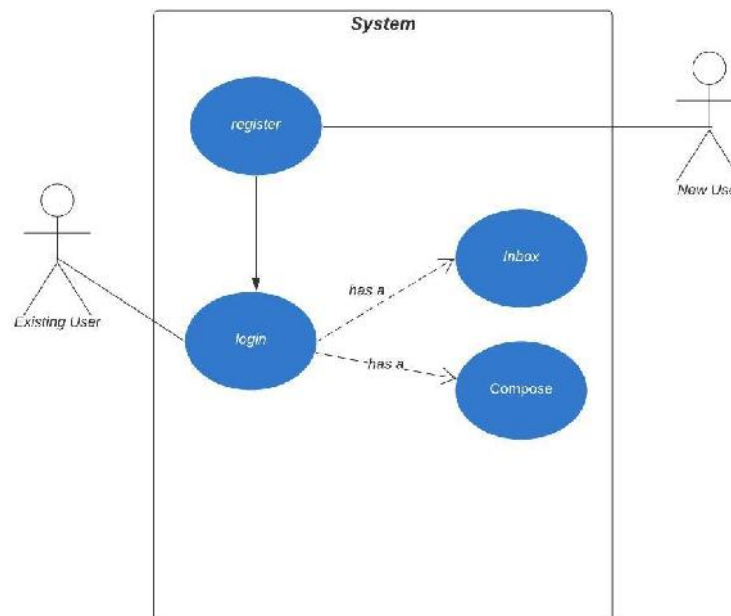


Figure 3 6Pmail Use Case diagram

Figure 3.6 shows the use case diagram for my email application. Using this I have created the application. According to the diagram every user must login and has a inbox where he/she can store the incoming mails. The new user however must register to be able to send or receive mails.

### 3.4 SOFTWARE REQUIREMENT

We do not require so many dependencies to run these projects. However some of the important ones are listed below:

- Windows 7+
- Python 3.x
- Django==3.2
- django-crispy-forms==1.11.2
- pymongo==3.11.3
- requests==2.25.1

### 3.4 DEVELOPMENT METHODOLOGY

The project uses agile development methodologies. Agile development of applications goes beyond systems like Scrum, Feature driven Development, extreme programming, tradition of pairs, test based development, stand-ups, sessions of preparation and sprints. Agile is capable of creating and reacting to transition. It is a way to address an unstable and chaotic world and eventually excel. Agile software development is a key concept for a series of processes and methods focused on the ideals and concepts of the Agile Development Manifesto and its 12 principles.



Figure 3 7Agile development process flowchart[4]

The agile model is an incremental distribution technique, where every incremental component supplied is generated after every time box by an iteration. The Agile model's principal concept is resilience by the removal of repetitive tasks that lose time and effort. For any iteration the finish date cannot be changed. In order to finish this version on

schedule, the developing team would maybe have to reduce the delivered features.

There are numerous modules like Incremental Model of development which can be progressively built and delivered that separate program specifications. The main features are first developed and the program is developed in subsequent iterations with the addition of new features. Also we do not have any preset time for the next model.

Four key principles are highlighted in the agile software growth.

- Interactions between individuals and teams of processes and instruments
- Extensive documents working tools
- Customer cooperation in the negotiation of agreements
- In response to changes to a timetable

## **CHAPTER 4**

### **PERFORMANCE ANALYSIS**

#### **4.1 CHATBOT PERFORMANCE ANALYSIS**

Chatbots, which are rules-based, are usually easier to train (less expensive). They work well with legacy networks. They simplify the transfer to a human agent and are very accountable and secured. The question of what chatbot can and cannot do is appreciated by people for its transparency. When the talk is wide open, it is also not started by adults. Stuff tend to work more easily when having keys and a straightforward direction for the user. The AI chatbots have their spot, but our customers find that rules-based bots are sufficiently scalable to deal with their use cases. Of course, the more versatile you practice your rule-based chatbot. Questions you cannot address from your rule-based chatboot are an opportunity to learn from your business. You can quickly change and change laws, whereas machine learning is harder to understand when things go wrong.

A very crucial role in the development process is evaluating its performance in real world. There have been numerous cases where an entire system crashes while performing in real world. I have integrated the chatbot using the watson's web integration and also integrated the bot on Slack using the slack apps. The results were really good. I performed unit test integration the store management bot.

The store management bot is built to be integrated with a store website and can give information like:

- Items Enquiry
- Timings of operation
- Booking a visit
- Cancelling a visit
- Store locator
- General FAQs

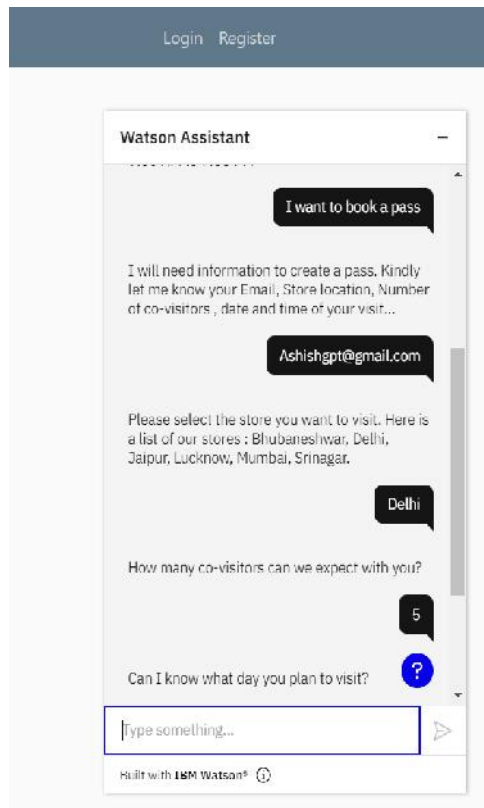


Figure 4 1 Chatbot integrated into the website for inquiries related to booking pass

Based on the intent triggered the bot can book a pass for visit by asking some simple questions to the user. At anytime a user can cancel the booking. If the user does not cancel booking then a pass is generated by the chatbot.

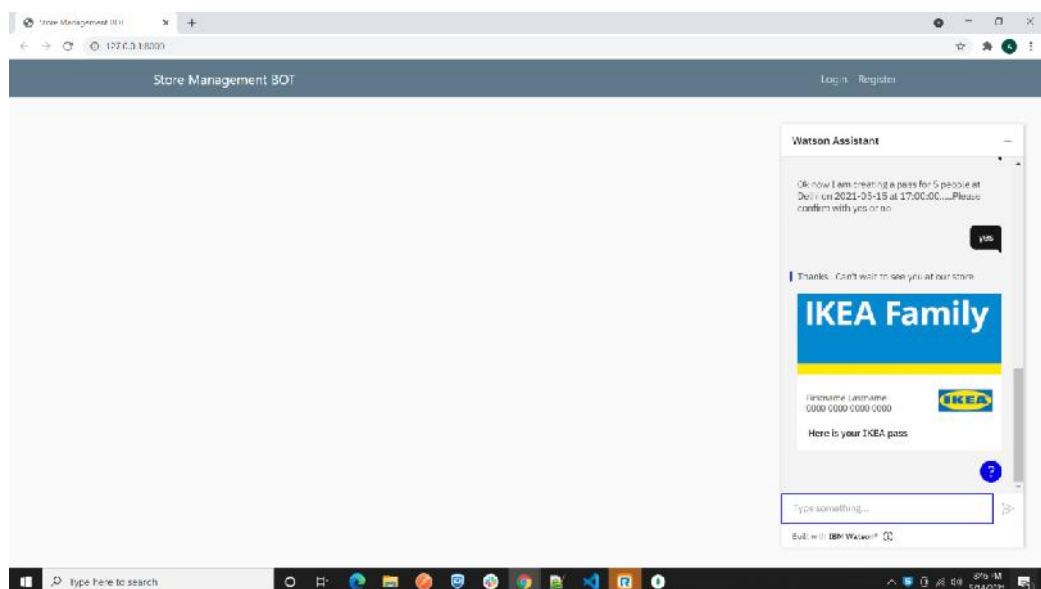


Figure 4 2 Chatbot state after the pass has been booked successfully

The chatbot can be asked simple questions like the timings of store operation, store location and if the store is open or not. All this has been made possible due to Watson dialog skills. The bot works by sending data to the cloud service through APIs and then the cloud service gives a response which is handled at the backend. The main benefit of Watson is that we can integrate our chatbot to multiple platforms with so much ease.

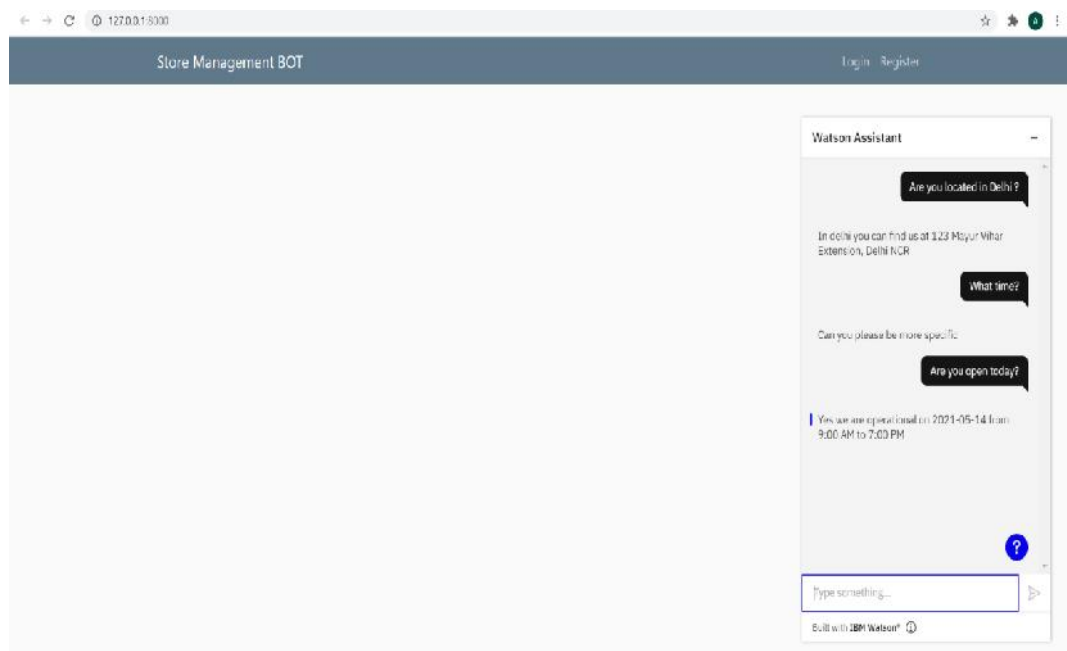


Figure 4.3 Chatbot state when asking general FAQ questions

I have integrated the chatbot with Slack by building a Slack app. Slack apps are easy to build. We only need some keys and data to integrate a bot with Slack, some of which are:

- Verification token
- OAuth permissions need to be changed
- Enabling events
- URL is required for Watson service which is generated by Slack App

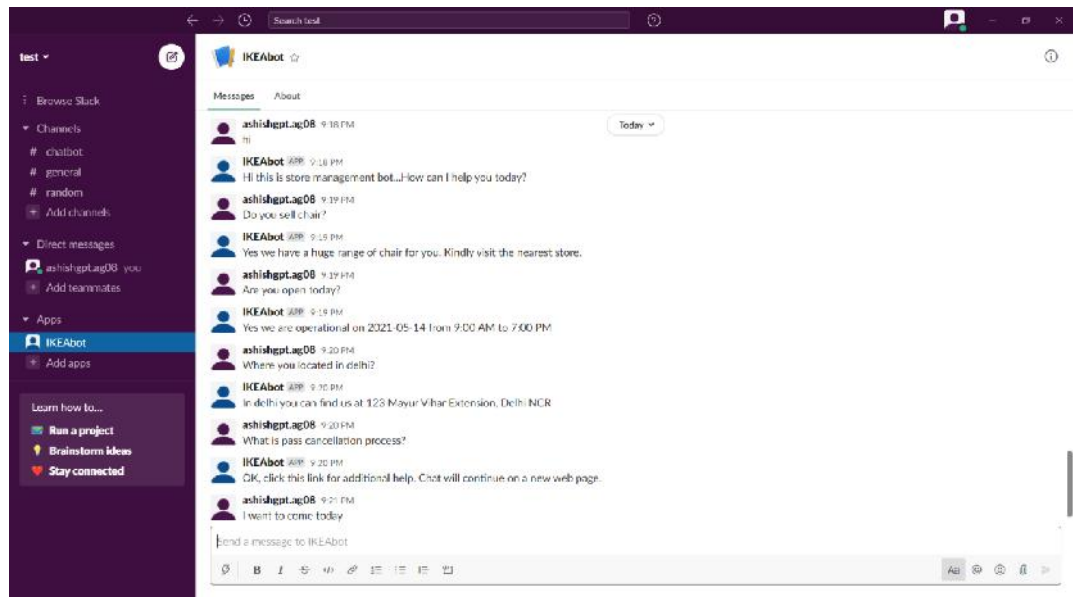
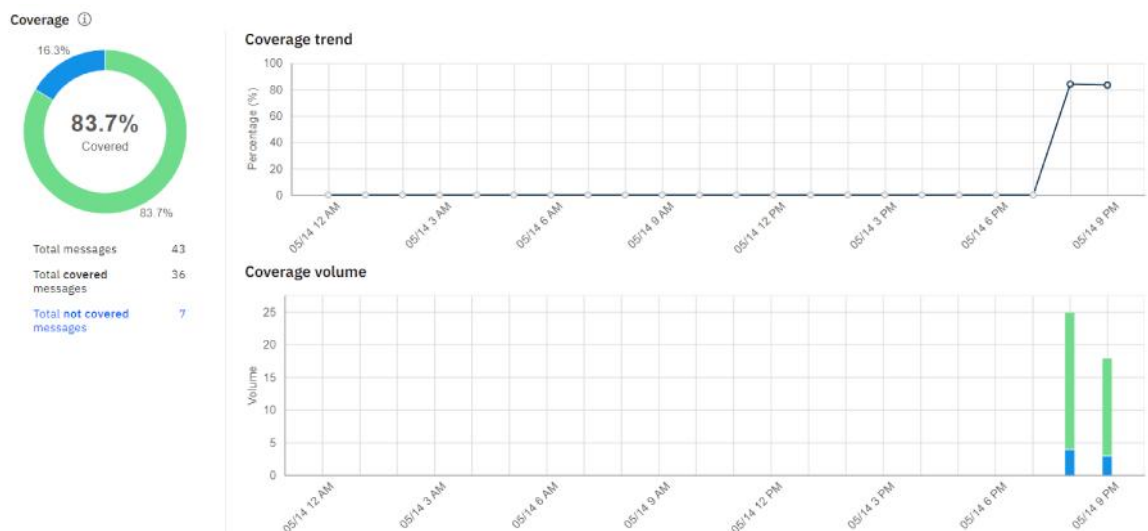


Figure 4 4Chatbot is integrated with a slack app



Graph 4 1 Watson assistant performance using coverage matrix

## 4.2 EMAIL APPLICATION PERFORMANCE ANALYSIS

The email application is called PMail and offers various functionalities like logging in, registering any new user. By logging in a user can send mails to each other and can view their mails. For the login a user needs a password and a username. Both the values are saved in the db through JSON.

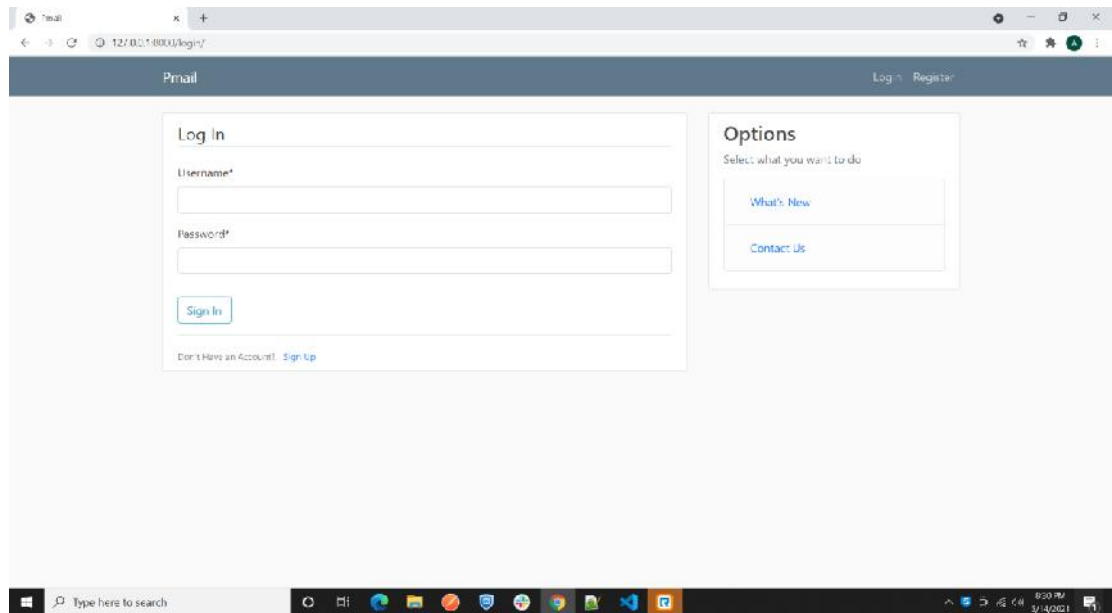


Figure 4 5Pmail login page

It's very simple to use JSON syntax. It has a syntax that allows one to easily parse the data and to execute them more quickly. Since its syntax is very little and light weighed, it performs the answer more quickly. It has the full variety of web compatibility provided for the operating systems so that JSON coding applications don't take much work to make it compliant with all browsers. The user after logging can send compose emails by providing email of receiver, the subjects and the email body. The email is sent securely to the receiver.

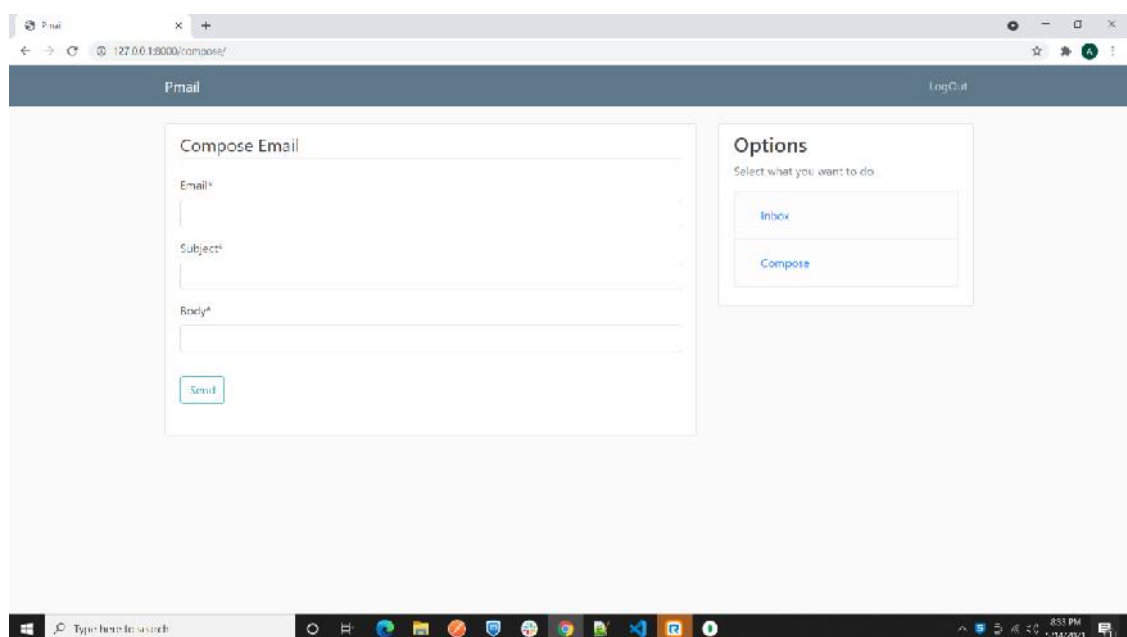


Figure 4 6Pmail compose email functionality



The user can view his/her inbox only if he/she is logged in. It is where e-mails are sent in a postal or internet e-mail client. where they are received. The Inbox is the default place to send messages to another mail, folder or application unless the rules are set. User can tap the Inbox folder for the navigation section to display messages.

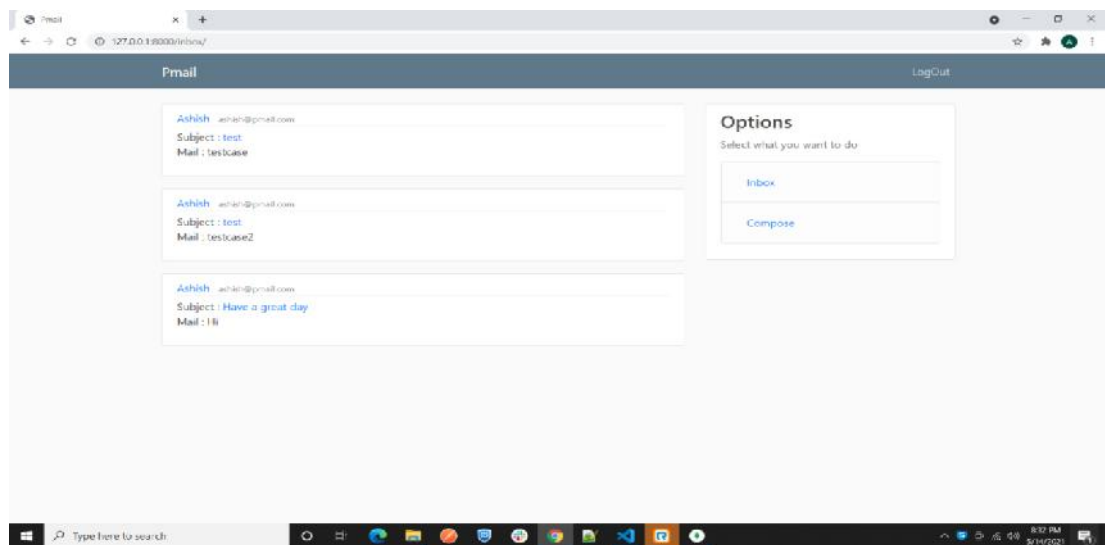


Figure 4 7Pmail inbox functionality

Logging out ensures that a network machine or website access is stopped. When logged-out, the device or website will be informed that the current user wants to terminate the login. Once logged out no one can view or compose mails.

In order to access the MongoDB collections, Python requires a MongoDB engine. MongoDB can support many independent databases combined with collections in a single instance. If we use pymongo we can use MongoClient instances to navigate the needed databases.

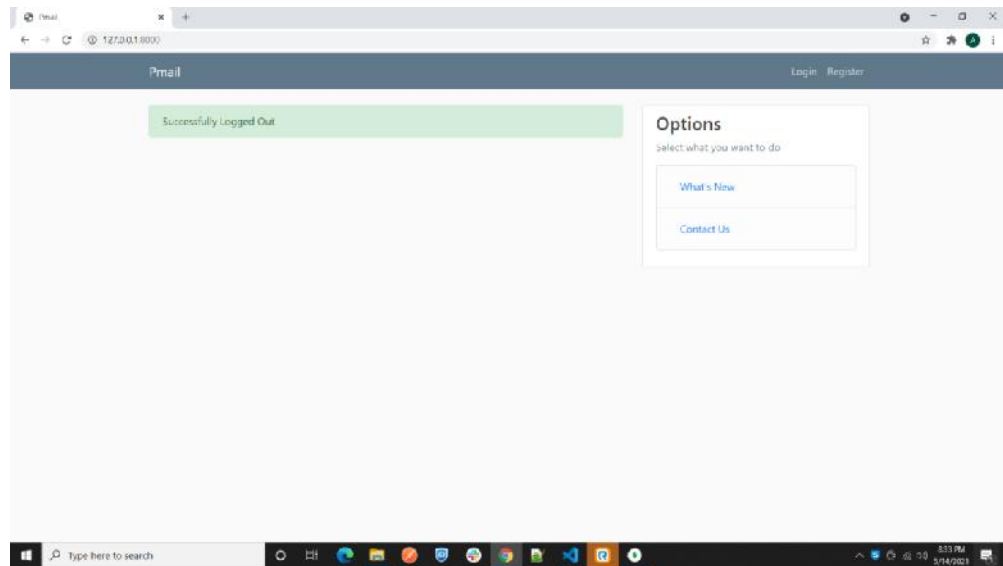


Figure 4 8Pmail logout functionality

The pace of the website gives company the first impression. It is important to remember that when it comes to customer interface, we won't get a second chance. One of the most annoying things about your resource is the low pace of our website. Good value websites lead to high return visits, low bounce rates, increased conversions, commitment, better organic search ranks and enhanced user experience. Slow websites are going to cost you money and credibility hurt. You have a positive effect on marketing and distribution processes by reducing website load times.

## **CHAPTER 5**

### **CONCLUSION**

#### **5.1 CONCLUSION**

The chatbot that is built was mainly to help in some common online store management tasks and also the email application was to learn about fundamentals of web development. I have thus achieved my goal. Apart from this I have also learned about various Deep learning tasks. Through this internship I have learned a lot about Artificial Intelligence , backend development which will help me in carrying out my tasks in the company. Chatbot development has been a very growing field in itself.

Through intensive reading and hands-on practice I have got a good idea about chatbot development. Simple chatbots which were available earlier could only match a string in form of text from user and provide an answer when the exact match is found. AI powered chatbots are far more smart then just normal searching. They are able to process the text or speech just like a human being does and provide answers to the person they are chatting with just like we human do.

Chatbots are available on a 24\*7 basis, all of which are based on the huge expertise they can possess. They will soon surpass human skills with speed and precision and provide service to businesses. Chatbots have developed through waves of artificial intelligence thanks to the enormous amount of data being generated by humans and made available on the internet. Chatbots acts as customer support to replace people

They are getting smarter and smarter every day. Chatbots will undeniably experience huge changes . While NLP research has been active since 1960s, progress has been slow in developing NLP clinical text applications, and it has been lagging behind progress in the general domain of NLP..

However there seems to be a lag in the amount of open-source data and resources available for chatbot development. While we created this project from scratch we also came across many online tools which can even be used by people with zero programming expertise to develop embedded chatbots for their specific purpose.

At times you can't do it without the experience of programming, a thorough knowledge of artificial intelligence and the workings of chatbots. But now it is much easier to create chatbots because of the resources that are available now.

That includes tools which allow beginners without any coding to build their own chatbots. Most of them have interfaces that are easy to use and can precisely be configured as you

want. You can also chat for convenience, but you can't personalise it as much.

You can do this at little or no expense now as well. It took a pretty penny to get one built for your company before chatbots came into the common consciousness. There are also specialised chatbots available for a monthly charge when you choose to have one for you.

## **5.2 FUTURE SCOPE**

Artificial intelligence is the main discussion point for business clients who wish to enhance efficiency, implement new concepts, and take the next steps in the transition towards a digital organisation. AI and chatbots are promoting democratisation, creating new alliances and start-ups, and this needs to be prepared for any organisation.

Each company is a technology firm that was just one of the mantras of the decade. Each organisation has begun working and contact with smartphones in every vertically and sector, using cloud platforms to open its data and adopting as one-service solutions for reducing business costs and expanding its business base and employee opportunities.

Ten years ago, experts in maintaining databases and designing websites were required. Now someone with a plan can create a whole business out of the shelf, sell around the world without leaving their desk.

Chatbots are now even used in health sectors. Given that the need for mental health resources is often greater than what is available people in need can contact chatbots online on mental health. Mind chatbots assist service users, engaging them with interaction even when they feel vulnerable. In other situations there is a human aspect. Some chatbots are passive and respond only when they reach out to users. Other users who are on their site or have downloaded an app will actively communicate with them. So to check with users, they will start talking.

Chatbots for mental wellbeing might only make a friendly ear. A place to address problems, fears, distracting feelings, or "therapeutic" discussions. You can use this feedback to detect the user's mood and respond empathically.

Some chatbots can aid users questioning their negative thoughts with advice or guidance. Psychological wellbeing bots are widely used to treat people who show symptoms of diabetes or some kind of medical anxiety.

While these conditions are not specifically treated by the bots, they may still provide help to relieve them up till a certain . Chatbot technology is growing in general, there has been a huge demand. Some people even freelance and build and sell bots to companies based on their specific use case. With chatbots moving into customer service work, they become

increasingly accustomed to communicating with them.

Via machine learning and language processing chatbots are now smarter and more able to communicate with us. People are inevitably searching for new methods of using them. Bots are growing with the increasing knowledge of mental health. More people are searching for mental well-being assistance. The availability of trained therapists is thus compromised. As a result, patients sometimes have to wait agonisingly for the clinical assistance they require. Then the fundamental usability of bot help lies beyond these rising patterns.

### 5.3 APPLICATIONS OF CHATBOTS

#### Content delivery

Media publishers have discovered that chatbots are a powerful way to connect and track interaction with their audiences in order to gain useful insights into the desires of readers. Chat on Facebook Messenger with the CNN and Wall Street Journal Chatbots and receive the latest news directly in Messenger, without having to visit their websites. Many publishers often use their chatbots with AI and machine learning technologies to predict what content their customers will be interested in. This is an exciting chatbot technology framework and it will certainly contribute to instant and more personalised content than ever before.

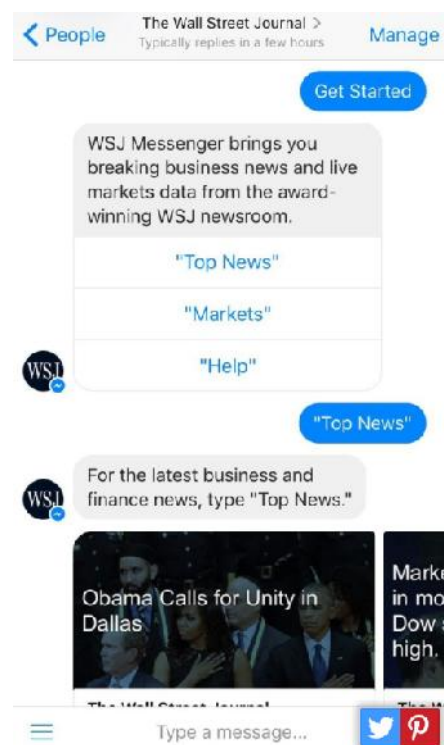


Figure 5 1The Wallstreet Journal Chatbot[5]

## Order Food

In Chatbots, numerous fast food giants such as KFC and Pizza Hut have invested in enabling clients to position their orders via conversations. By giving their chatbot called TacoBot some personality, Taco Bell went a step further to enhance the conversational experience. If the client mentions being hungover, TacoBot cracks jokes, uses emojis, answers questions about trivia, and even adds a cup of water to an order. Chatbots connect with customers, remind them of meals and nutritious foods, or even initiate certain simulated behavior, for example adding a dish to a cart or closing an account if desired. Chatbots may use artificial intelligence to mimic human responses (AI). Users may not even know they are talking to a computer or a person while they speak with those virtual assistants.



Figure 5 2TacoBot is a food ordering bot of Tacobells[5]

## Companionship

Endurance, a Russian technology firm, has created its companion chatbot for senior citizens and Alzheimer's disease patients. The key role of the chatbot is to be a virtual friend, to talk about general topics such as the weather, nature, hobbies, movies, music, news, etc. with senior people. The chatbot asks questions, responds to replies, can talk about different topics and share interesting Google news and information.

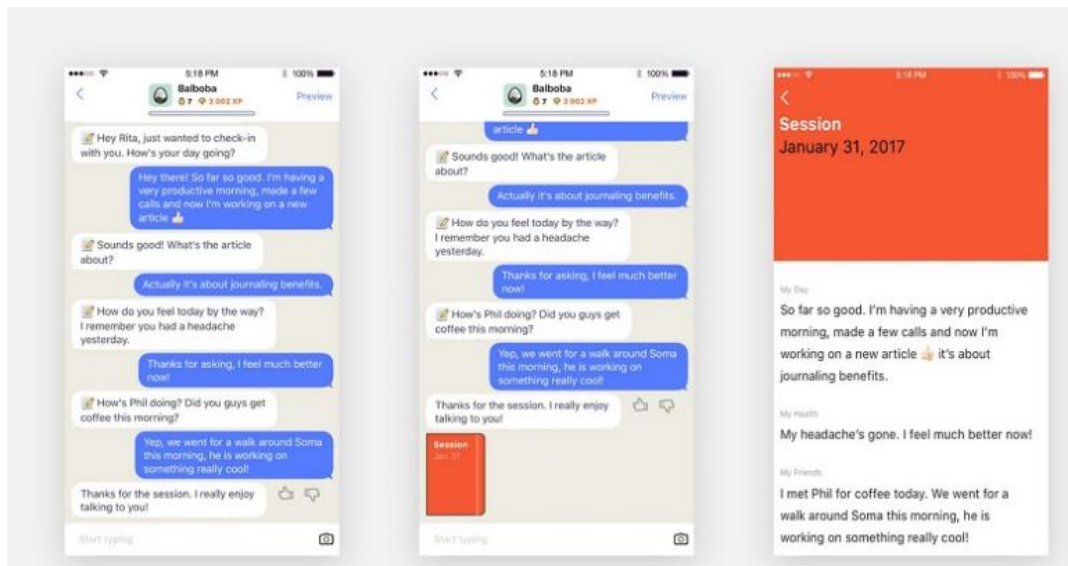


Figure 5 3 Endurance firm Chatbot to help people with Alzheimer's Disease[5]

## Health Care

By easing the pressure on medical professionals by enabling quicker medical diagnosis, answering health-related questions, scheduling appointments and much more, chatbots have also made their way into health care. Florence is called an interesting Chatbot in health care. This robot is more like a robotic nurse and has a Facebook Messenger office. Florence will remind patients to take their pills, all they need to do is write in chat the name of the prescription, the number of times they need to take it a day and at what time. Each time the patient needs to take their meds, Florence sends a chat message.

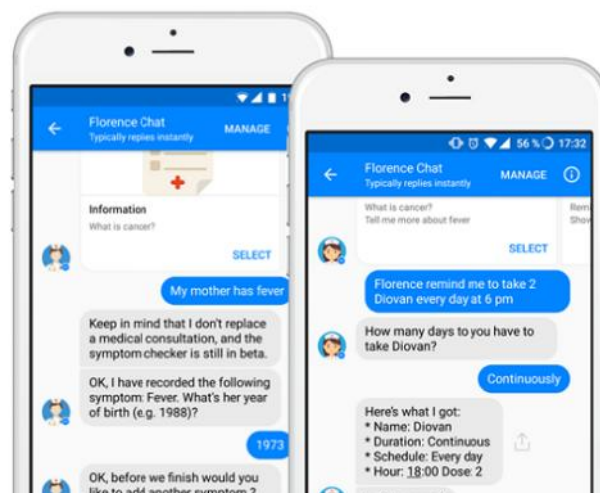


Figure 5 4 Healthcare Chatbot called florence[5]

## E-Commerce

Chatbots also improve the shopping experience in the e-commerce industry. With the help of chatbots, clients can now scan and shop more conveniently. Through their ShopBot, eBay has invested in Chatbot technology, a virtual shopping assistant that helps clients locate the things they want at the desired price range.

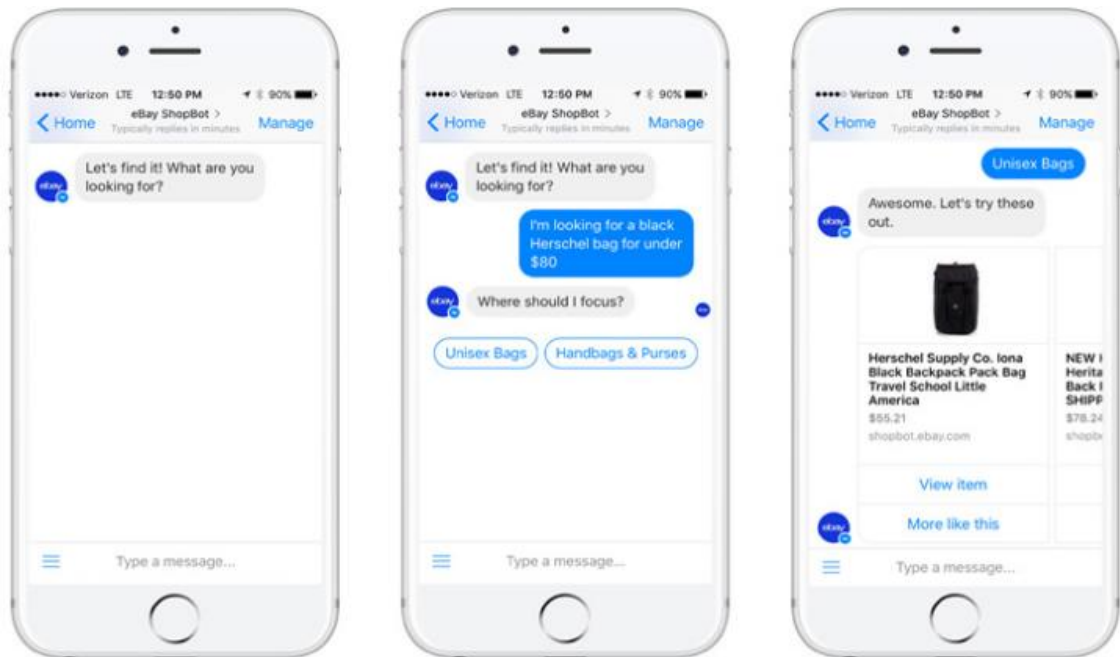


Figure 5 Ebaychatbot to help customers shop[5]

Customers only need to enter specifics of what they are searching for (e.g. telescopes under \$150), to find the best fit, ShopBot will ask you all the necessary questions. This is a perfect example of how chatbots can expand the shopping experience beyond what can be provided by traditional e-commerce sites. E-Commerce chatbots add a handy and professional Salesman to the modern world through their interaction experience. The chatbot on e-commerce will engage with consumers, consider their needs through conversations and provide related product suggestions. Through using the power of the NLU, the e-commerce chatboot will enter into discussions, consider their needs and direct them to the things it wants, and make customized product recommendations. This further enhances the consumer retention activities of the e-commerce website.



## References

- 1) IBM Cloud Documentation [Online] Available :  
[:https://www.ibm.com/cloud/architecture/tutorials/watson\\_conversation\\_support/](https://www.ibm.com/cloud/architecture/tutorials/watson_conversation_support/)  
(accessed May 13, 2021).
- 2) Django Book [Online] Available :<https://djangobook.com/mdj2-django-structure/>  
(accessed May 12, 2021).
- 3) MLSDev [Online] Available :<https://mlsdev.com/blog/agile-sdlc> (accessed May 13, 2021).
- 4) Open Genus [Online] Available : <https://iq.opengenus.org/model-view-controller-django/> (accessed May 13, 2021).
- 5) Crx Service 360 [Online] Available : <https://www.cxservice360.com/10-interesting-applications-of-chatbots-2/> (accessed May 14, 2021).

# JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

## PLAGIARISM VERIFICATION REPORT

Date: 18/06/2021

Type of Document (Tick): ☒ Ph.D Thesis ☒ M.Tech Dissertation/Report ☐ B.Tech Project Report ☐ Paper

Name: Ashish Gupta Department: CSE/IT Enrolment No 171336

Contact No. 7807493166 E-mail. 171336@juitsolan.ir

Name of the Supervisor: Dr. Ruchi Verma

Title of the Thesis/Dissertation/Project Report/Paper (In Capital letters):  
INTERNSHIP REPORT AT PAXCOM INDIA PVT LT

### UNDERTAKING

I undertake that I am aware of the plagiarism related norms/ regulations, if I found guilty of any plagiarism and copyright violations in the above thesis/report even after award of degree, the University reserves the rights to withdraw/revoke my degree/report. Kindly allow me to avail Plagiarism verification report for the document mentioned above.

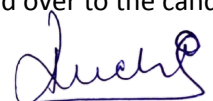
#### Complete Thesis/Report Pages Detail:

- Total No. of Pages = 41
- Total No. of Preliminary pages = 34
- Total No. of pages accommodate bibliography/references = 7

  
(Signature of Student)

### FOR DEPARTMENT USE

We have checked the thesis/report as per norms and found **Similarity Index** at .....13.....(%). Therefore, we are forwarding the complete thesis/report for final plagiarism check. The plagiarism verification report may be handed over to the candidate.

  
(Signature of Guide/Supervisor)

Signature of HOD

### FOR LRC USE

The above document was scanned for plagiarism check. The outcome of the same is reported below:

Copy Received on	Excluded	Similarity Index (%)	Generated Plagiarism Report Details (Title, Abstract & Chapters)	
	<ul style="list-style-type: none"><li>• All Preliminary Pages</li><li>• Bibliography/Images/Quotes</li><li>• 14 Words String</li></ul>		Word Counts	
Report Generated on			Character Counts	
		Submission ID	Total Pages Scanned	
			File Size	

Checked by  
Name & Signature

Librarian

Please send your complete thesis/report in (PDF) with Title Page, Abstract and Chapters in (Word File) through the supervisor at [plagcheck.juit@gmail.com](mailto:plagcheck.juit@gmail.com)

as

#### ORIGINALITY REPORT

13%

SIMILARITY INDEX

9%

INTERNET SOURCES

1%

PUBLICATIONS

8%

STUDENT PAPERS

#### PRIMARY SOURCES

1

[data.conferenceworld.in](http://data.conferenceworld.in)

Internet Source

3%

2

Submitted to Middlesex University

Student Paper

2%

3

Submitted to Jaypee University of Information Technology

Student Paper

2%

4

[www.cxservice360.com](http://www.cxservice360.com)

Internet Source

2%

5

[fastapi.tiangolo.com](http://fastapi.tiangolo.com)

Internet Source

1%

6

Submitted to Gusto International College

Student Paper

1%

7

Submitted to University of Greenwich

Student Paper

1%

8

Submitted to Universiti Teknikal Malaysia

1%