AI-POWERED DIAGNOSIS SYSTEM WITH VIRTUAL CONSULTS AND MULTIMODAL ANALYSIS

PRESENTED BY

Vineet Parmar
Omkar Rao
Hatim Sawai

UNDER GUIDANCE OF

Prof. Varsha Hole

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Content Summary

Problem Statement

In the realm of healthcare, effective communication between patients and healthcare providers is essential for accurate diagnosis and timely treatment. However, certain factors create a hindrance for the same. Some of them are:

Language Barriers

Lack of Proper Description

Lack of Access due to Remote Residence

OBJECTIVES

CHATBOT

Develop a **medical chatbot** that accepts symptom descriptions in **Hinglish** and intelligently **extracts relevant medical terms** for analysis.

Utilize **named entity recognition (NER)** to predict probable diseases based on the extracted symptoms and **recommend appropriate doctor consultations.**

CV MODEL

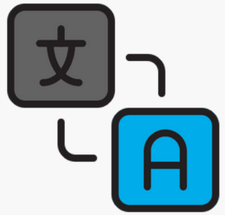
Integrate **image processing algorithms** for analyzing **medical image scans**, particularly for diseases like cancer, to enhance diagnostic accuracy.

Provide a versatile and accessible platform for users to receive accurate diagnoses and personalized treatment recommendations, regardless of their linguistic background.

Scope

Following listed down will be the boundaries of the project that the project will comprise of

Will provide a list of 3 to 5 probable diagnoses for **non-critical** diseases based on symptom analysis where users must further consult a doctor for confirmation.



The language translation component will focus **solely on Hinglish to English medical keyword** extraction for symptom analysis, rather than providing comprehensive translation services

The **image scan analysis** will be **limited to cancer-related predictions** and will not encompass diagnoses for other medical conditions.

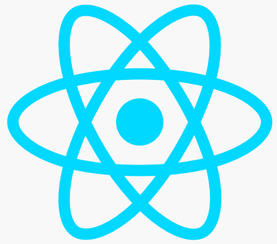
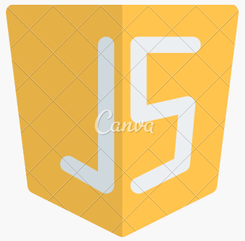
LITERATURE SURVEY

NAME & YEAR	AUTHORS	WORK	TECHNIQUES
BioBERT Based Named Entity Recognition in Electronic Medical Record, 2019	• X. Yu • Z. Yuan • W. Hu • S. Lu • X. Sun	They have covered codemixed input text summarization in a medical setting using MMCQs dataset , which combines Hindi-English codemixed medical queries with visual aids. They have introduced a framework named MedSumm that leverages the power of LLMs and VLMs for this task.	ML Models Used: • MedSumm
Classification of Patient Portal Messages with BERT-based Language Models, 2023	Y. Ren	This paper proposes a pipelined mechanism for machine translation of a bi-lingual language i.e. Hinglish to monolingual English in this paper.	Python Libraries Used: Nltk Spacy
Disease Prediction using Machine Learning, 2022	• N. Kosarkar • P. Badole • P. Basuri • P. Jumle • P. Karamore • P. Gawali	They have have proposed a Language Modelling (LM) based approach to text classification of Hinglish text. We approach this problem by building a Universal Language Model Fine-tuning using AWD-LSTM architecture on a Hindi-English code-switched (Hinglish) corpus collected from various blogging sites.	Architecture Used: AWD-LSTM
Chatbot for Disease Prediction and Treatment Recommendation using Machine Learning, 2019	• R. B. Mathew • S. Varghese • S. E. Joy • S. S. Alex	They have created a python library for clinical texts, EHRKit. This library contains two main parts: MIMIC-III-specific functions and task-specific functions. The first part introduces a list of interfaces for accessing MIMIC-III NOTEEVENTS data, including basic search, information retrieval, etc.	NLP Libraries Used: • MIMIC-Extract • ScispaCy • medspaCy • Stanza Biomed • SciFive • EHRKit (ours)
Human Disease Prediction And Doctor Booking System, 2023	• Joel Roy • Reeju Koshy • Roshan Roy • Anjumol Zachariah	They have we propose a supervised learning method that can be used for much special domain NER tasks. The model consists of two parts, a multidimensional self-attention (MDSA) network and a CNN-based model.	ML Model Architecture Used: MDSA-CNN

LITERATURE SURVEY

NAME & YEAR	AUTHORS	WORK	TECHNIQUES
MedSumm: A Multimodal Approach to Summarizing Code-Mixed Hindi-English Clinical Queries, 2024	• Akash Ghosh • Arkadeep Acharya • Prince Jha • Aniket Gaudgaul	They have used a recently introduced pre-trained language model BERT for named entity recognition in electronic medical records to solve the problem of missing context information and we add an extra mechanism to capture the relationship between words.	BERT-Based Named Entity Recognition in Chinese Electronic Medical Record
Code-Mixed Hinglish to English Language Translation Framework, 2022	IEEE Conference Publication	This paper examines if using semantic features and word context improves portal message classification. Materials and methods: ortal messages were classified into the following categories: informational, medical, social, and logistical. We constructed features from portal messages including bag of words, bag of phrases, graph representations, and word embeddings	• random forest • logistic regression classifiers • convolutional neural network (CNN) with a softmax output.
Machine Learning based Language Modelling of Code Switched Data, 2020	IEEE Conference Publication	they have In introduced a system which is trained on sentences consisting of various symptoms and later by using the dataset consisting of disease and the set of symptoms they possess the most probable disease the user may be suffering from is determined.	NLP Techniques used: • NER • SVM
EHRKit: A Python Natural Language Processing Toolkit for Electronic Health Record Texts, 2023	• Irene Li • Keen You • Yujie Qiao • Lucas Huang	they have In introduced a system which is trained on sentences consisting of various symptoms and later by using the dataset consisting of disease and the set of symptoms they possess the most probable disease the user may be suffering from is determined.	NLP Techniques used: • NER • SVM
Multidimensional self-attention for aspect term extraction and biomedical named entity recognition, 2020	• X. Song • A. Feng • W. Wang • Z. Gao	This project aims to develop a portal for predicting disease according to the symptoms which is given by the user and an option for consulting doctor.	• Decision Tree • Naive Bayes • Random Forest

Tech Stack

FRONTEND	BACKEND	DATABASE
   	 	 

Tech Stack

COMMUNICATION	ML / NLP	IMAGE PROCESSING
 	 NLTK	

TIMELINE

PHASE 1

Weeks 1-4

Define objectives, scope and requirements

Conduct initial research and literature review

PHASE 2

Weeks 5-10

Design System Architecture and UML Diagrams

Define tech stack, finalise architecture

PHASE 3

Weeks 11-26

Start developement of frontend, backend and ML

Collaborate on integration of various modules

PHASE 4

Weeks 27-32

Conduct unit testing and integration testing.

Collect user feedback and iterate on system improvements.

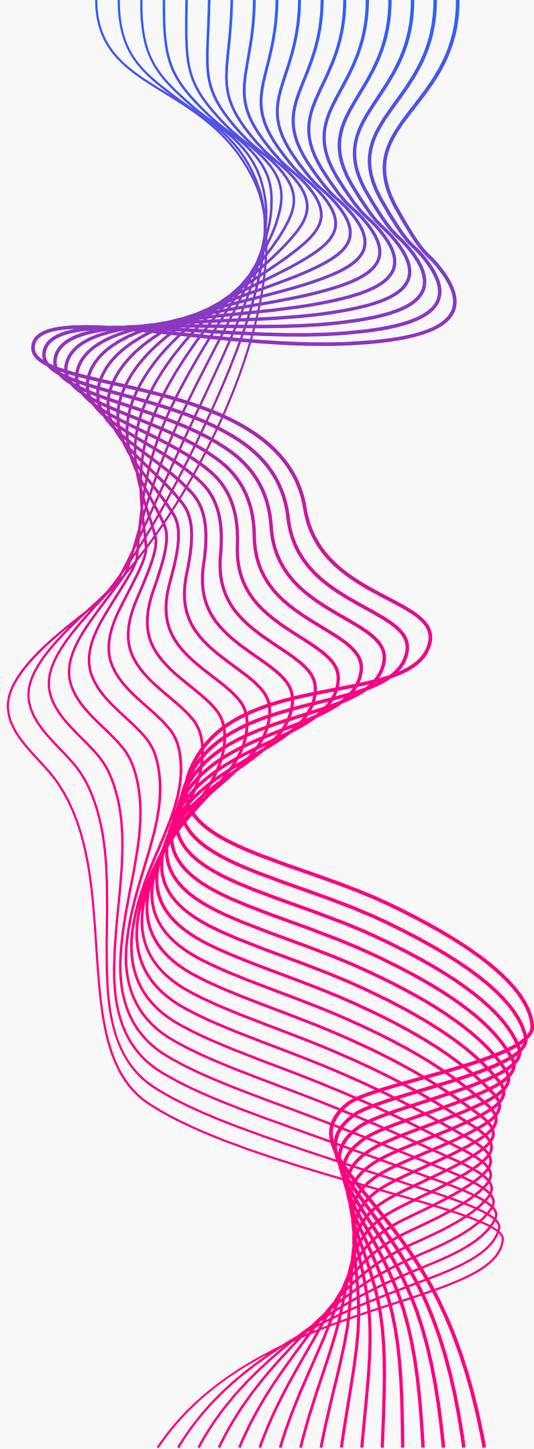
PHASE 5

Weeks 33-36

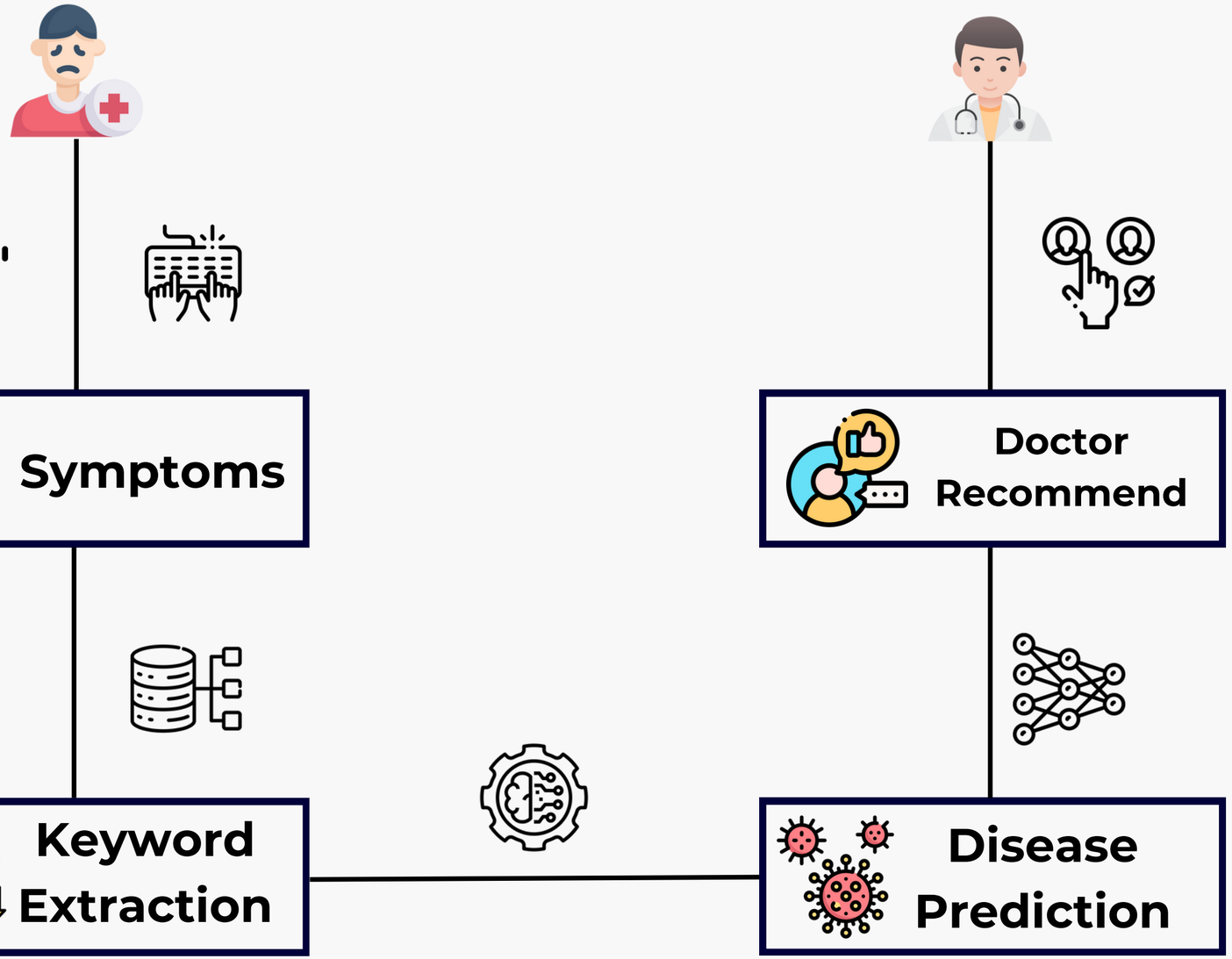
Prepare for system deployment.

Evaluate performance, accuracy and user satisfaction

IMPLEMENTATION DETAILS



DESIGN AND METHODOLOGY



Patient Case

Virtual Consultation

Get Test Results

Predict Results

Give Remedies

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5. Mr. Joel Roy, Mr. Reeju Koshy, Mr. Roshan Roy, Ms. Anjumol Zachariah, 2023, Human Disease Prediction And Doctor Booking System, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH and TECHNOLOGY (IJERT), Volume 11, Issue 01 (June 2023)

Resource Page

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