

PROJECT REPORT
ON
IMPLEMENTATION OF AI CHATBOT BASED ON
ANDROID APPLICATION FOR RESTAURANT



DAFFODIL INTERNATIONAL UNIVERSITY
DHAKA, BANGLADESH
APRIL 2021

**IMPLEMENTATION OF AI CHATBOT BASED ON
ANDROID APPLICATION FOR RESTAURANT**

BY

**ABDULLAH NAZMUS SAKIB
ID: 181-15-963**

**IMTIAZ ATIK
ID: 181-15-949
AND**

**FABIHA RAHMAN DRISTY
ID: 181-15-945**

This Report Presented in Partial Fulfillment of the Requirements for the Degree of
Bachelor of Science in Computer Science and Engineering

Supervised By

MS. TASLIMA FERDAUS SHUVA
Senior Lecturer
Department of CSE
Daffodil International University



DAFFODIL INTERNATIONAL UNIVERSITY

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APPROVAL

This Project titled “**Implementation of AI chatbot based on Android Application**”, submitted by Abdullah Nazmus Sakib (ID 181-15-963), Imtiaz Atik (ID 181-15-949) and Fabiha Rahman Dristy (ID 181-15-945) to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation was held on

DECLARATION

We hereby declare that this project has been done by us under the supervision of **Taslima Ferdaus Shuva, Senior Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:



Taslima Ferdaus Shuva

Senior Lecturer
Department of CSE
Daffodil International University

Submitted by:



Abdullah Nazmus Sakib

ID: 181-15-963
Department of CSE
Daffodil International University



Intiaz Atik

ID: 181-15-949
Department of CSE
Daffodil International University

Fabiha Rahman

Fabiha Rahman Dristy

ID: 181-15-945
Department of CSE
Daffodil International University

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ABSTRACT

Android applications and AI-based chatbots are vastly used in our society. The neediness of Android with AI is increasing day by day. From a lot of problems in our society, we try to solve the problem of getting food at home and easy interaction with the restaurant by an android application and AI chatbot. Our application provides a big collection of food, from where people can order food easily and get the delivery. Our application can take orders manually like foodpanda and others. The special feature of our application is the chatbot which is called waiter chatbot because it can interact with the customer on its own with all the proper knowledge of the interaction. It can take the statement from the customer or user and search on the dataset of knowledge for the efficient and wanted an answer. Like if someone wants to buy a burger he or she can buy it manually by pressing add cart on the home page, but if anyone wants to know the details about the burger then simply go to the chat section and ask a question which is going around in your mind, waiter bot will provide the most efficient answer to the user what they looking for. This bot can learn from the dataset we provide for training. Larger the dataset can make a more efficient bot for our application and user. Our bot can provide accuracy up to 85%.

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CHAPTER 1

INTRODUCTION

1.1 History of Chatbot

The chatbot is artificial intelligence(AI) based software that conducts a conversation with a human via text or text to speech. Chatbots are also called digital assistants. It interprets & processes the query of users and gives them relevant answers. The first chatbot was called Eliza. It was created by MIT professor Joseph Weizenbaum in the mid-1960s. Users were fooled by ELIZA that they were talking to humans. The next chatbot was Parry. It was developed by Psychiatrist Kenneth Colby.

Google was launched in 2012 and was replaced by Google Assistant in 2017. Google wants to provide information easily. Nowadays this is a part of our google search strategy.

Latest chatbots are very smart, they can handle customer service and marketing tasks, etc. Chatbot didn't cost much but took care of time-consuming tasks where human resources are expensive. A chatbot can help to save expenses and can make a better interaction. [\[1\]](#) [\[2\]](#)

1.2 History of android application:

Android is a mobile operating system based on the Linux kernel. Andy Rubin established Android Inc. in Palp Alto, California, the United States in 2003 to develop an OS for digital cameras. In 2004 the project changed to an operating system for smartphones because of the low market for cameras only. Then in 2005, the American search engine company Google Inc. acquired Android Inc. After that in 2007, Google decided to develop the Open Handset Alliance, including Intel Corporation, Motorola, Inc., Samsung Electronics, etc.

1.3 Goal of making Waiter Chatbot

We are trying to make a chatbot to interact with customers in a restaurant. This is a friendly bot. it will answer the questions automatically. It can take orders, make recommendations, offer special deals, answer any questions of a customer.

WaiterBot can talk about the menu. It also can say the ingredients we are using to make food. Customers don't have to order manually or wait for the waiter to take orders. This Bot will take orders from customers and transfer them to the system. Customers want recommendations. WaiterBot will also recommend food to them depending on their situation.

1.4 Structure Overview

Our report consists of 7 chapters. The first chapter introduces us to the history of AI and Android. The 2nd chapter taught us about the basics of machine learning and natural language processing. Chapter 3 is about all tools and technologies that need to make an AI chatbot. Chapter 4 contains the knowledge about the dataset and how to gather the data for a chatbot. The 5th chapter is about which tools need to be developed and how to develop an android application. Chapter 6 is about testing and the result of our project(AI chatbot and android application). Chapter 7 leads us to the improvement, limitations, and conclusion.

CHAPTER 2

TECHNICAL ANALYSIS

2.1 Fundamentals of Machine Learning

Machine learning enables a system to learn and develop from experience using data. It is a part of artificial intelligence (AI) and can be developed. This allows a machine to learn from sample data called "training data". Data is the base of machine learning.

Machine learning has various algorithms. Programmers use the algorithms to train a model. These algorithms are capable of working with huge amounts of data and extracting information. It improves their earlier iteration by learning from data. The trained module will respond depending on the knowledge based on data.

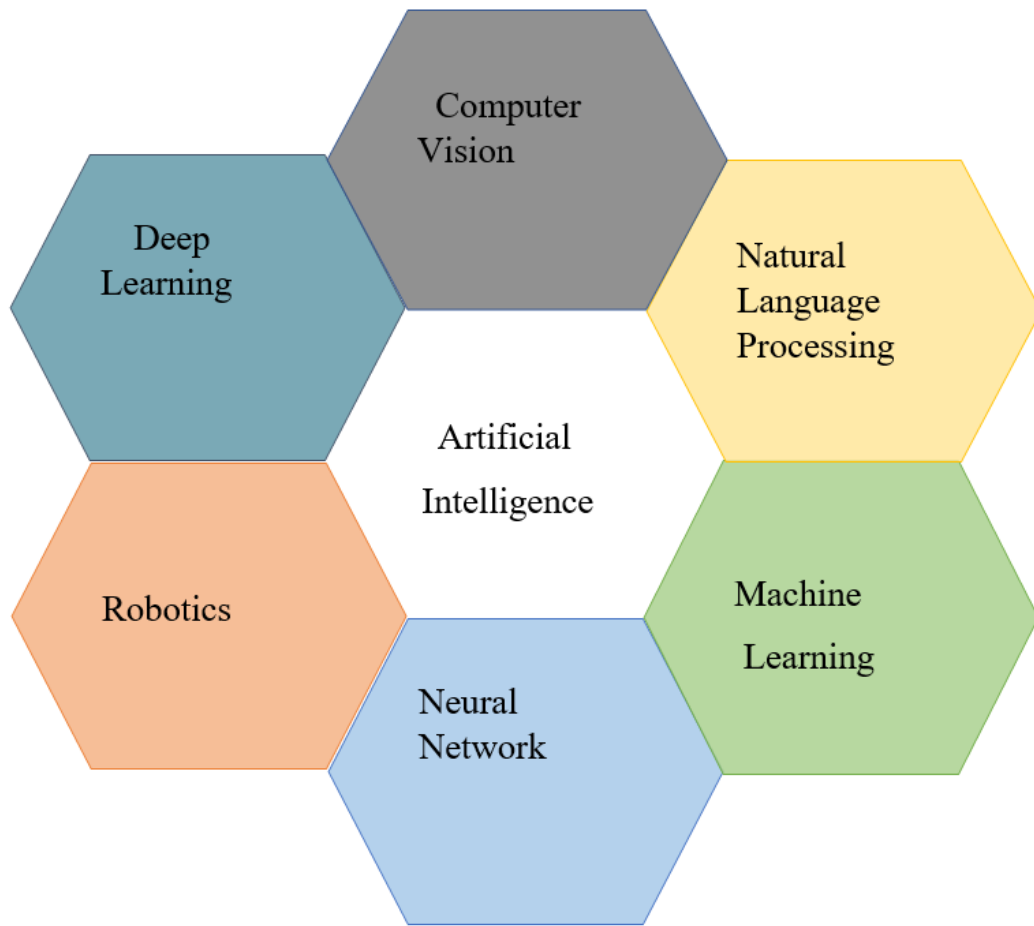


Figure2.1.1: Machine Learning

2.2 Fundamentals of Natural Language Processing(NLP)

Natural languages are known as human languages. They evolved naturally, not designed by people. There are lots of natural languages like English, Bangla, Hindi, Urdu, French, etc. These are the ways people exchange information and thoughts. The machine can not understand text information like humans.

For natural language processing(NLP) users give input as natural language, then the machine will process the input and generate a response. After that, it will translate the response into a natural language and return it to the user. We can say that the NLP computer can read the text and hear speech. This is a way of human-to-machine communication. It is a sector of Artificial Intelligence. [\[3\]](#)

CHAPTER 3

TOOLS AND TECHNOLOGIES

3.1 PYTHON

Python is an interpreted high-level general-purpose programming language. Python's design philosophy highlights code readability with its notable use of a significant slot. This language is a successor of ABC Programming Language, The working invention of build python began in the late 1980s an initial release of python in 1991 as python 0.9.0 by Guido van Rossum.

They advanced their packages by developing AI in python, libraries, and frameworks. However, there is a massive difference between Python 2 & Python 3 versions. To build the Waiter Chatbot we used the python 3.7 version. At least python 3.6 is preferable.^[4]

3.2 TensorFlow

TensorFlow is a free and open-source software library for machine learning. The range of use of python is huge but it has a particular work to train and process to interpret the deep neural network.

TensorFlow is a math library with symbols based on data flow and discriminable programming. It is also used in neural networks which are used for machine learning (means trains and ask). Google uses tensor flow for research and development purposes.^[5]

3.2.1 History

TensorFlow was released on February 11, 2017, as the version was 1.0.0 and it is used as Google's second-generation brain. Whether Google uses deep learning neural networks from 2011 for its first-generation brain. TensorFlow can run in more than one CPU and GPUs with optional CUDA and SYCL extension for general-purpose computing on graphics processing units. TensorFlow is available for a maximum of 64-bit OS like Linux, macOS, Windows, Android, and iOS. TensorFlow 2.0 introduces many changes in 2019 technologies are static computational graph, chainer, PyTorch, etc.^[6]

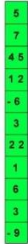
3.2.2 Advantages of TensorFlow

TensorFlow provides excellent community support. It goes through a very unique process that allows supervising the training progress of a set of data models and tracking several metrics. It has some useful features: graphs, Library management, Debugging, Scalability, pipeline, etc. Tensorflow is the most powerful method and it suits or is perfectly useful for our industry. It has the most powerful AI library in the world with numerous applications and APIs.

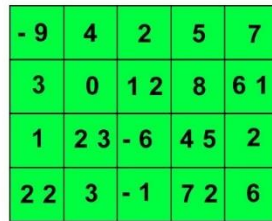
3.2.3 Brief Introduction of TensorFlow

As we know TensorFlow has mathematical computational methods which are based on vectors. We know k is a shape or dimension of a vector and the TensorFlow is based on the dimension of K . A single tensor can be represented by a K -dimensional dataset.

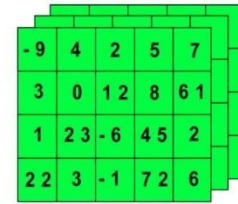
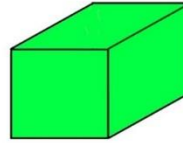
1D TENSOR /
VECTOR



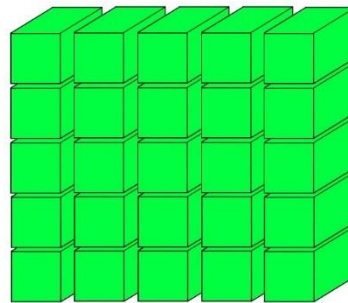
2D TENSOR /
MATRIX



3D TENSOR /
CUBE



4D TENSOR
VECTOR OF CUBES



5D TENSOR
MATRIX OF CUBES

Figure 3.2.3.1: Tensor

So, as it has different types of dimensions, it will be more complex when the dimension increases.

Now about flow, Flows are like a tree structure that shows the flow one by one with precedence. So, every node of a tree represents a calculation operation of any of the equations. By finishing all calculations, it produces a new tensor.

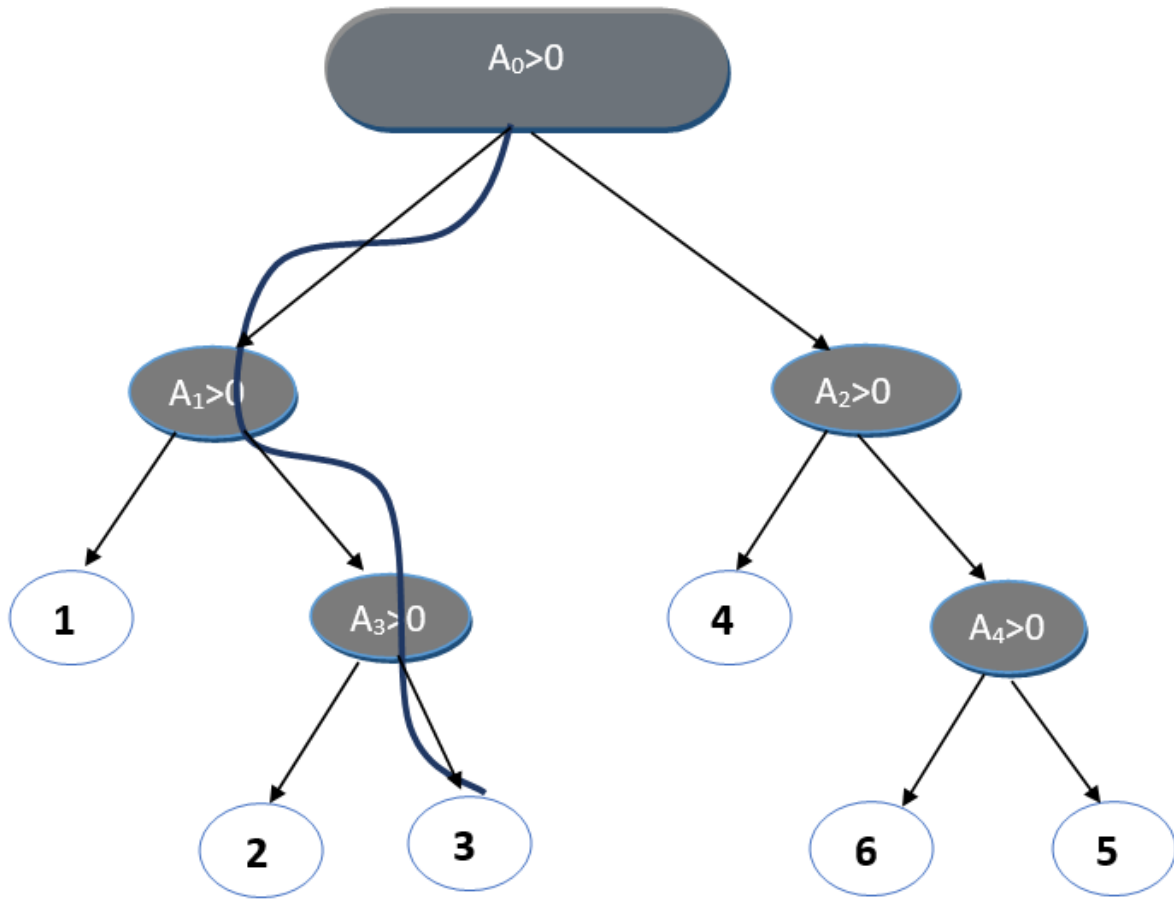


Figure 3.2.3.2 : Flow Of Tensor

From the figure, we saw that the calculation happened in every node. Decisions are made in two states whether it is greater or less than the value. After all the calculation it provides a tensor so all the block with numeric number is the tensor which is produced by finishing all the calculation in those nodes.

That's where TensorFlow shows its beauty. All the tensor runs automatically and parallelly and completes its tasks. For the higher dimensions of the tensor higher machine power is required.

3.3 WordNet Interface

WordNet is a large lexical database of English. Nouns, verbs, adjectives, and adverbs are grouped into sets of cognitive synonyms (synsets), each expressing a distinct concept. Synsets are interlinked using conceptual-semantic and lexical relations. It maintains a relationship between two words. If we can think of WordNet as a database then the System is like a primary key. It is used for gathering info about the meaning of words that we use naturally. This is not only the relationship between the synonyms collection but also associated with certain relationships such as upper and lower, whole & partial relationship, antisense relationship, inheritance relationship, etc.

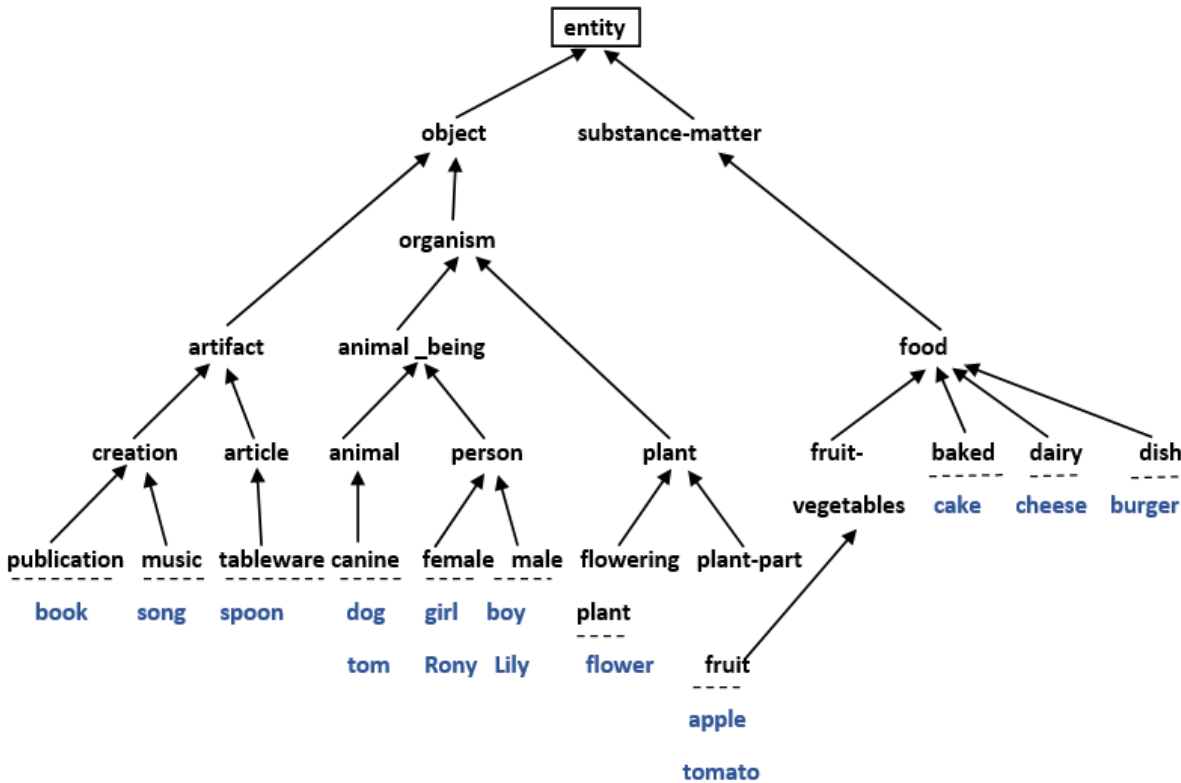


Figure 3.3.1: WordNet Interface

3.4 NLTK (Natural Language Toolkit)

NLT (Natural Language Toolkit) is a major platform for creating Python programs to work with human language data. The Natural Language Toolkit provides an easy-to-use interface to many corpora and lexical resources, such as Wordnet, as well as packaging for classification, tokenization, stemming, tagging, parsing and semantic logic, industrial-power NLP libraries, and an active discussion forum. [\[7\]](#)

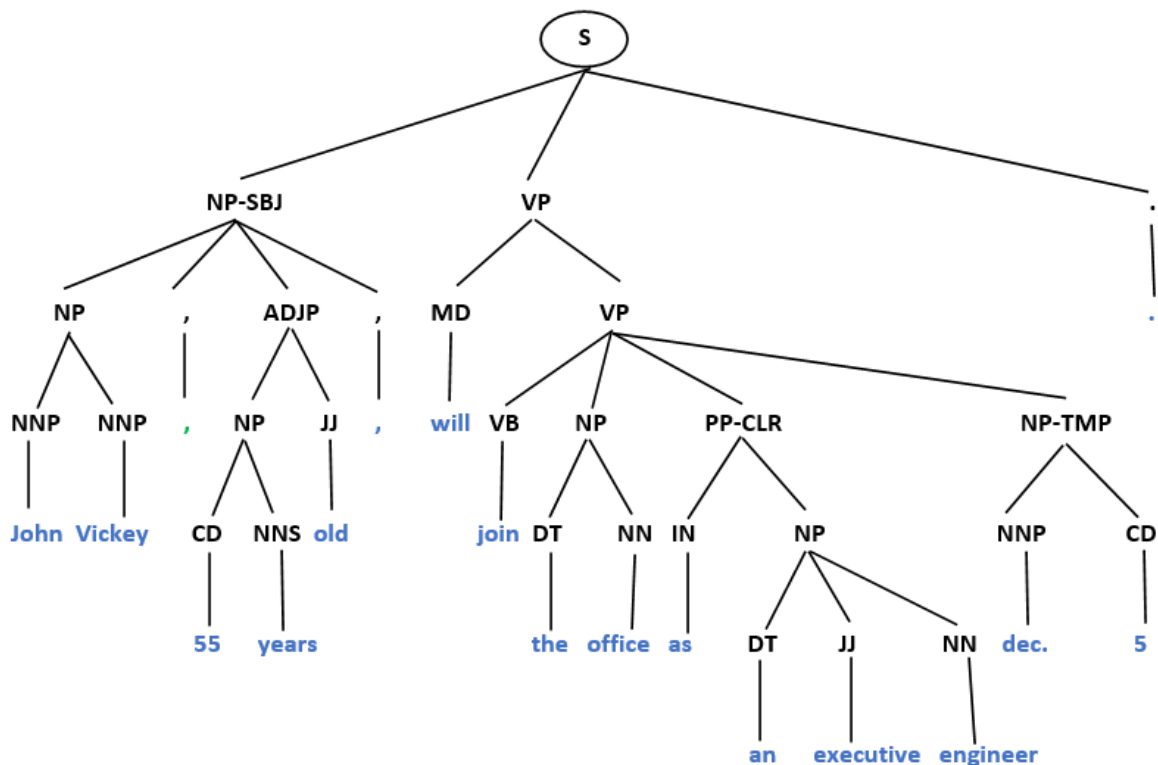


Figure 3.4.1 : NLTK

3.5 CHATTERBOT

3.5.1 Outline of Chatbot

Generating automated responses to a user input makes it very easy by using Chatterbot which is the most powerful python library. Machine learning algorithms are used to make different types of responses. Chatterbot makes a chatter engine very easily. We use the chatterbot version

3.5.2 Language Support

It supports a combination of NLTK. That means natural language is used for making chatter engines. As we know NLTK has more than 50 corpora and different languages so the language is going to be language independent. So, chatterbot can learn about any language and give responses in any language and it specifically learns from chatting data.

3.5.3 Training of Chatbot

Each chatbot needs to be designed in its ways such as its way of getting data and its way of responding, so there are many convenient features for chatting. Using those features we create a chatbot and make it independent. So, we need to train the chatterbot with its natural information to create the right response. It has a small module by which it takes a part of data from a vast dataset and loads the data to the program database. By creating a graph, it will show the statement to the users. After gathering whole or heavy datasets from the database, the database or dataset is put into the knowledge structure to make an accurate response to users. So by using this module we can easily make a chatbot for our project.

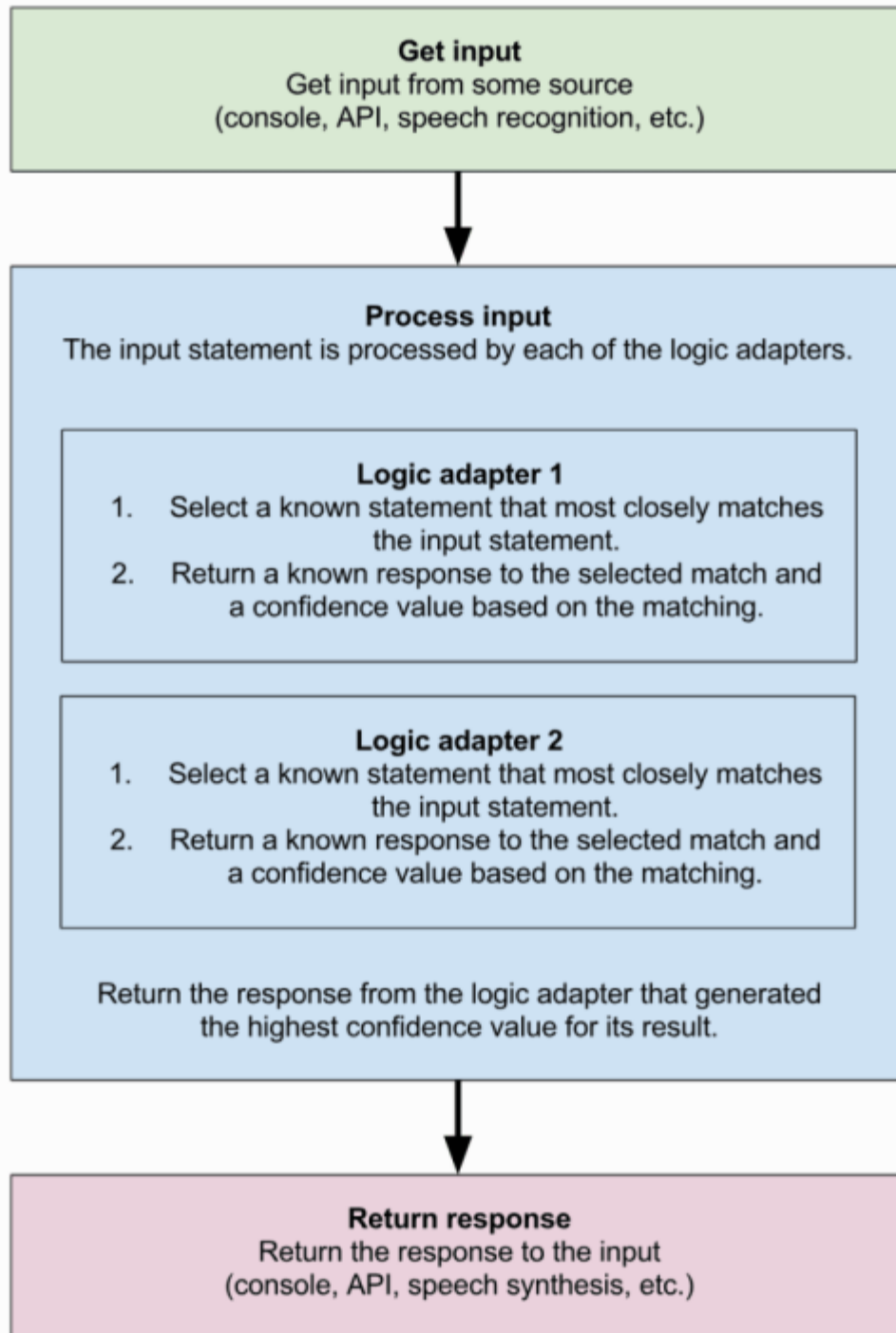


Figure 3.5.3.1 : Chatterbot Process Flow

3.5.4 Process of Training Preparation

First, we need to define intent, then give a dataset with a map in that intent. Then divide data with levels into training and test data sets. After separate training datasets, it starts training by using the chatterbot module. When the first user comes to make a conversation with it, it starts updating training data with the new conversation, by updating the training dataset makes more accurate knowledge about the dataset. After loading the maximum possible dataset, its response to the user is more accurate.

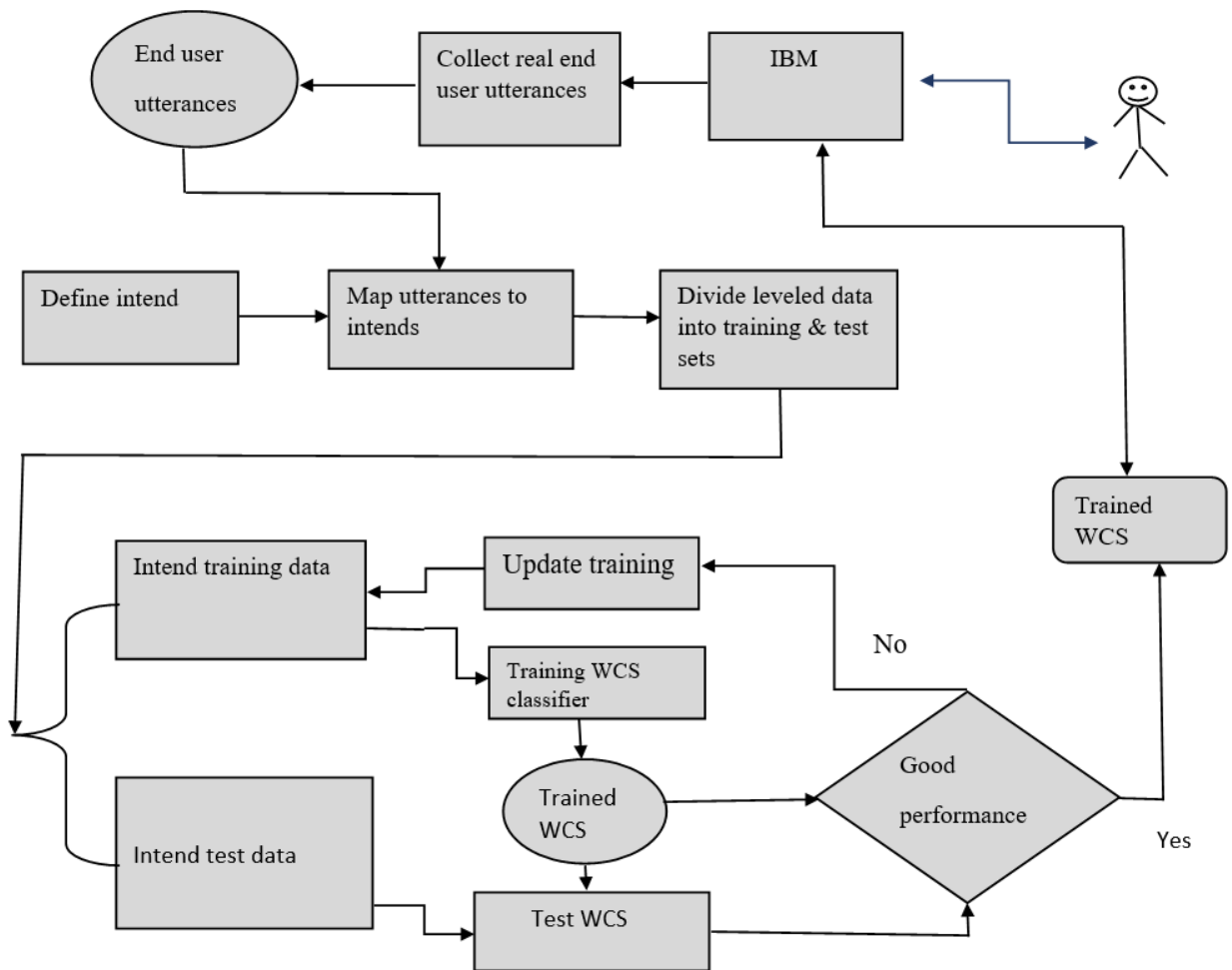


Figure 3.5.4.1 : Training Process Flow

In the initial situation, some of the tasks take place in the action. For that reason, the initial state response will not be so accurate after processing all the data coming from the user and it becomes more mature and gives a more effective response to the users. And all the response data is stored in a directed file for further use and it reduces time to response.

Moral:

In the initial state, chatterbot does not know anything about the project or dataset and does not even have any connection or way to communicate with the user. When a user starts to communicate with it then it will save the given input and give a response to the library model. In those states, it has the possibility of giving wrong responses. When a user communicates or converses more and more it learns more and then it gives a more efficient or accurate response. So by engaging in more conversation it will respond more accurately or the chatterbot gets mature.

3.5.5 Advantages of chatterbot

- The training corpus or result should be saved on many types of media.
- It supports different types of algorithms such as similarity matching, mathematical estimation algorithm, etc.
- A chatbot can be trained in many languages.

3.5.6 Disadvantages of chatterbot

- Larger corpus data requires a long time to be trained.
- It takes too long to respond.

3.6 C++

C++ is a general-purpose programming language created by Bjarne Stroustrup as an extension of the C programming language, or "C with Classes". To build the Waiterbot corpus dataset we have built a module to read and write the dataset in a faster way.

3.7 Google Collab

Google collab has a huge library with a python notebook. It provides powerful CPUs, GPUs support, and large memory space. Users can train their data using a free GPU. It also supports TensorFlow, BigQuery, Google Drive, Matplotlib, Numpy, Pandas, and other basic libraries of Deep Learning. We can add our own personal or necessary library and that is why this is the most interesting part of google collab. There is a disadvantage when a session ends all the data used in the chatterbot and used to train data to vanish.

3.8 Virtual Environment - venv

Python supports a package called venv. venv stands for the virtual environment. venv allows users to create isolated projects in the same directory. The virtual environment does not interfere with other libraries of other environments. Venv is used to make a project portable or lightweight. Each environment has its python library files. Also, it is possible to work with the matching python version. It is very easy to use virtual environments and control them. Only a few lines of command can activate the virtual environment. Once it is activated it is in a different environment & also doesn't depend on Operating System Libraries. Python code runs from that environment.

CHAPTER 4 TECHNICAL SPECIFICATION

4.1 Data Formulation

4.1.1 Data Gathering for Chatbot

Data is the key in terms of building Artificial Intelligence applications. The quality and depth of data will determine the level of AI applications we can achieve. WaiterBot is a goal based on the problem. We had to collect our data manually and train it with the help of Shuffle, which helped us to generate more datasets. We had to generate a dataset in a pattern and write a simple program for generating these datasets.

Firstly we differentiated the question types that could be asked by the customers. We call question types by the name of ‘tag’. Under every tag, we simply put some questions and answers. Our target was to collect more question types and increase the number of sample patterns and responses. We built a JSON file to store all our intents and data. Some examples are given of how these datasets are formed for this application.

Tag	Patterns	Responses
Greeting	Hi there	Hello
	How are you?	How can I help?
	Is anyone there?	Hi there
	Hello	Good to see you again
	Anyone there?	Thanks for asking
GoodBye	Bye	Good bye

	See you later	Have a nice day
	Nice chatting to you	Bye! Come back again
Thanks	Thanks	My pleasure
	That's helpful	Any time!
	Awesome	Happy to help!

Table: Basic Structure Of Data Preparing

We designed our data according to tags. Then we set patterns and responses. As this is already in conversational data, we passed the data to the NLTK to process our data.

CHAPTER 5

ANDROID APPLICATION

5.1 Introduction of Android Application

Android is a mobile operating system(OS) developed on Linux. Which is designed primarily for touchscreens like smartphones, tablets, and e-book readers.

Android is manifested by the Open Handset Alliance, which is operated by Google. Popular Android device developers are Samsung, Motorola, Sony Ericsson, Acer, HTC, and LG. Android is additionally built into a limited number of other devices like portable music players, netbooks, the Binatone iHome Phone, and Odroid Handheld game consoles, etc.

Android Inc. was exposed in October 2003. It is developed by a group of developers and commercially sponsored by Google. Its founders were Nick Sears, Andy Rubin, Chris White, and Rich Miner. Google bought Android in 2005.

5.2 Intention of developing Android Application

Our purpose in developing the android application is to build engagement with customers in the restaurant. It can take orders, tell what's on the menu, and give recommendations. It will take orders from customers, and pass them to the system. Sometimes waiters give us a long wait for our food. But with this android application frustrations are often eliminated, ensuring every customer gets a good experience and is served in a timely manner.

5.3 Tools of developing Android Application

We must fulfill the requirements to develop the waiter bot. Here is the list of the software requirements.

- Windows / Linux / MAC
- Android Studio
- Minimum Android 6.0 (API level 23)

5.4 Requirements from users(permission)

- INTERNET

5.5 Dependency Requirements

- AppCompatActivity
- RelativeLayout
- LinearLayout
- Junit
- RecyclerView
- ScrollView
- Volley

5.6 Diagram

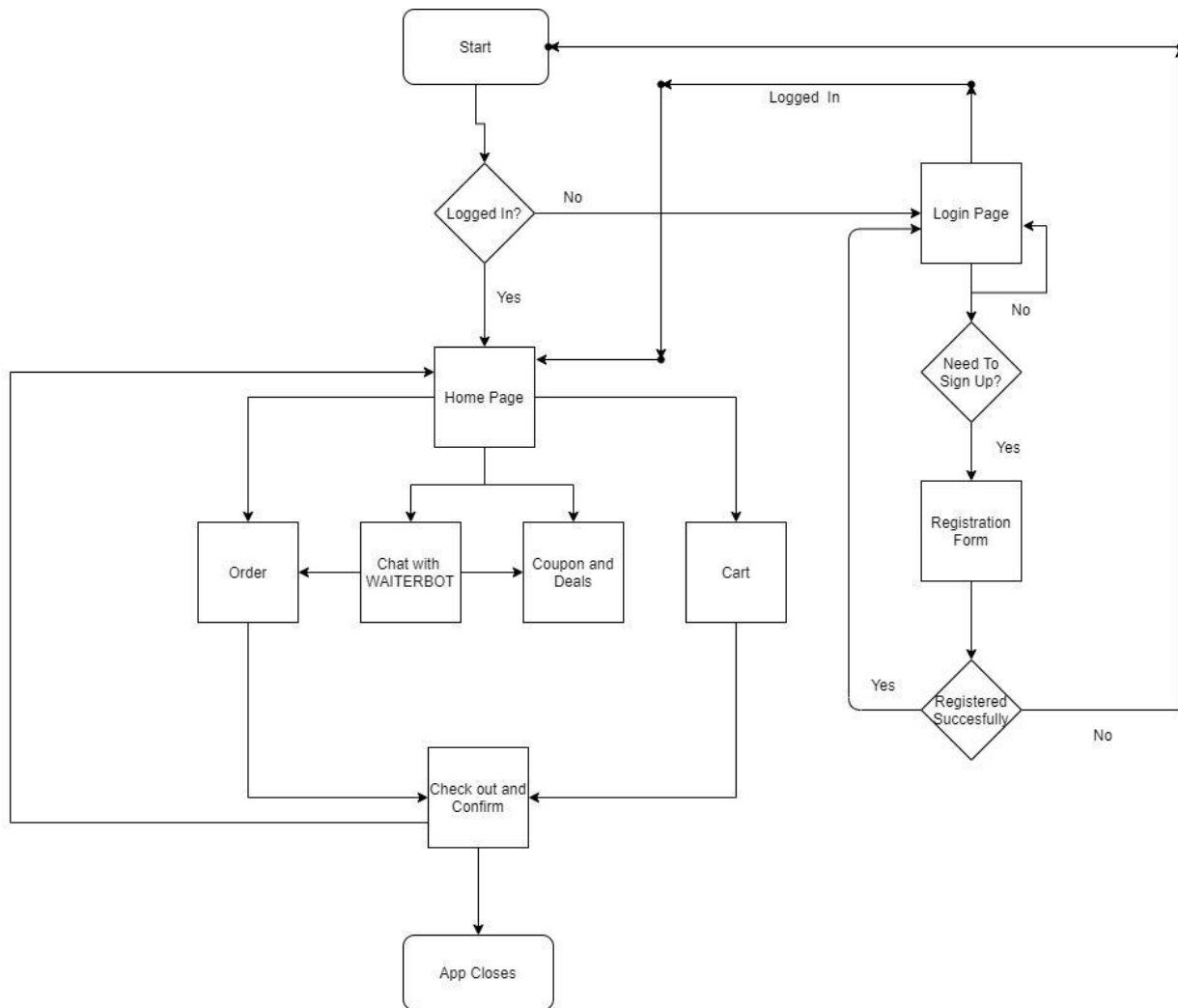


Figure 5.6.1 : Flow Of Android Application Development

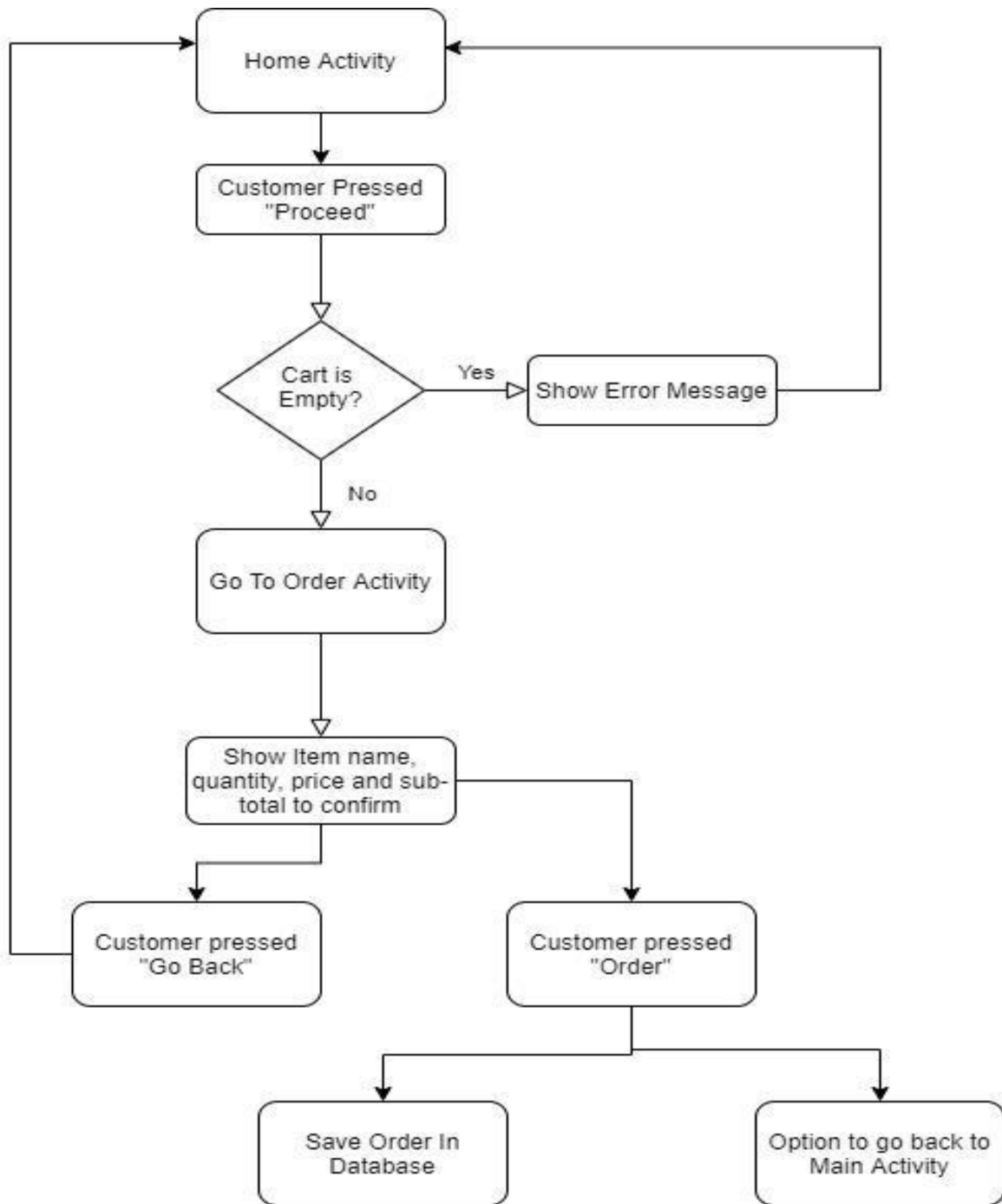


Figure 5.6.2 : Home Activity To Order Success Activity Flow Diagram

5.7 Implementation

To implement the application we have to create some activities. Behind those activities, we create some JAVA classes to maintain XML layouts. We need some dependency software and platforms like Server Communication(Volley, Uniform Resource Identifier, Request, RequestQueue, Response, StringRequest, JSON, JSONObject), Dynamic View(RecyclerView, LayoutInflater), Static Pages(Intent, Timer), Response time.

Timer in Android

The timer is under utility class which is used to record a task to be implemented after a certain amount of time. Tasks may be listed for one-time execution, or repeated execution periodically.

Multiple objects of the Timer class can be created but there is a single background thread monitoring to execute, each task of the timer.

Intent in Android

The intent is used to perform a visualization action on the screen. The intent is mostly used to start an activity, start services, send broadcast receivers, and send messages between two activities. We can invoke a new activity by using the startActivity() method.

ScrollView in Android

Generally, ScrollView is helpful when our content does not fit the android app layout screen. This is useful to add horizontal or vertical scroll bars to the content which is larger than the actual size of layouts such as linear layout, relative layout, frame layout, etc.

RecyclerView in Android

RecyclerView is a group view that contains the view corresponding to the data. It makes it easy to efficiently display larger sets of data.

In Android, RecyclerView is a flexible and advanced version of ListView and GridView.

LayoutInflater in Android

LayoutInflater class takes an XML file as input and builds the view object from it. This class is used to represent the content of layout XML files into their corresponding View objects.

LayoutInflater is used for dynamic layout. We use the Inflater keyword in the XML file. This is used in the onCreate() function of class. [\[8\]](#)

Volley in Android

To communicate with the webserver we have some classes or packages of Java such as Volley, Uri, Request, RequestQueue, Response, StringRequest, JSONObject, etc. Volley is a networking library. It manages network requests. Volley is an HTTP library that makes networking for applications faster & easier. Basically, Volley is a product of Google, the first launch year of the volley was 2013 by google I/O.

It saves developers time as they do not need to rewrite the same code again and again or network requests repeatedly as it manages the processing and caching of network requests.

Volley holds all responses in memory during parsing that is why volley is not suitable for large download or streaming operations.

Response

The response represents the successful results of invoking an API method in Google Play Services by using a subclass of google API. It wraps an instance of a result.

Uniform Resource Identifier(URI)

A Uniform resource identifier or URI is a sequence of characters that is generally used to identify resources. The classification of URI is divided into two parts: either location or a name or both. URIs are used to identify anything described using the RDF or Resource Description Framework.

An instance of this class represents a URI reference as defined by RFC 2396: Generic Syntax, Uniform Resource Identifiers (URI): amended by RFC 2732: Format for Literal IPv6 Addresses in URLs. The Literal IPv6 address format supports scope_ids.

JSON

JSON stands for JavaScript Object Notation. It is lightweight, structured, human-readable, and easy to parse. It's the best alternative to XML when our android app needs to interchange data from the server. XML parsing is very complex as compared to JSON parsing.

Request

We send a request using the Volley.newRequestQueue method which sets up a RequestQueue. Firstly make a RequestQueue by using volley and passing the RequestQueue to the Request object. This RequestQueue makes the worker threads for running the network operations, reading from and writing to the cache, and

Requests do the parsing of raw responses. Volley takes care of dispatching responses(parsed) back to the main thread for delivery.

If we need to make a single-time request and we do not want to leave the thread pool around, volley can make a RequestQueue by us.newRequestQueue() anywhere we need it, and call stop() on the created RequestQueue once response or error has come back.

RequestQueue

We need to create RequestQueue in the application class, for using the same RequestQueue from multiple activities. It used to stack our requests and handle the cache.

The RequestQueue needs multiple things to do its job, such as a network to perform transport of requests and a cache to handle caching.

DiskBasedCache provides a one-file-per-response cache with an in-memory index, and BasicNetwork provides a network transport based on a preferred HTTP client; these are some standard implementations available in the Volley toolbox.

5.8 Importance of Android application

This application will increase interaction between people and services, enhancing customer experience. It can adapt to building engagement with customers. It can save customers valuable time and customers can have fun through the conversation. A chatbot can be a better solution than instructing employees to learn.

We are trying to make this application to deliver exceptional, personalized customer experiences that win new customers and convert more sales.

Chapter 6

Testing and Result

6.1 Testing

6.1.1 Testing of applications

When we go for a test of our application as it is an e-commerce application of e-commerce, we have to handle the user information, so that this application has the option to register and log in. First, we test the registration option with all credentials it responds successfully and the data or credentials are stored in the firebase database successfully. Then we go for login with the given info for registration and we successfully logged into our application. After that, it takes us to the homepage where the option of ordering products appears. Then we try to order by pressing add to cart and proceed for the order and the order information stored to the firebase database successfully. So the testing results of the application are perfectly ok.

6.1.2 Testing of waiter bot:

We basically test our chatbot manually. We ask some questions to the chatbot and it responds to us. The Responses are quite correct but some of the answers are not correct. The question answer dataset is given below.

6.1.2.1 Dataset for testing waiter bot:

Question	Actual Answer	WaiterBot
hello	Hi there, how can I help?	Hi there, how can I help?
Who are you?	Hi! My name is WaiterBot	Hi! My name is WaiterBot
are a bot?	My name is WaiterBot. I'm a neural network developed by TechNinja	My name is WaiterBot. I'm a neural network developed by TechNinja
what do you do?	I can guide you through food menu, food suggestion, any info related to food and restaurant	I can guide you through food menu, food suggestion, any info related to food and restaurant
sorry	Can you ask me again?	Bye! Come back again soon.
give me menu	Chicken Burger 1 Pc Tk. 150/- (BDT) Grilled Chicken 1 Pc Tk. 110/- (BDT) Chicken Nachos Tk. 290/- (BDT) Fusilli Creamy Chicken Pasta Tk. 180/- (BDT)	If you are hungry like me then you should order a Chicken Nachos. It will fill your soul.
what are you serving?	Chicken Burger 1 Pc Tk. 150/- (BDT) Grilled Chicken 1 Pc Tk. 110/- (BDT) Chicken Nachos Tk. 290/- (BDT) Fusilli Creamy Chicken Pasta Tk. 180/- (BDT)	Chicken Burger 1 Pc Tk. 150/- (BDT) Grilled Chicken 1 Pc Tk. 110/- (BDT) Chicken Nachos Tk. 290/- (BDT) Fusilli Creamy Chicken Pasta Tk. 180/- (BDT)

tell me a joke	What did one traffic light say to the other? Stop looking at me, I'm changing!	What did one traffic light say to the other? Stop looking at me, I'm changing!
okay bye	Be Safe	Be Safe
which food should i get	Can't choose between Creamy Chicken Pasta and Grilled Chicken. Those are so delicious	Can't choose between Creamy Chicken Pasta and Grilled Chicken. Those are so delicious
which is your fvrt among all dishes	Chicken Nachos is my favorite	Chicken Nachos is my favorite
who built you	My name is WaiterBot. I'm a neural network developed by TechNinja	I'm a ChatBot aka WaiterBot
which item is gluten free	All of our items contain gluten and sugar. Sorry for this inconvenience.	All of our items contain gluten and sugar. Sorry for this inconvenience.
what		Chicken Burger 1 Pc Tk. 150/- (BDT) Grilled Chicken 1 Pc Tk. 110/- (BDT) Chicken Nachos Tk. 290/- (BDT) Fusilli Creamy Chicken Pasta Tk. 180/- (BDT)

CHAPTER 7

IMPROVEMENT AND CONCLUSION OF WAITER CHATBOT

7.1 Improvement:

We make this android application and the waiter chatbot to make it easy to get food to home for the users/customers. Android applications can take orders manually and make the delivery by this app data. Users can make orders easily by entering the application. The special feature chatbot can interact with the information of food of a restaurant and the information of the food also. The chatbot may be able to produce some basic interaction with the user at the introductory level.

Our next improvement will be the admin panel by which a restaurant owner can post food information with price and ingredient and the post or the data will store to the database and when a user makes a tour to the application the feed of the application shows the posted information to the users or the customers from where they can make an order what they need.

Our next intention is to improve the dataset. Make the dataset much bigger and much reliable to make the chatbot more efficient. At that moment chatbots are running with the old and not the most reliable data. So after improving the dataset with a modern and reliable dataset the chatbot will be more efficient than now.

In the future, we will try to store data from the user interaction. We know different users have different types of interaction methods so if we can store the interaction data for the chatbot it will provide a more and more efficient answer than now.

Still, now our bot cannot handle the Bangla language, so one of the plans is to make the bot understand the Bangla language.

At this point, it will be tough to convert the Bangla language dataset to the corpus data because a chatbot prefers big data so we have to convert a Bangla dataset to the corpus data to train the bot and it will not be an easy task to do.

We will try to integrate voice recognition and image processing into our application as it will help users to grab the wanted product by searching with partially related images and being able to easily search with the voice.

7.2 Limitation:

The main limitation of our project is not being able to integrate the chatbot with our android application. Merging chatbot with the android application is quite a tough job to do. To merge the waiter bot with the android application we have to make an API web server for our bot. After making the API of our bot we have to take the API key and work with the API integration to our android studio.

Our chatbot is trained with limited data that's why it's not able to answer more efficiently what the user wants. If we train this bot with big data it will be able to give a more efficient answer.

7.3 Conclusion:

As we are going in the limited resources, so our chatbot and the android application will need more development in further situations. with the up-gradation of the dataset for our chatbot will be more efficient than the current situation.

We are beginners for those projects, so we have to face a lot of difficulties to reach this stage. By researching and updating with more modern solutions our application and chatbot will be a commercially and economically huge revolution.

Our app will provide an easy way to order food from a restaurant and some entertaining features like a chatbot. People can confirm orders and gather information about food like ingredients etc by just chatting with the chatbot and we hope that this feature will amaze people a lot.

REFERENCES

Journal paper:

- 1) Chatbot basic information at <<<https://en.wikipedia.org/wiki/Chatbot>>> [Last accessed on Jan 22, 2021 at 8:00 pm]
- 2) Chatbot basic and history information at <<<https://www.sciencedirect.com/science/article/pii/S2666827020300062>>> [Last accessed on Jan 26, 2021 at 8:16 pm]
- 3) Building chatbot by python at : <<<https://morioh.com/p/9ed6a9bd5ab7>>> [Last accessed on Mar 18, 2021 at 8:00 pm]
- 4) Android structure and demo at : <<https://docs.google.com/document/d/1KDXs871ZAIpsw8wryGSK_qPIeQI_YVd71rpSRPkYEGs/edit?usp=sharing>> IMPLEMENTATION OF AI CHATBOT BASED ON ROUTES IN DHAKA CITY
By MD. ZAHID HASAN, MD. YEASHIN RAHMAN, MD. ABDUR ROUF NIROB.
- 5) Basic of android application at : <<<https://www.educative.io/edpresso/what-is-an-android-app>>> [Last accessed on May 5, 2021 at 8:30 pm]
- 6) Basic of android application and building an android project at : <<<https://developer.android.com/training/basics/>>> [Last accessed on May 14, 2021 at 9:30 pm] <https://developer.android.com/training/basics/>

Image source:

- 1) Tensor image diagram <<<https://www.datacamp.com/community/tutorials/investigating-tensors-pytorch>>> [Last access on Feb 17, 2021 at 10:10 pm]

2)Chatterbot extension at : <<<https://chatterbot.readthedocs.io/en/stable/>>>[Last accessed on Feb 25, 2021at 09:30 pm]

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