UNIVERSITY OF ENERGY AND NATURAL RESOURCES, SUNYANI

SCHOOL OF SCIENCES

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATICS

PROJECT PROPOSAL

DIAGNOSIS SUPPORT SYSTEM WITH CHATBOT

GROUP MEMBERS	INDEX NUMBERS
Sak Kwadwo Daniel	UEB3512920

Introduction

The healthcare landscape is constantly evolving, with a growing emphasis on preventative care and empowering individuals to manage their health. Limited access to healthcare professionals due to geographical barriers, long wait times, and cost constraints creates a significant challenge. Additionally, individuals often experience confusion and anxiety when navigating potential health concerns. This project proposes the development of a mobile application called **HealthBuddy**, a Diagnosis Support System (DSSC) with Chatbot, to address these issues by providing a user-friendly tool for preliminary health assessments and informed decision-making.

Background

Early diagnosis and informed decision-making are crucial for effectively managing common illnesses and minor health conditions. However, various factors hinder timely access to healthcare professionals. These factors include:

- **Geographical limitations:** Limited access to doctors in rural or remote areas.
- **Long wait times:** Busy schedules and long wait times for appointments can delay seeking professional help.
- **Cost constraints:** The cost of healthcare can be a barrier for some individuals, especially for minor health concerns.

Furthermore, navigating potential health issues can be overwhelming for users. They may experience:

- **Confusion:** Difficulty in identifying the cause of symptoms and understanding potential diagnoses.
- **Anxiety:** Uncertainty about the severity of their condition and the best course of action.

These challenges highlight the need for innovative solutions that improve healthcare access and empower individuals to manage their health effectively. Technology offers immense potential in this domain.

Problem Statement

While advancements in medicine have led to improved healthcare outcomes, there remains a significant gap between individuals experiencing health concerns and timely access to professional medical advice. This gap is caused by several factors:

- **Limited Access:** Geographical limitations, particularly in rural or remote areas, can create significant barriers to reaching healthcare professionals. Additionally, long wait times for appointments and overcrowded clinics can further delay diagnosis and treatment.
- **Cost Constraints:** The rising cost of healthcare can be a deterrent for individuals seeking medical attention, especially for seemingly minor health concerns. This can lead to delayed diagnoses and potentially worsen health outcomes.
- **Information Overload and Confusion:** Individuals experiencing health issues often face an overwhelming amount of information online. Distinguishing reliable sources from misinformation can be difficult, leading to confusion about the nature of their symptoms and potential causes.
- **Anxiety and Uncertainty:** Navigating potential health issues can be a source of anxiety and stress. Uncertainty about the severity of symptoms and the best course of action can lead to delayed care seeking.

These challenges highlight the need for innovative solutions that improve access to healthcare information, empower individuals to make informed decisions about their health, and potentially reduce the burden on healthcare systems.

Proposed Solution

HealthBuddy utilizes a chatbot interface within a mobile application to guide users through a symptom-based assessment. The system leverages:

- **Natural Language Processing (NLP):** To understand user input through text messages and ask clarifying questions.

- **Machine Learning (ML):** To analyze symptom data and generate a differential diagnosis with varying probabilities for common illnesses and minor health conditions.
- **Medical Knowledge Base:** To provide users with relevant educational content about potential diagnoses.

System Functionality

- **Chatbot-driven Symptom Assessment:** The chatbot will ask a series of questions about the user's symptoms, medical history, and lifestyle factors.
- **Differential Diagnosis:** Based on the collected data, the ML model will generate a list of possible diagnoses related to common illnesses and minor health conditions, along with associated probabilities.
- **Educational Content:** The system will provide evidence-based information sourced from a medical knowledge base about each suggested diagnosis.
- **Self-care Recommendations:** The system will offer recommendations for self-care based on the diagnosis.
- **Disclaimers and Limitations:** HealthBuddy will clearly state that the results are for informational purposes only and should not be a substitute for professional medical advice. Users will be encouraged to consult a doctor for any concerning symptoms or persistent conditions.

Scope

- **Health Conditions:** The system will focus on common illnesses and minor health conditions like colds, allergies, headaches, fever, stomachache, diarrhea, nausea, and basic skin concerns (e.g., rashes, acne).
- **Target Audience:** Adults with basic medical knowledge seeking preliminary assessments and information about common health concerns.
- **Functionalities:** The system will provide symptom assessment, differential diagnosis, educational content, and self-care recommendations. It will not provide treatment plans or prescribe medication.

Significance of the Study

HealthBuddy has the potential to revolutionize access to healthcare information by offering a user-centric tool for preliminary diagnoses and health education. This project aligns with the growing trend of leveraging technology to empower individuals and improve healthcare outcomes. By focusing on common illnesses and minor health conditions, HealthBuddy can:

- **Increase early detection:** Prompting users to seek professional help when necessary.
- **Empower informed decision-making:** Providing users with knowledge about their symptoms and possible causes.
- **Reduce anxiety and confusion:** Offering clarity and direction for users experiencing health concerns.
- **Improve healthcare access:** Providing a readily available tool for preliminary assessments, potentially reducing unnecessary doctor visits for minor conditions.

Methodology

The project will utilize the Agile Development Methodology for a flexible and iterative approach. This allows for continuous improvement based on user feedback and testing throughout the development process. Here's a breakdown of the Agile workflow:

- **Sprints:** Development will be divided into short, time-boxed sprints
- **User Stories:** Each sprint will focus on specific user stories that define features and functionalities to be implemented.
- **Daily Stand-up Meetings:** The development team will hold daily meetings to discuss progress, identify roadblocks, and ensure project alignment.
- **Testing and Feedback:** Each sprint will conclude with user testing and feedback incorporation for continuous improvement.

Technology Stack

- **Frontend:** React Native - A framework for building cross-platform mobile applications with native-like performance.
- **Backend:** Node.js - A JavaScript runtime environment for building scalable and efficient server-side applications.

- **Database:** A secure and scalable database will be chosen to store user data and the medical knowledge base (MongoDB).
- **NLP Library:** A library like spaCy or Natural will be used to enable the chatbot's natural language processing capabilities.
- **Machine Learning Framework:** A framework like TensorFlow or PyTorch will be used to develop and train the ML model for generating differential diagnoses.

Conclusion

The Diagnosis Support System with Chatbot has the potential to revolutionize healthcare access by providing a user-centric tool for preliminary diagnoses and health education. This project aligns with the growing trend of leveraging technology to empower individuals and improve healthcare outcomes.