VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

"Chatbot for Healthcare System Using AI"

Submitted in partial fulfilment for the award of degree(18CSI85)

BACHELOR OF ENGINEERING IN
COMPUTER SCIENCE

Submitted by:

TABISH ANWAR

1GC20CS064

Conducted at
COMSOFT TECHNOLOGIES

GHOUSIA COLLEGE OF ENGINEERING

Department of Computer Science

Accredited by NBA, New Delhi

Ramanagara-562159

GHOUSIA COLLEGE OF ENGINEERING
Department of Computer Science & Engineering
Accredited by NBA, New Delhi
Ramanagara-562159

CERTIFICATE

This is to certify that the Internship titled **"Chatbot for Health-care system using AI"** carried out by **Mr. TABISH ANWAR,** a bonafide student of Ghousia Collage of Engineering, in partial fulfillment for the award of **Bachelor of Engineering**, in **COMPUTER SCIENCE** under Visvesvaraya Technological University,Belagavi, during the year 2023-2024. It is certified that all corrections/suggestions indicated have been incorporated in the report.

The project report has been approved as it satisfies the academic requirements in respect of Internship prescribed for the course Internship / Professional Practice (18CSI85)

Signature of Guide **Signature of HOD** **Signature of Principal**

External Viva:

Name of the Examiner Signature with Date

1)_____
_____

2)_____
_____

D E C L A R A T I O N

I, **TABISH ANWAR**, final year student of Computer Science & Engineering, Ghousia College of Engineering - 562159, declare that the Internship has been successfully completed, in **COMSOFT TECHNOLOGIES**. This report is submitted in partial fulfillment of the requirements for award of Bachelor Degree in Computer Science & Engineering, during the academic year 2023-2024.

Date :20/09/2023 :

Place: Ramanagara

USN : 1GC20CS064

NAME : TABISH ANWAR

OFFER LETTER

Internship Offer Letter

Date: 11th August, 2023

Name: **Tabish Anwar**
USN: **1GC20CS064**
Placement ID: **TIE0408ML091**

Dear Student,

We would like to congratulate you on being selected for the **Machine Learning with Python (Research Based)** Internship position with **Compsoft Technologies**, effective Start Date **11th August, 2023**, All of us are excited about this opportunity provided to you!

This internship is viewed as being an educational opportunity for you, rather than a part-time job. As such, your internship will include training/orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts of **Machine Learning with Python (Research Based)** through hands-on application of the knowledge you learn while you train with the senior developers. You will be bound to follow the rules and regulations of the company during your internship duration.

Again, congratulations and we look forward to working with you!.

Sincerely,

Nithin K. S
Project Manager
Compsoft Technologies
No. 363, 19th main road,
1st Block Rajajinagar
Bangalore - 560010

A C K N O W L E D G E M E N T

This Internship is a result of accumulated guidance, direction and support of several important persons. I take this opportunity to express my gratitude to all who have helped us to complete the Internship.

I express my sincere thanks to my Principal, for providing us adequate facilities to undertake this Internship.

I would like to thank my Head of Dept – CSE, for providing us an opportunity to carry out Internship and for her valuable guidance and support.

I would like to thank my (Shakil Ahmad) Software Services for guiding us during the period of internship.

I express my deep and profound gratitude to my guide, Zabiha Khan, Associate Prof, for her keen interest and encouragement at every step in completing the Internship.

I would like to thank all the faculty members of my department for the support extended during the course of Internship.

I would like to thank the non-teaching members of my dept, for helping us during the Internship.

Last but not the least, I would like to thank my parents and friends without whose constant help, the completion of Internship would have not been possible.

NAME: TABISH ANWAR
USN:1GC20CS064

ABSTRACT

The integration of artificial intelligence (AI) into healthcare systems has revolutionized patient care and administration processes. This abstract presents an innovative approach to healthcare management through the development and implementation of an AI-powered chatbot. This chatbot, designed for the healthcare sector, aims to enhance the patient experience, streamline administrative tasks, and improve overall healthcare system efficiency.

The AI-driven healthcare chatbot employs natural language processing (NLP) and machine learning algorithms to engage with patients, healthcare providers, and administrative staff effectively. It provides a user-friendly interface for patients to schedule appointments, access medical information, receive personalized health advice, and obtain medication reminders. Additionally, it assists healthcare professionals in managing their daily tasks, such as appointment scheduling, patient record retrieval, and basic diagnosis support, allowing them to focus more on patient care.

The chatbot's intelligent capabilities extend beyond administrative tasks. It can analyze patient symptoms, historical health data, and medical literature to offer preliminary diagnoses, recommend appropriate healthcare providers, and suggest treatment options. The system prioritizes data security and patient confidentiality, complying with the highest healthcare industry standards and regulations.

In conclusion, the AI-enhanced chatbot for healthcare system presented in this abstract serve as a transformative tool in modernizing healthcare delivery and management. By harnessing the power of AI, this system promises improved patient outcomes, reduced administrative burdens, and increased overall healthcare system efficiency, ultimately contributing to a more accessible and patient-centric healthcare ecosystem.

Table of Contents

CHAPTER 1

COMPANY PROFILE

1. COMPANY PROFILE

A Brief History of Company

Company, was incorporated with a goal “To provide high quality and optimal Technological Solutions to business requirements of our clients”. Every business is a different and has a unique business model and so are the technological requirements. They understand this and hence the solutions provided to these requirements are different as well. They focus on clients requirements and provide them with tailor made technological solutions.They also understand that Reach of their Product to its targeted market or the automation of the existing process into e-client and simple process are the key features that our clients desire from Technological Solution they are looking for and these are the features that we focus on while designing the solutions for their clients.

Company is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever-increasing automation requirements, Sarvamoola Software Services. specialize in ERP, Connectivity, SEO Services, Conference Management, effective webpromotion and tailor-made software products, designing solutions best suiting clients requirements.

we strive to be the front runner in creativity and innovation in software development through their well-researched expertise and establish it as an out of the box software development company in Bangalore, India. As a software development company, they translate this software development expertise into value for their customers through their professional solutions.

They understand that the best desired output can be achieved only by understanding the clients demand better. At our Company we work with them clients and help them todefine their exact solution requirement. Sometimes even they wonder that they have completely redefined their solution or new application requirement during the brainstorming session, and here they position themselves as an IT solutions consulting group comprising of high caliber consultants.

They believe that Technology when used properly can help any business to scale and achieve new heights of success. It helps Improve its efficiency, profitability, reliability; to put itin one sentence” “Technology helps you to Delight your customers” and that is what we wantto achieve.

CHAPTER 2

ABOUT THE COMPANY

2. ABOUT THE COMPANY

We are a Technology Organization providing solutions for all web design and development, Researching and Publishing Papers to ensure the quality of most used ML Models, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever-increasing automation requirements, Compsoft Technologies specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements. The organization where they have a right mix of professionals as a stakeholder to help us serve our clients with best of our capability and with at par industry standards.They have young, enthusiastic, passionate and creative Professionals to develop technological innovations in the field of Mobile technologies, Web applications as well as Business and Enterprise solution. Motto of our organization is to "Collaborate with our clients to provide them with best Technological solution hence creating Good Present and Better Future for our client which will bring a cascading a positive effect in their business shape as well". Providing a Complete suite of technical solutions is not just our tag line, it is Our Vision for Our Clients and for Us, We strive hard to achieve it.

Services provided by Compsoft Technologies.

- Core Java and Advanced Java
- Research and Development/Improvise of ML Models
- Web services and development
- Dot Net Framework
- Python
- Selenium Testing
- Conference / Event Management Service
- Academic Project Guidance
- On The Job Training
- Software Training

CHAPTER 3

INTRODUCTION

3. INTRODUCTION

Introduction to ML

Machine Learning (ML) is a subfield of artificial intelligence (AI) that has gained immense popularity and significance in recent years. It is a branch of computer science that focuses on the development of algorithms and models that enable computers to learn from and make predictions or decisions based on data, without explicit programming. ML has revolutionized various industries, from healthcare and finance to entertainment and transportation, by automating complex tasks and extracting valuable insights from vast amounts of data.

The fundamental concept behind machine learning is the ability of a computer system to improve its performance on a specific task through experience, much like how humans learn from their experiences. Instead of relying on explicit instructions, ML systems use data-driven approaches to identify patterns, relationships, and trends within data, allowing them to make predictions or decisions that become more accurate over time

Problem Statement

In today's complex and data-rich world, organizations face the challenge of extracting meaningful insights from vast datasets and automating decision-making processes. Traditional rule-based systems are often inadequate to handle the intricacies of real-world data, which is where machine learning comes into play. The problem is to develop and deploy effective machine learning solutions that can accurately analyse data, make predictions, or automate tasks across various domains. This entails addressing issues related to data quality and quantity, selecting appropriate algorithms, and ensuring the ethical and fair deployment of models. The goal is to harness the potential of machine learning to improve efficiency, enhance decision-making, and drive innovation while mitigating potential biases and ethical concerns in the development and system.

CHAPTER 4

SYSTEM ANALYSIS

4. SYSTEM ANALYSIS

1. Existing System

a. Manual Administrative Tasks:
In the current system, administrative tasks such as appointment scheduling, patient registration, and record-keeping are predominantly manual processes, consuming valuable staff time and leading to potential errors.

b. Limited Accessibility:
Patients often face difficulties in accessing healthcare information or services outside of standard working hours. This results in inconvenience and delays in care delivery.

c. Overwhelmed Staff:
The healthcare staff, including doctors, nurses, and administrative personnel, are frequently overwhelmed with routine queries and appointment scheduling tasks, reducing their efficiency in patient care.

d. Data Fragmentation:
Patient data is stored across multiple systems, including physical records, digital databases, and Electronic Health Records (EHRs). This fragmentation hinders the seamless exchange of information between healthcare providers.

e. Patient Engagement:
The current system lacks effective mechanisms for engaging patients in proactive healthcare management. Patients often receive limited information about their health conditions and treatment plans.

f. Privacy and Security:
Patient data privacy and security are paramount in healthcare, and the existing system struggles to meet the stringent regulatory requirements, such as HIPAA, to safeguard patient information adequately.

2. Proposed System

- **Efficiency Enhancement:** Streamline administrative processes such as appointment scheduling, patient registration, and record-keeping to reduce the burden on healthcare staff and improve operational efficiency.
- **24/7 Accessibility:** Provide patients with 24/7 access to healthcare information, appointment booking, and general inquiries, ensuring that healthcare services are available when needed.

- **Improved Patient Engagement:** Foster proactive patient engagement by delivering personalized health information, reminders, and educational content, empowering patients to take charge of their health.

- **Data Integration and Analysis:** Seamlessly integrate with existing data sources, including Electronic Health Records (EHRs), to provide healthcare providers with real-time patient information and insights for better decision-making.

- **Privacy and Security Compliance:** Ensure strict adherence to healthcare data privacy regulations, including HIPAA, to guarantee the secure handling of patient information.

- **Resource Optimization:** Optimize resource allocation by automating routine tasks, allowing healthcare staff to focus more on patient care and less on administrative responsibilities.

- **Key Features and Functionalities:** The AI-powered chatbot will offer the following key features and functionalities:

    1. **Appointment Scheduling:** Patients can easily schedule, reschedule, or cancel appointments with healthcare providers through natural language conversations with the chatbot.

    2. Health Information Access: Provide patients with access to their medical records, test results, and treatment plans, ensuring they have comprehensive information about their health.

    3. Symptom Checker: Assist patients in evaluating their symptoms and provide initial guidance on whether they should seek medical attention.

    4. Medication Reminders: Send medication reminders and dosing instructions to patients to improve adherence to treatment plans.

    5. FAQs and Educational Content: Answer frequently asked questions and deliver educational content on health conditions, wellness tips, and preventive care.

3. Objective of the System

1. Introduction

- Briefly introduce the purpose of defining system objectives in healthcare.

2. High-Level Objectives

- Clearly state overarching goals:
    - Enhance patient care.
    - Improve user experience.
    - Increase operational efficiency.

3. Specific Functional Objectives

- Define chatbot capabilities:
    - Provide medical information.
    - Assist with appointments.
    - Automate routine tasks.

4. Data-Driven Objectives

- Leverage data for:
    - Personalized care.
    - Insights for diagnosis.
    - Compliance with data privacy.

5. Integration Objectives

- Ensure seamless integration:
    - EHR systems.
    - Laboratory/diagnostic systems.

6. Compliance and Security Objectives

- Maintain regulatory compliance:
    - HIPAA.
    - Protect patient data.

7. Scalability and Performance Objectives

- Design for:
    - Scalability.
    - High system uptime.
    - Minimal downtime.

8. Budget and Resource Objectives

- Manage:
    - Development and operational costs.
    - Resource allocation.

9. Risk Mitigation Objectives

- Identify and mitigate:
    - Potential risks.

CHAPTER 5

REQUIREMENT ANALYSIS

5. REQUIREMENT ANALYSIS

Hardware Requirement Specification

Processor (CPU): Quad-core Intel Core i5 or equivalent recommended.

RAM (Memory): 16 GB or more recommended.

Graphics Processing Unit (GPU): Nvidia GeForce GTX 1050 or better recommended.

Storage: 512 GB SSD or more recommended.

Operating System: Windows 10 or 11 (64-bit).

Internet Connectivity: High-speed connection.

Software Requirement Specification

1. Python 3.x.
2. IDE (e.g., Visual Studio Code).
3. ML Libraries (e.g., TensorFlow, PyTorch).
4. Chatbot Framework (e.g., Rasa).
5. Database System (e.g., MySQL).
6. Version Control (e.g., Git).
7. Web Framework (optional).
8. Cloud Services (optional).
9. Data Security & Compliance Tools (if handling sensitive data).
10. Documentation & Collaboration Tools.
11. CI/CD Tools (optional).
12. Chatbot Testing Tools.

CHAPTER 6

DESIGN ANALYSIS

6. DESIGN & ANALYSIS

Designing and analyzing a chatbot healthcare system using AI involves a multifaceted approach. Firstly, the objectives of the system must be clearly defined, whether it's enhancing patient engagement, facilitating appointment scheduling, or offering medical advice. Data collection and preparation are pivotal, encompassing the acquisition and organization of healthcare data while ensuring stringent adherence to privacy regulations. Selecting appropriate AI technologies, such as NLP and machine learning algorithms, underpins the chatbot's ability to understand and respond to user queries effectively. The system's architecture should be meticulously planned, focusing on scalability, high availability, and seamless integration with healthcare databases and IT infrastructure. Crafting a robust NLP-based dialog flow is essential for context-rich interactions. A user-friendly interface is crucial for seamless user experience, with accessibility and usability as guiding principles. Integration with healthcare systems like electronic health records and appointment booking ensures data continuity. Rigorous training and testing, complemented by ethical considerations and regulatory compliance, guarantee the system's reliability and trustworthiness. Post-deployment, continuous monitoring, user support, and a commitment to improvement are integral for sustained success. Lastly, ethical AI practices, unbiased medical information, and crisis management protocols contribute to the chatbot's ethical and effective healthcare provision.

In designing a Medical Chatbot ML Project, the process begins with the careful collection and preprocessing of medical data, ensuring both its quality and compliance with data privacy regulations like HIPAA. Using Python and machine learning libraries such as TensorFlow or Anaconda, a natural language processing (NLP) model is developed and trained on this data to understand and contextualize medical queries. The integration of a chatbot framework like Rasa or Dialog flow facilitates user interactions, connecting the NLP model to the chatbot for processing and generating responses. A secure database system, such as MySQL, is essential for storing and retrieving medical information. Optionally, a user-friendly interface can be developed for non-technical users. Security measures, including encryption and access control, are crucial to protect sensitive medical data, and ongoing regulatory compliance efforts must be maintained. The analysis phase involves assessing data quality, model performance, user interactions, scalability, security, and regulatory adherence. Continuous feedback gathering and iterative enhancements ensure that the chatbot provides accurate medical assistance while evolving with user needs and medical knowledge advancements.

CHAPTER 7

IMPLEMENTATION

7. IMPLEMENTATION

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification. It involves careful planning, investigation of the current system and it constraints on implementation, design of methods to achieve the changeover and an evaluation of change over methods a part from planning.

Two major tasks of preparing the implementation are education and training of the users and testing of the system. The more complex the system being implemented, the more involved will be the system analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition is carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

TESTING

The testing phase is an important part of software development. It is the Information zed system will help in automate process of finding errors and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied. Software testing is carried out in three steps:

1. The first includes unit testing, where in each module is tested to provide its correctness, validity and also determine any missing operations and to verify whether theobjectives have been met. Errors are noted down and corrected immediately.
2. Unit testing is the important and major part of the project. So errors are rectified easily in particular module and program clarity is increased. In this project entire system is divided into several modules and is developed individually. So unit testing is conducted to individual modules.
3. The second step includes Integration testing. It need not be the case, the software whose modules when run individually and showing perfect results, will also show perfect results when run as a whole.

CHAPTER 8

SNAPSHOTS

8. SNAPSHOTS

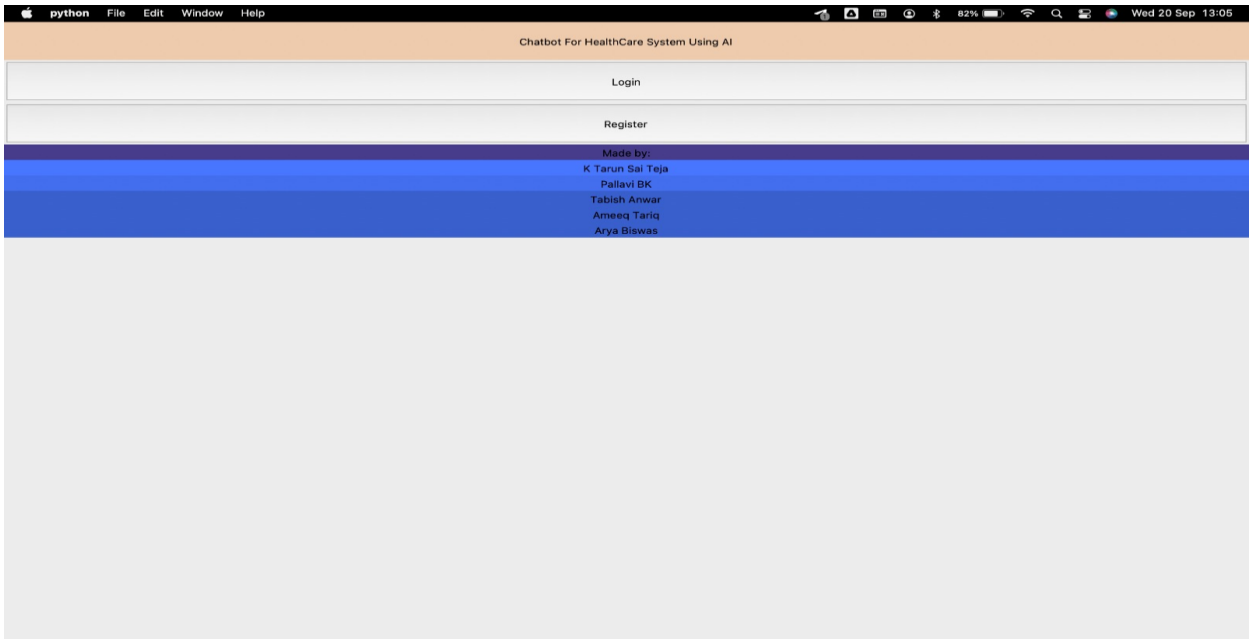

Figure 1.LOGIN/REGISTER

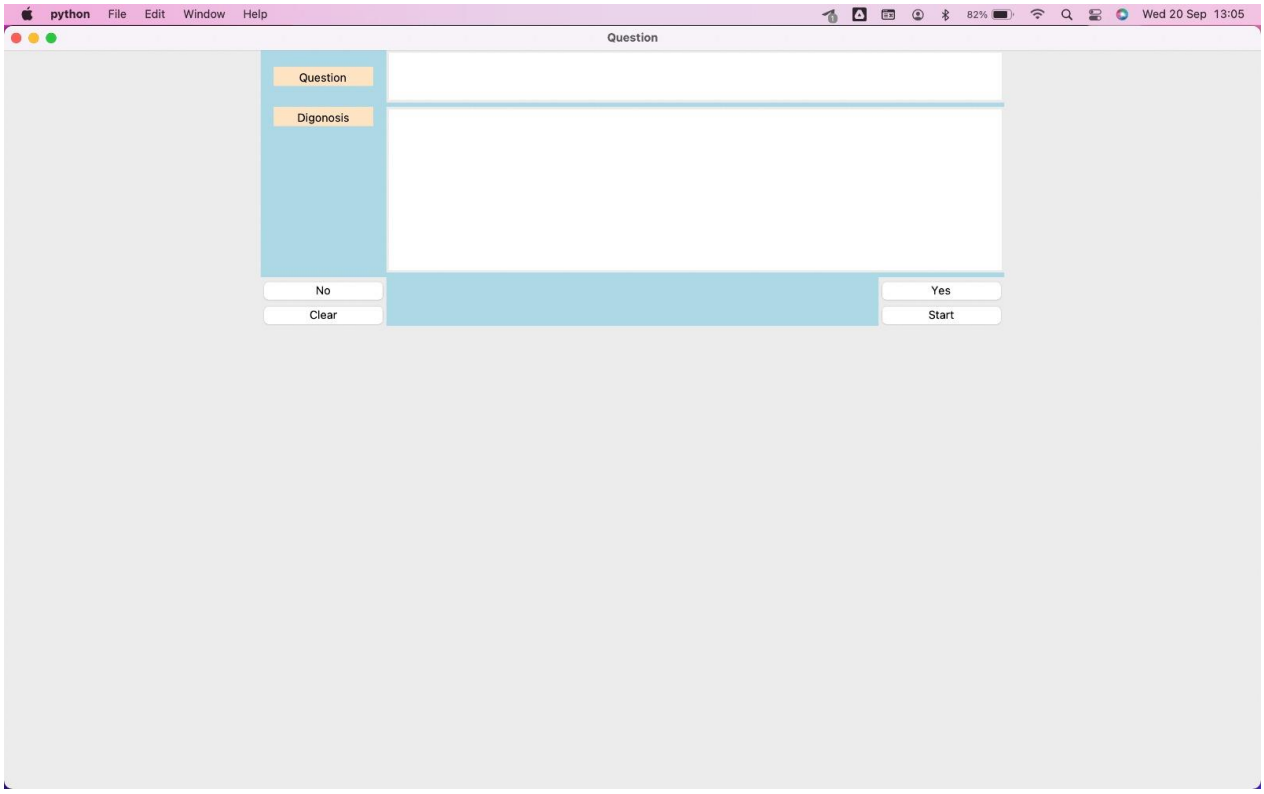

Figure 2. INTERFACE

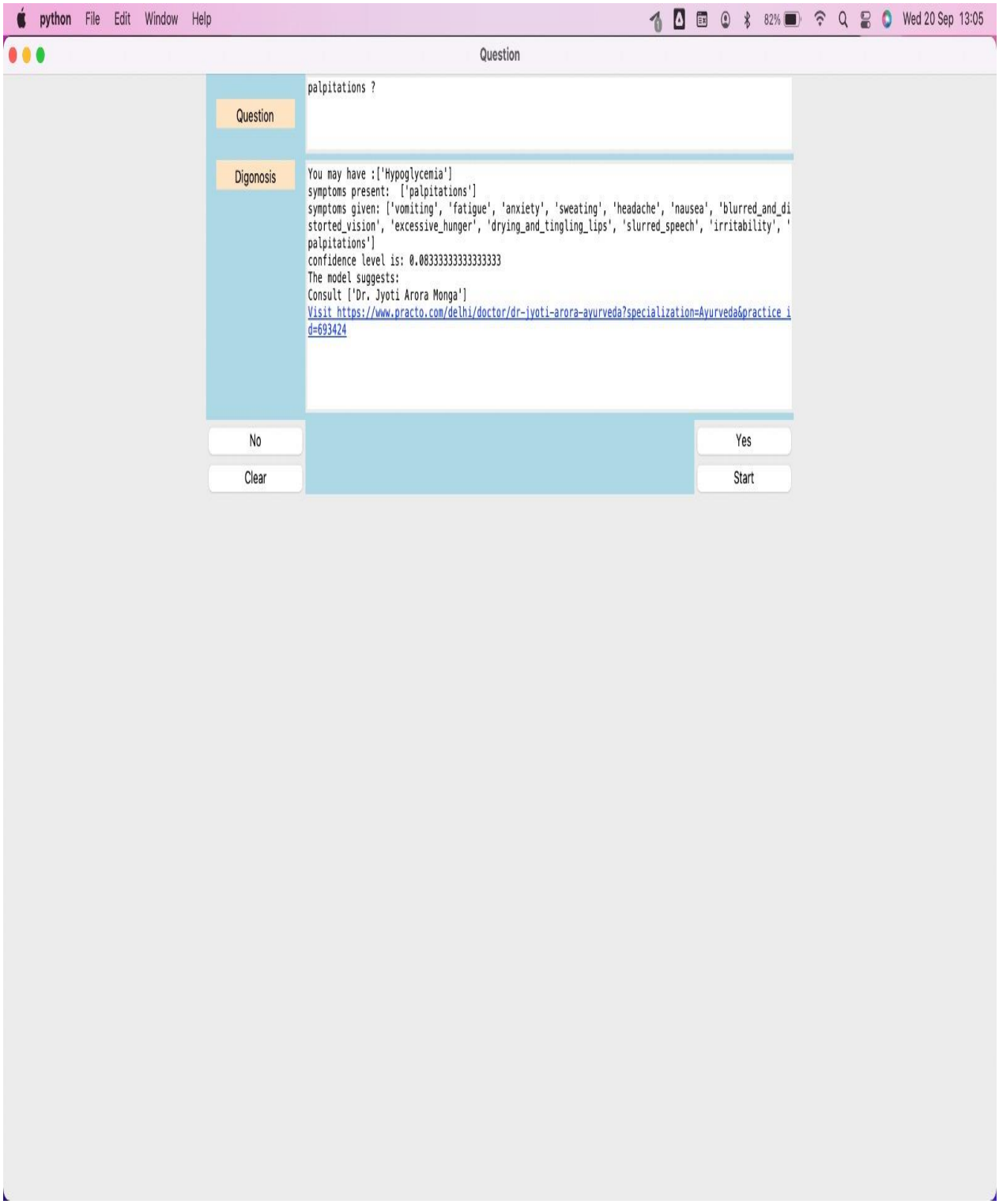

Figure 3INTERACTION WITH HEALTH-BOT

CHAPTER 9

CONCLUTION

9. CONCLUTION

The package was designed in such a way that future modifications can be done easily. The following conclusions can be deduced from the development of the project:

- Automation of the entire system improves the efficiency
- It provides a friendly graphical user interface which proves to be better when compared to the existing system.
- It gives appropriate access to the authorized users depending on their permissions.
- It effectively overcomes the delay in communications.
- Updating of information becomes so easier
- System security, data security and reliability are the striking features.
- The System has adequate scope for modification in future if it is necessary.

10. REFERENCE

1.Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron:

- This book provides hands-on guidance for implementing various machine learning algorithms using Python. It covers both traditional machine learning with Scikit-Learn and deep learning with Keras and TensorFlow, which can be valuable for your chatbot project.

2."Python Machine Learning" by Sebastian Raschka and Vahid Mirjalili:

- This book focuses on machine learning techniques using Python. It covers topics like data preprocessing, model evaluation, and practical examples. It's a great resource for building machine learning components for your chatbot.

3.Anaconda Documentation (https://docs.anaconda.com/**)**:

- Since you mentioned using Anaconda, make sure to explore Anaconda's official documentation to understand how to manage Python environments and packages effectively.

4.Medical Data Sources and Datasets:

- Depending on your project's scope, look for publicly available medical datasets that you can use to train and test your chatbot's machine learning models. The UCI Machine Learning Repository and Kaggle are good places to star

5.Online Courses (Coursera, edX):

- Platforms like Coursera and edX offer numerous courses on machine learning using Python. Consider courses like the "Machine Learning" course by Andrew Ng on Coursera or "Introduction to Artificial Intelligence" on edX for comprehensive learning.