AI HEALTHCARE BOT SYSTEM

Submitted in partial fulfilment of the required for the award of

BACHELOR OF COMPUTER SCIENCE

by

Divya M - 41290018



DEPARTMENT OF COMPUTER SCIENCE

SCHOOL OF SCIENCE AND HUMANITIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work **DIVYA M (41290018)** who carried out the project entitled "**AI HEALTHCARE BOT SYSTEM**" under our supervision from DECEMBER 2023 to APRIL 2024.

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ABSTRACT

Healthcare is very important to lead a good life. However, it is very difficult to obtain a consultation with a doctor for every health problem. The idea is to create a medical chatbot using Artificial Intelligence that can diagnose the disease and provide basic details about the disease before consulting a doctor. This will help to reduce healthcare costs and improve accessibility to medical knowledge through medical chatbots. The chatbots are computer programs that use natural language to interact with users. The chatbot stores the data in the database to identify the sentence keywords to make a query decision and answer the question.

We have seen now that bots like Sensely, Florence, and Ada Health might have a great impact on providing help to people suffering from illness. Many people are still not educated about this technology for treating illness and how chatbots could be a real help. The chatbot is a great platform for anyone and is widely available anytime through an interface and internet access.

The system provides text-text assistance to communicate with the bot in a user-friendly manner. The chatbot also provides medical suggestions that can cure the disease based on user symptoms. Based on the symptoms Chatbot classifies the disease into a severe or negligible health problem. If it is a severe health problem the user will be advised to consult a doctor for a better treatment and if it is a negligible disease, it provides medical assistance. The Chatbot can also give you medical prescriptions for health problems. Along with the medicines, the Chatbot can also provide you with Ayurvedic Remedies and Homeopathy treatments for related health problems.

Mental health support is crucial, but challenging for individuals who speak languages that are not widely supported. Our AI-powered mental health chatbot with language support offers a solution. Our chatbot is a cost-effective and scalable solution, offering mental health support to a broader range of people who speak different languages.

CHAPTER 1

INTRODUCTION

1.1 PROJECT INTRODUCTION

As the chatbot hype increases throughout the COVID-19 era, healthcare chatbots play a key role in caring for patients without compromising the safety of your staff. A chatbot used as a symptom checker, for example, can guide patients through a series of questions to determine if they may be infected with COVID-19. Based on their symptoms and risk, the chatbot can direct them to the appropriate level of care, whether it's a testing site, an emergency room, or simply directions to self-quarantine at home. Chatbot solution for healthcare industry is a program or application designed to interact with users, particularly patients, within the context of healthcare services. They can be powered by AI (artificial intelligence) and NLP (natural language processing). The Global Healthcare Chatbots Market, valued at USD 307.2 million in 2022, is projected to reach USD 1.6 billion by 2032, with a forecasted CAGR of 18.3%. Let's take a look at what's driving this growth

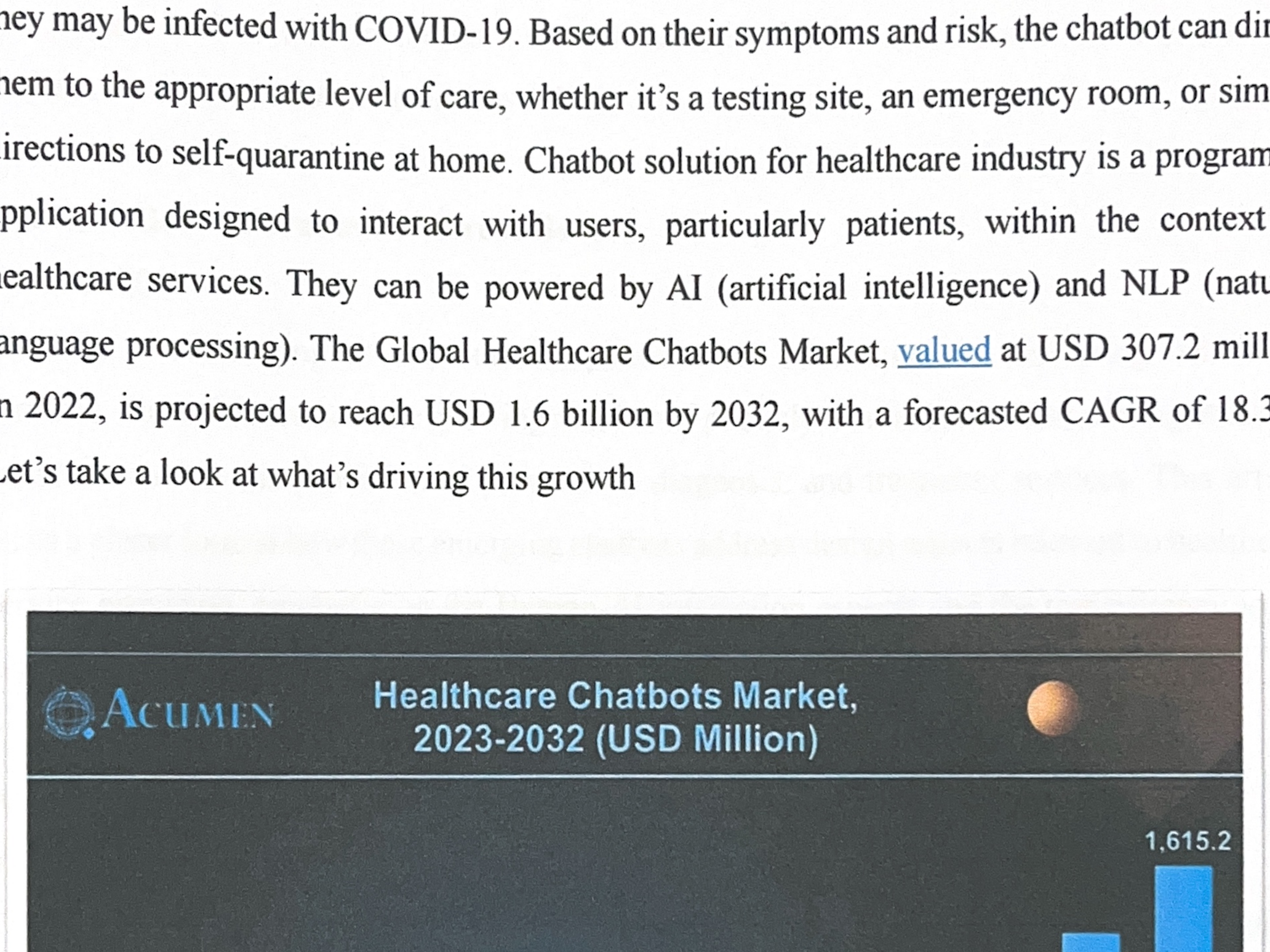


Fig 1.2 Chatbot Market

1.3 LITERATURE SURVEY

Author: Krishnendu Rarhi, Abhishek Mishra and Krishnasis Mandal

Year: 2018

This paper aims to present a design for a medical Chatbot that provides diagnosis and remedies based on the symptoms provided to the system.

The system will be able to measure the seriousness of the diagnosis and if needed, it will connect the user to a doctor available online.

Author: **Mlađan Jovanović, Marcos Baez**

Year: 2020

Chatbots are emerging as a promising platform for accessing and delivering healthcare services. The evidence is in the growing number of publicly available chatbots aiming at taking an active role in the provision of prevention, diagnosis, and treatment services. This article takes a closer look at how these emerging chatbots address design aspects relevant to healthcare service provision, emphasizing the Human-AI interaction aspects and the transparency in AI automation and decision making.

Author: Mrs. Rashmi Dharwadkar, Dr.Mrs. Neeta A. Deshpande

Year: 2018

This system helps users to submit their complaints and queries regarding the health. Customer satisfactions the major concern for developing this system. . The actual welfare of the chatbot is the facilitate the people by giving proper guidance regarding the good and healthy living. For the reason that many of the people do not have fundamental awareness of physical condition. Some people

live for years with debilitating but they do not pay attention to symptoms simply because they think they don't require a doctor.

Author: *Benilda Eleonor V. Comendador, Bien Michael B. Francisco, Jefferson S. Medenilla, Sharleen Mae T. Nacion, and Timothy Bryle E. Serac*

Year: 2015

The Pharmabot is a chatbot designed to provide information and give recommendations on generic medicines for children. It is a standalone computer application using Visual C# as its frontend and MS Access as its backend. The system has four buttons on its main menu: Start, Instruction, Guidelines, and Exit. Users can follow the instructions to access the program or start the consultation immediately by clicking the Start button. The study used Left and Right Parsing Algorithm to achieve the desired result.

Author: *Siddhant Rai, Akshayanand Raut, Akash Savaliya, Dr. Radha Shankarmani*

Year: 2018

In this paper, we propose the development of a healthcare assistant that will enable users to check for symptoms of common diseases, receive suggestions to visit a doctor, get exercise recommendations, track their exercise/workout routine, and access a comprehensive exercise guide. The primary objective of this system is to utilize AI and deep learning to assist individuals with busy schedules in easily monitoring their health and improving their quality of life.

CHAPTER 2

SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

The use of chatbots for medical purposes has become increasingly popular in recent times. However, existing chatbot systems have certain limitations that make it difficult for patients to get instant responses to their queries. Patients often have to wait for a long time to receive an acknowledgement from medical experts. Additionally, the limited number of diseases in the chatbot dataset can be a significant drawback. Technical problems such as voice messages that are not very accurate can also affect the overall effectiveness of existing systems.

To address these issues, an assistant professor from the College of Engineering Thalassery in Thalassery, India, has developed a chatbot system that offers significant improvements over existing systems. The chatbot can interact with users through text messages and respond using both text and voice. It can identify diseases based on user queries, provide suggestions for treating the disease, and recommend specialist doctors.

Another project that focuses on medical question-answering is HHH-An-Online-Question-Answering-System-for-Medical-Questions, developed by 14H034160212. This project uses a Hierarchical Bi-directional Word Attention Model (HBAM) for deep learning-based question answering. The chatbot aims to provide accurate responses to medical questions, ensuring that patients receive reliable and trustworthy information for their medical concerns.

The chatbot aims to provide accurate responses to medical questions

2.2 PROPOSED SYSTEM

In today's world, it's essential for everyone to have access to accurate and reliable healthcare information, regardless of their language or geographic location. To address this issue, we are proposing the development of a Multilingual Medical Chatbot system. This system will leverage advanced natural language processing (NLP) techniques and language translation capabilities to provide accessible healthcare guidance and support to users worldwide, breaking down linguistic barriers and ensuring that every individual can receive the medical information they need.

As we work on this project, we expect several outcomes that could have a significant impact on the medical field. Firstly, the intelligent medical chatbot will offer a more engaging and user-friendly experience for individuals searching for medical information. It will be capable of understanding user queries effectively and responding to them accordingly, addressing a wide range of medical inquiries and providing accurate information in the user's preferred language.

Additionally, this chatbot system will have the potential to improve healthcare outcomes by enabling medical professionals to interact with patients more efficiently. It will reduce the language barrier between patients and healthcare providers, enabling them to communicate effectively and ensure that patients understand their diagnosis and treatment options. This could potentially lead to better patient outcomes, improved patient satisfaction, and reduced healthcare costs. Overall, the Multilingual Medical Chatbot system has the potential to revolutionize the healthcare industry, making healthcare information accessible to everyone, regardless of their language or geographic location.

CHAPTER 3

ARCHITECTURE

3.1 CHATBOT GENERAL ARCHITECTURE

There are numerous techniques that can be used to develop chatbots, but the basic structure of a chatbot is relatively simple. Chatbots are computer applications that use machine learning (ML) techniques to simulate human conversation. The general framework for all types of chatbots consists of four main stages: input processing, input understanding, response generation, and response selection.

The first stage in the chatbot development process is input processing. This involves a user making a request in text or speech format, which is then received and interpreted by the chatbot. The chatbot will then analyze the request and determine whether it is a valid request or not. If it is valid, the chatbot will move on to the next stage.

The second stage is input understanding. In this stage, the chatbot will process the information it has received from the user and try to understand the user's intent. Depending on the complexity of the request, the chatbot may need to ask the user for more information to clarify the request.

After the chatbot has understood the user's request, it moves on to the response generation stage. This is where the chatbot generates a response based on the user's request. The chatbot will use machine learning algorithms to analyze the user's request and generate an appropriate response.

Finally, in the response selection stage, the chatbot selects the most appropriate response from the ones generated in the previous stage. The chatbot will consider the user's intent, context, and other factors to select the best response.

A general chatbot architecture is illustrated below, which provides a simplified overview of the chatbot development proces

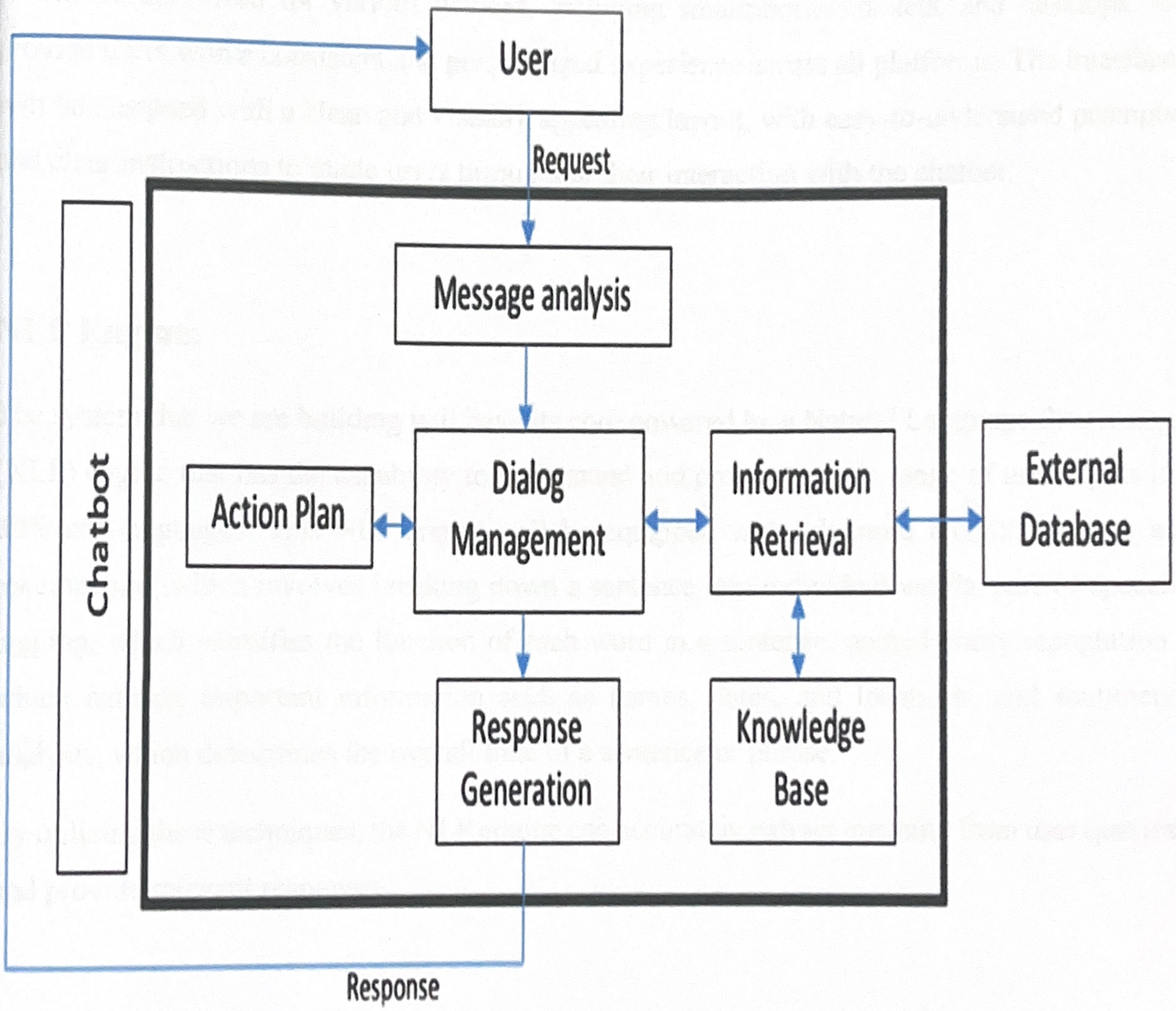


Fig 3.2 Schematic Representation of General Chatbot Architecture

3.3 SYSTEM ARCHITECTURE

User Interface:

The chatbot will be designed with a highly intuitive and user-friendly interface that users can easily access through web browsers, mobile applications, or various messaging platforms. The interface will be designed to ensure seamless navigation for users, making it easy to interact with the chatbot and access the information they need.

It will be optimized for various devices, including smartphones, tablets, and desktops, to provide users with a consistent and personalized experience across all platforms. The interface will be designed with a clean and visually appealing layout, with easy-to-understand prompts and clear instructions to guide users throughout their interaction with the chatbot.

NLP Engine:

The system that we are building will have its core powered by a Natural Language Processing (NLP) engine that has the capability to understand and process a wide range of user inputs in different languages. This NLP engine will be equipped with advanced techniques such as tokenization, which involves breaking down a sentence into individual words, part-of-speech tagging, which identifies the function of each word in a sentence, named entity recognition, which extracts important information such as names, dates, and locations, and sentiment analysis, which determines the overall tone of a sentence or phrase.

By utilizing these techniques, the NLP engine can accurately extract meaning from user queries and provide relevant responses.

Knowledge Base:

Our chatbot will be equipped with a robust and extensive knowledge base that will contain a diverse range of medical information. This knowledge base will include treatment guidelines, symptom databases, medication details, and other relevant healthcare data that will help our users make informed decisions about their health.

The chatbot will use this knowledge base to provide quick and accurate responses to user inquiries, ensuring that they receive the best possible guidance and advice. We constantly update and maintain our knowledge base to ensure that our users have access to the latest and most reliable healthcare information.

Language Support Module:

A language support module is an essential component of a chatbot that aims to communicate with users in multiple languages. This module incorporates advanced language detection capabilities that help identify the language of the user's input accurately. The language detection functionality can differentiate between various languages, including English, Spanish, French, German, and so on, to ensure that the chatbot can respond appropriately. In addition to language detection, the module also includes language translation functionality that generates responses in the user's preferred language. This feature works by translating the chatbot's responses from its default language to the user's preferred language, making it easier for users to communicate with the chatbot seamlessly. With this module, chatbots can cater to a broader audience base that speaks different languages, making them more accessible and user-friendly.

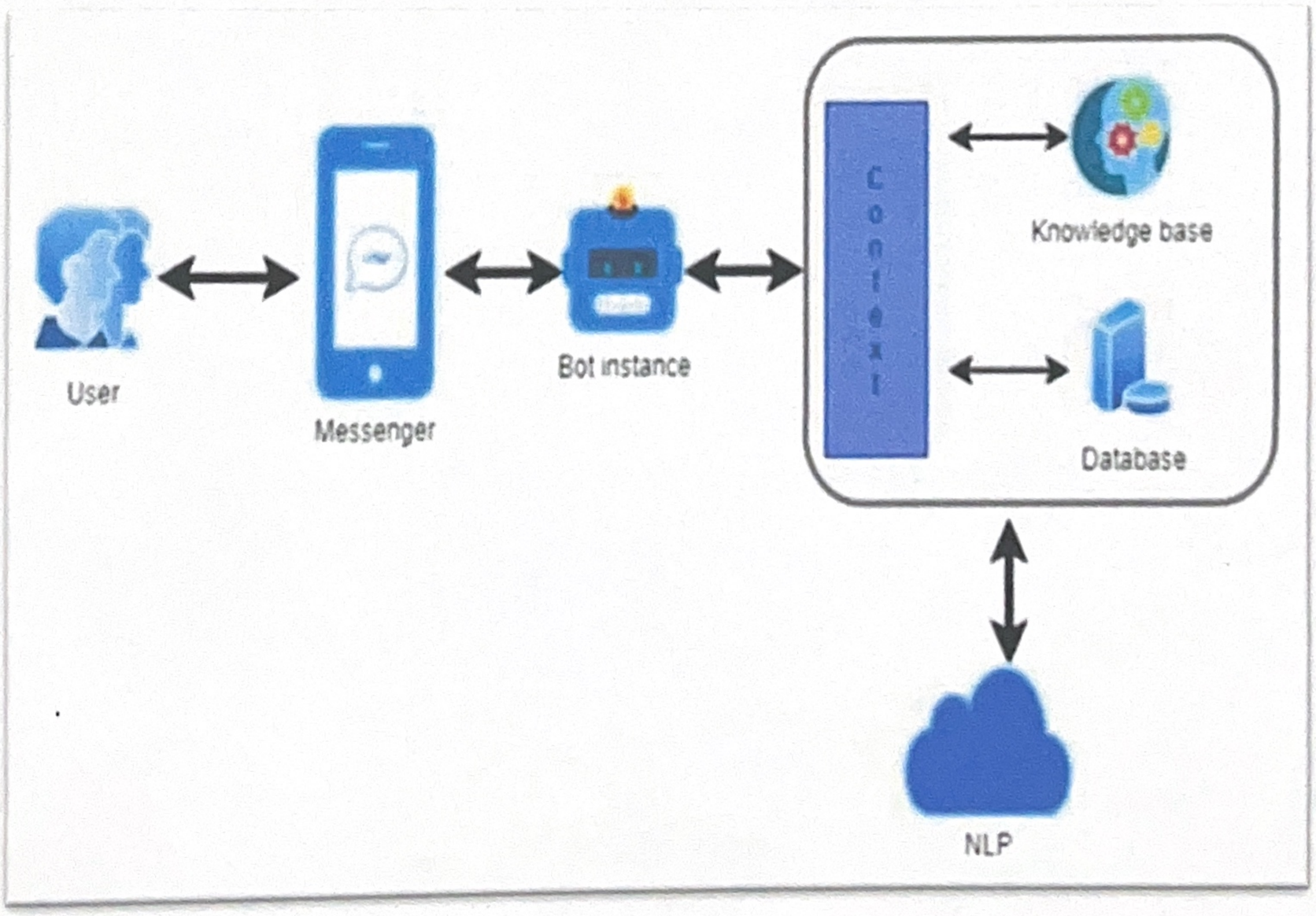


Fig 3.4 Chat Bot

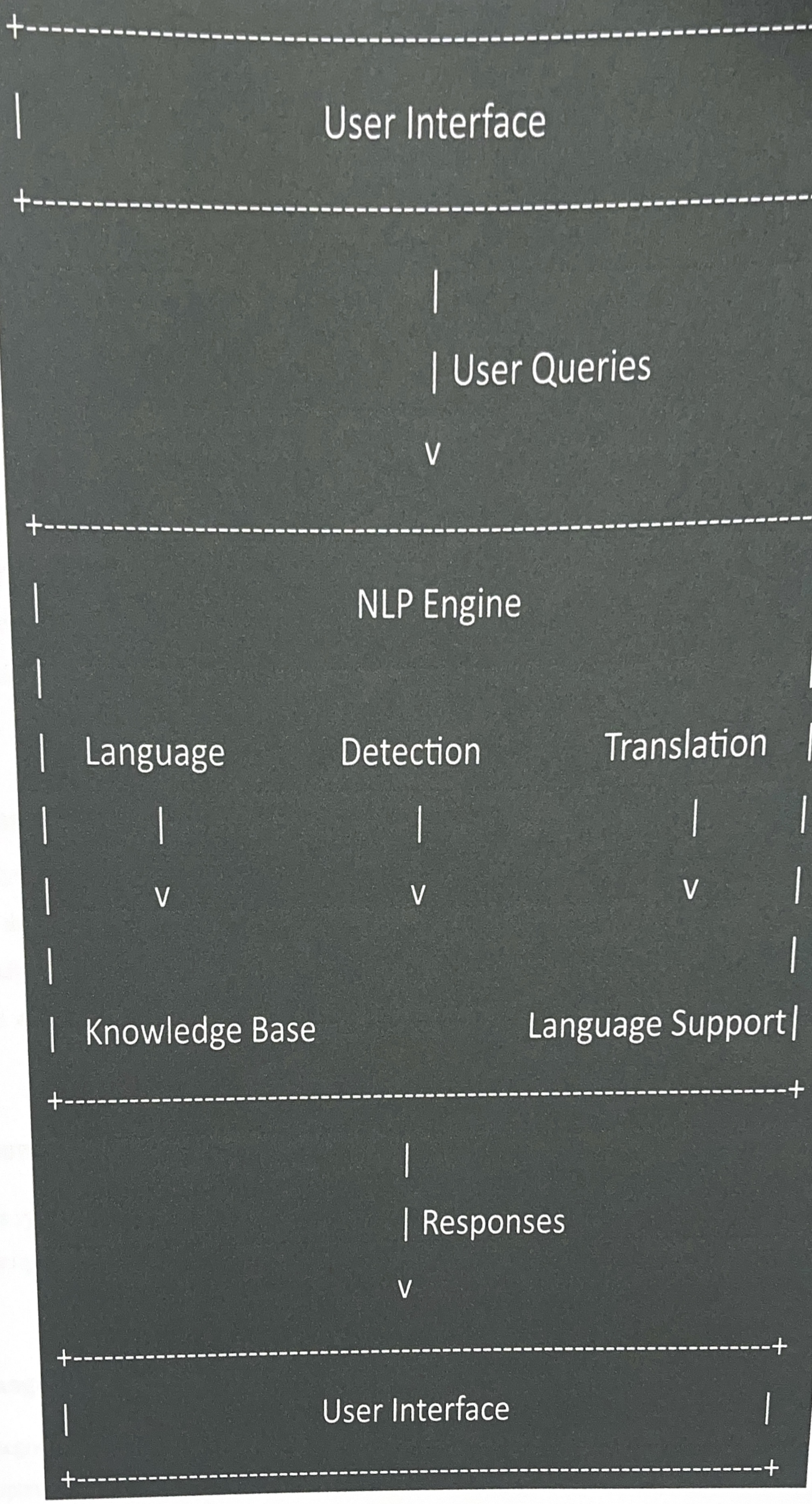


Fig 3.5 SQL Code for System Architecture

3.6 CODE EXPLANATION

User Interface:

This component serves as the user interface for interacting with the chatbot via web browsers, mobile apps, or messaging platforms.

NLP Engine:

Language Detection: It is a feature that allows the system to determine the language of the user's input, ensuring that the system can provide accurate and relevant responses. This feature is particularly useful in multilingual environments where users may input text in different languages.

Translation: It is another important feature that allows the system to translate user queries and system responses into the desired language. This feature ensures that users can interact with the system in their preferred language, making the system more accessible and user-friendly. Additionally, this feature helps to break down language barriers, making it easier for users who speak different languages to communicate effectively.

Knowledge Base:

This system stores a comprehensive database of medical information, including symptom descriptions, treatment guidelines, medication details, and other relevant data.

Language Support Module:

Integrates with language translation APIs to provide multilingual capabilities and deliver responses in users' preferred language.

User Interface (Response):

After receiving the user's query, the Natural Language Processing (NLP) engine processes it and generates a response in the language preferred by the user. The engine is also responsible for detecting the language, translating it, and retrieving relevant information from the knowledge base.

This architecture ensures that users can communicate with the chatbot in their desired language, resulting in seamless multilingual interactions. The response is then presented back to the user through the user interface.

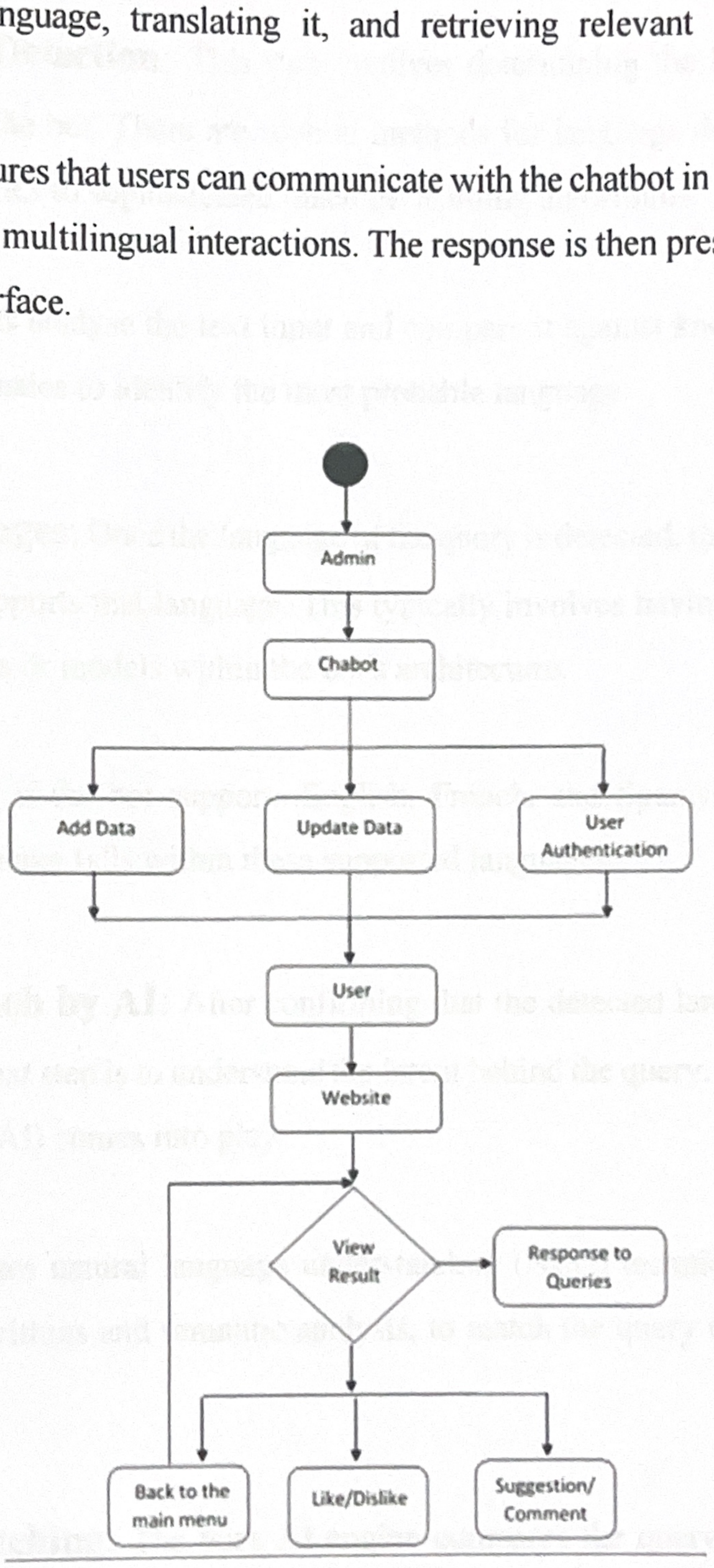


Fig 3.7 Flow Chart

CHAPTER 4

MULTILINGUAL CHATBOT FUNCTIONALITY

WORKING OF A MULTILINGUAL CHATBOT:

1. **Language Detection**: This step involves determining the language of the query submitted to the bot. There are several methods for language detection, ranging from simple heuristics to sophisticated machine-learning algorithms.

   These methods analyse the text input and compare it against known language patterns and characteristics to identify the most probable language.

2. **Bot Languages**: Once the language of the query is detected, the bot checks internally to see if it supports that language. This typically involves having predefined language configurations or models within the bot's architecture.

   For example, if the bot supports English, French, and Spanish, it will check if the detected language falls within these supported languages.

3. **Intent Match by AI**: After confirming that the detected language is supported by the bot, the next step is to understand the intent behind the query. This is where artificial intelligence (AI) comes into play.

   The bot utilizes natural language understanding (NLU) techniques, such as machine learning algorithms and semantic analysis, to match the query with predefined intents or actions.

- **Intent Matching**: The bot's AI engine compares the query against a database of predefined intents or patterns to determine the user's intention.

For example, if the user asks for the weather forecast, the bot identifies this as an intent related to weather information.

- **Response Generation**: Once the intent is identified, the bot generates an appropriate response based on the matched intent. This response could be in the form of text, audio, or other media, depending on the bot's capabilities.

- **Language-specific Response**: If the intent is matched and the detected language is supported by the bot, the response is crafted in that language. For example, if the user queried in Spanish and the bot supports Spanish, the response will be generated and delivered in Spanish.

Overall, this process ensures that the bot accurately detects the language of the query, verifies if it supports that language, matches the user's intent using AI techniques, and responds accordingly in the detected language if a match is found.

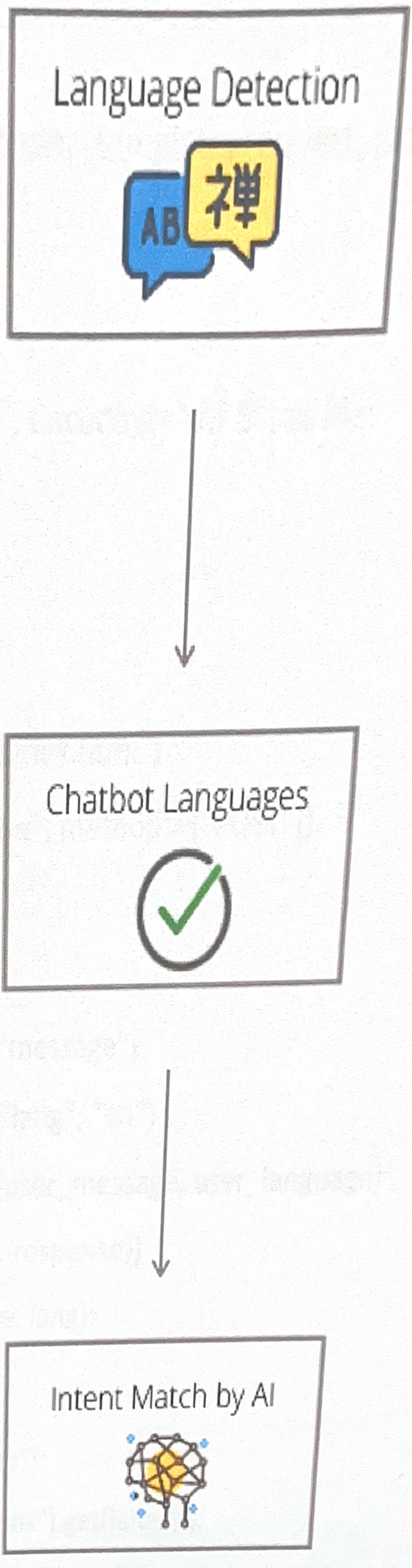


Fig 4.2 Multilingual Chatbot Diagram

CHAPTER 5

APPENDIX

5.1 SOUECE CODE

```
from flask import Flask, render_template, request, jsonify
import json
app = Flask(__name__)
with open("translate.json", encoding="utf-8") as file:
intents = json.load(file)
@app.route("/")
def home():
return render_template("index.html")
@app.route("/get_response", methods=["POST"])
def get_response():
data = request.get_json()
user_message = data.get("message")
user_language = data.get("lang", "en")
response = find_response(user_message, user_language)
return jsonify({"response": response})
def find_response(message, lang):


for intent in intents["intents"]:
if message in intent["patterns"].get(lang, []):
return intent["responses"].get(lang, ["Sorry, I don't understand that."])[0]
default_responses = {
```