AI-Based Multi-disease Diagnostic System

Akshansh Singh(211020408)
Shiva Chunbuk(211020447)

Supervisor name:
Dr.Mithilesh Kumar Chaube

Date: 12th October 2023

Dr. Shyama Prasad Mukherjee International Institute of Information Technology, Naya Raipur

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Introduction

- Addressing Healthcare Challenges: In response to the growing healthcare burden,we've developed the AI Doctor Assistant for more efficient diagnoses.

- Leveraging the Power of AI and machine learning: The AI Doctor is poised to revolutionize disease diagnosis, improve patient outcomes, and enhance the efficiency of healthcare delivery.

- Comprehensive Medical AI Tool: It predicts diseases and offers a virtual assistant, enhancing diagnostic capabilities and doctor-patient interaction.

Motivation

- Rising healthcare system demands: The escalating burden on healthcare systems globally has necessitated the development of the AI Doctor Assistant.

- Critical need for improved disease diagnosis: The primary objective of this tool is to facilitate quicker and more efficient disease Identification, enabling doctors to make well-informed decisions with greater speed.

- Empowering doctors: The AI Doctor Assistant is designed to be a valuable resource that supports healthcare professionals in their diagnostic processes, ultimately improving patient care. global escalating burden on healthcare systems

Literature Review

[1] Z. Wang et al., "Breast Cancer Detection Using Extreme Learning Machine Based on Feature Fusion With CNN Deep Features," in IEEE Access, vol. 7, pp. 105146-105158, 2019, doi: 10.1109/ACCESS.2019.2892795.

- **The model proposes a breast CAD method based on fusion deep features. Its main idea is to apply deep features extracted from CNN .**
- **ELM classifier is used to classify the multi dimensional dataset.**
- **Accuracy achieved through this model is 76.25%.**

[2] N. Abdulhadi and A. Al-Mousa, "Diabetes Detection Using Machine Learning Classification Methods," 2021 International Conference on Information Technology (ICIT), Amman, Jordan, 2021, pp. 350-354, doi: 10.1109/ICIT52682.2021.9491788.

- **This model produced an accuracy of 78% based on the random forest classifier model.**
- **This model mainly focuses on the prediction of diabetes specifically in females.**

Problem Definition/Problem statement

Scarcity of Expertise: Rural healthcare providers often lack immediate access to specialized medical knowledge and expertise, making complex diagnoses challenging.

Delayed Decision-Making: This lack of expertise can lead to delayed decision-making and treatment, potentially affecting patient outcomes and increasing healthcare costs.

Accurate and Interpretable diagnostic predictions : The AI doctor is a medical AI tool that can predict various diseases like breast cancer, healthy/unhealthy heart, lung, and diabetes. The AI model is trained on relevant medical data and uses state-of-the-art algorithms to make predictions.

Research Gap

- **Multi-model Data Integration:**

  Our model integrates all the four diseases and provides a user friendly interface that can help the doctors for more accurate and fast prediction .

  Accuracy:

  The accuracy of our AI model and its ability to predict diseases with high precision is something we are particularly proud of

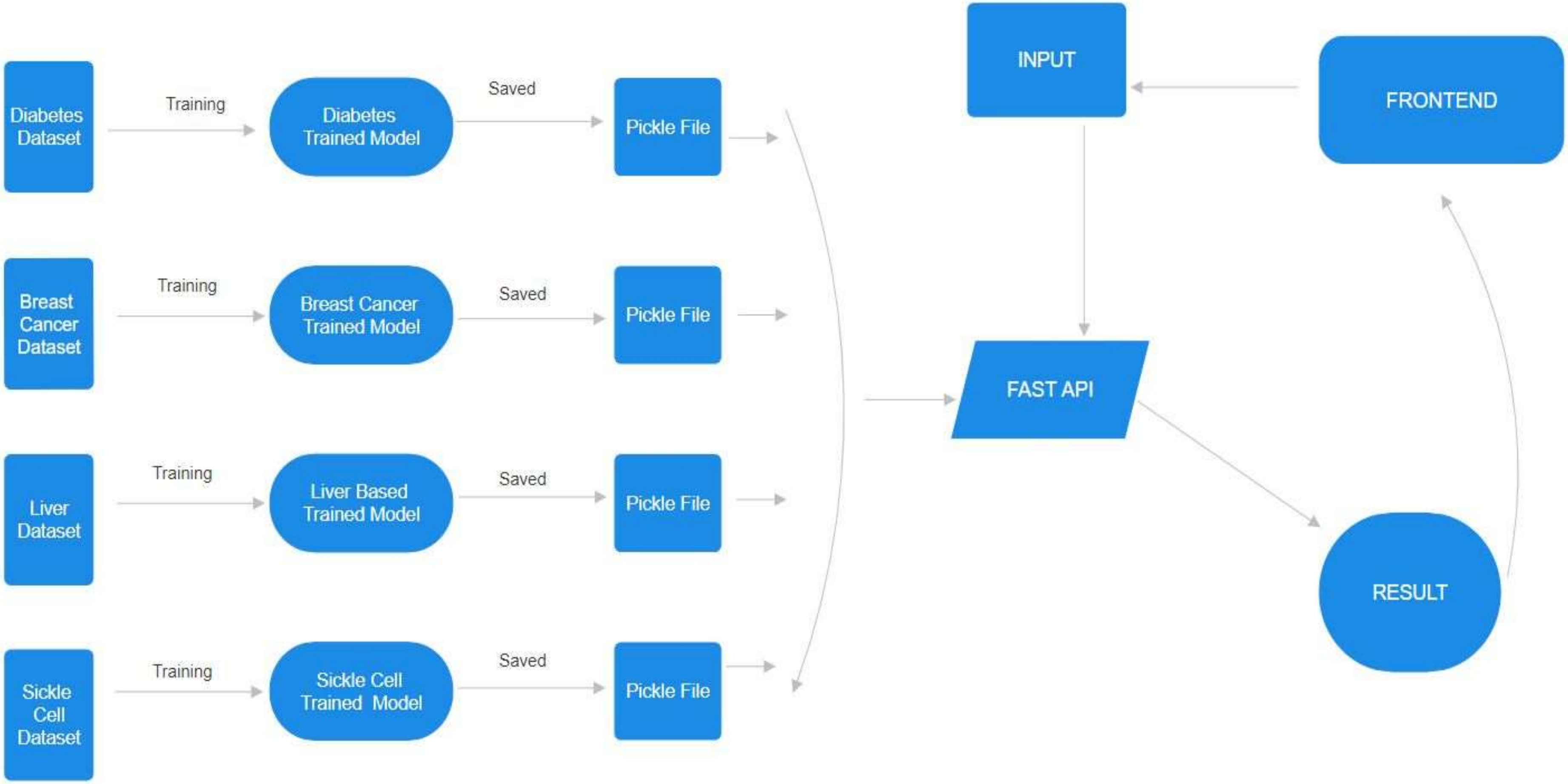
- **Chatbot:**

  The user-friendly interface of the chatbot and its ability to quickly provide relevant information makes our tool unique and valuable.

Objective (s) of the Project

- Enhance Diagnosis Speed and Accuracy
- AI Doctor project extends to both healthcare professionals and patients.
- User-friendly front-end interface for healthcare professionals to interact with the AI Doctor.

Proposed Framework/Methodology



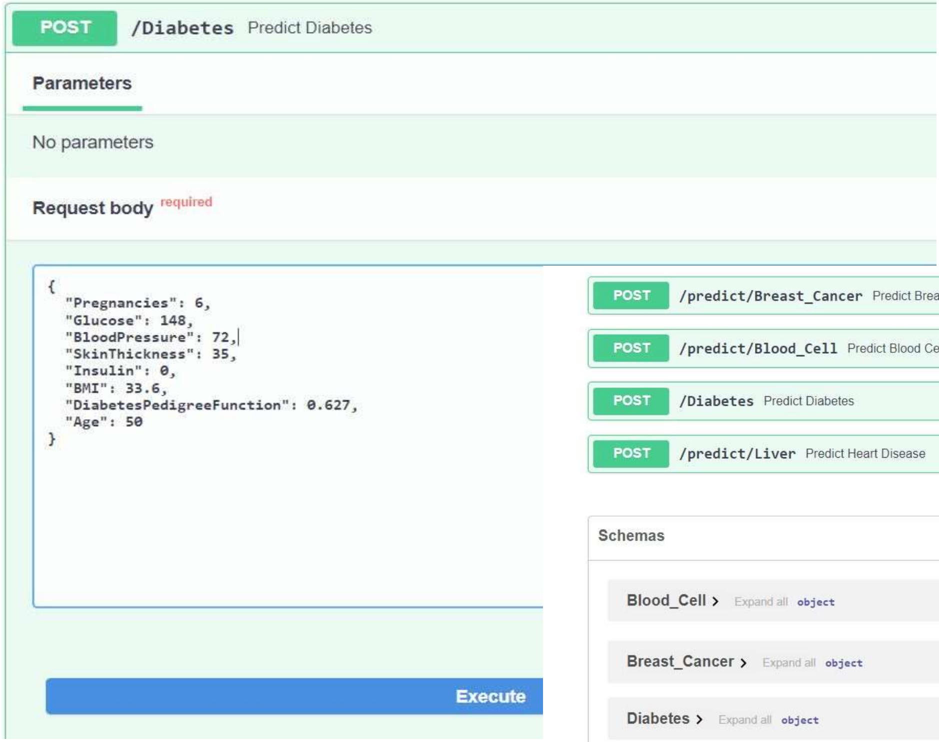
Database description

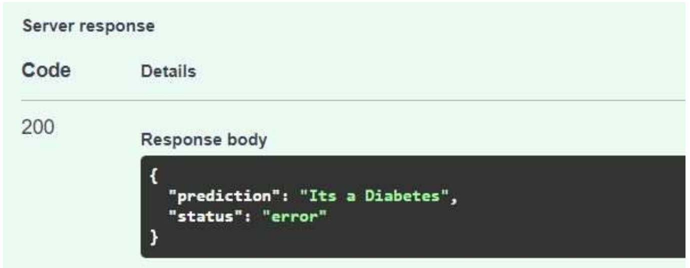
Features

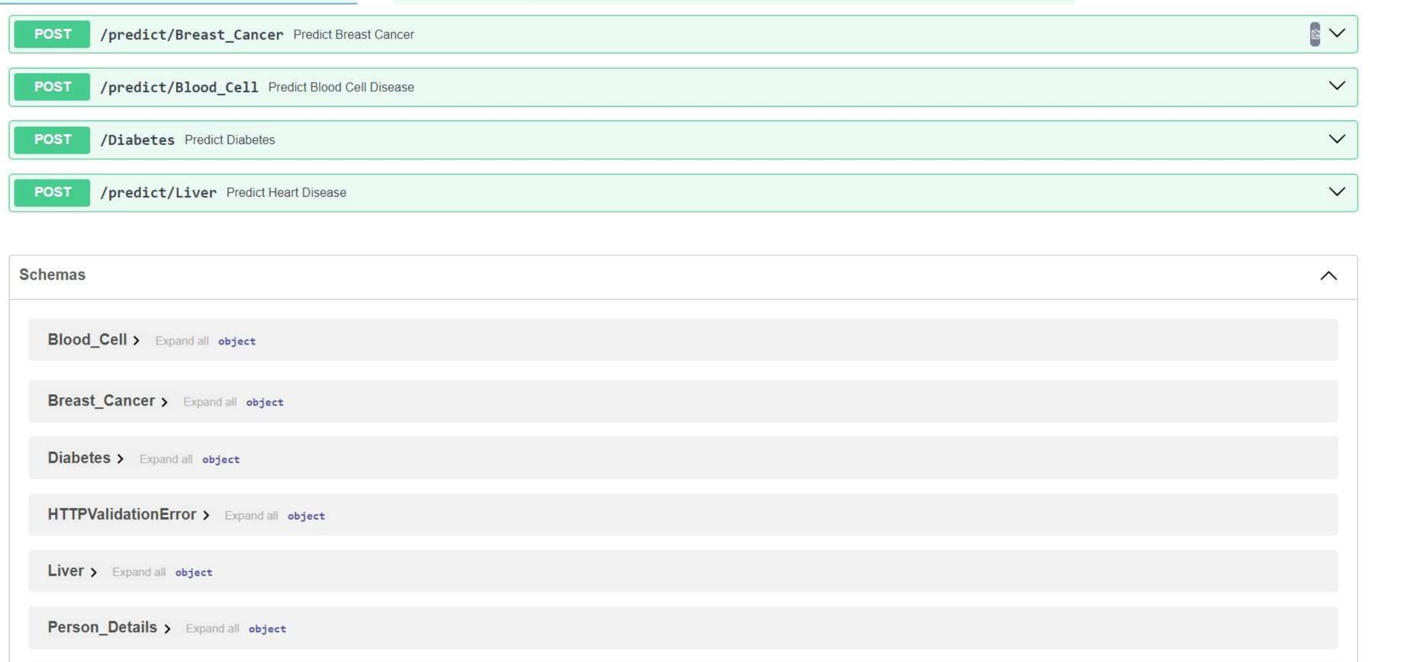
Pregnancies	Age	pelvic_incidence	clump_thickness
Glucose	Gender	pelvic_tilt	uniform_cell_size
BloodPressure	Total_Bilirubin	lumbar_lordosis_angle	uniform_cell_shape
SkinThickness	Direct_Bilirubin	sacral_slope	marginal_adhesion
Insulin	Alkaline_Phosphotase	pelvic_radius	single_epithelial_size
BMI	Alamine_Aminotransferase	grade_of_spondylistesis	bare_nuclei
DiabetesPedigreeFunction	Aspartate_Aminotransferase	diagnose	bland_chromatin
Age	Total_Protiens		normal_nucleoli
	Albumin		mitoses
	Albumin_and_Globulin_Ratio		

Dataset	No. of Entries	No. of Features
Diabetes Dataset	768	8
Liver Dataset	583	10
Sickle Cell Dataset	655	7
Breast Cancer Dataset	699	9

Experimental Results :







Predictions

Breast Cancer

Metric	Value
Accuracy	95.6%
False Positive Rate	5.6%
Precision	96.1%
Recall	94.8%
F1 Score	95.5%

Sickle cell

Metric	Value
Accuracy	88.2%
False Positive Rate	11.2%
Precision	87.8%
Recall	89.3%
F1 Score	88.5%

Diabetes

Metric	Value
Accuracy	91.7%
False Positive Rate	8.3%
Precision	92.3%
Recall	91.1%
F1 Score	91.7%

Liver

Evaluation Metric	Result
Accuracy	0.85
Precision	0.88
Recall	0.80
F1 Score	0.84

Plan of action for the remaining project work

- Develop an Intuitive User Interface
- Seamlessly Integrate with Backend
- We plan on expanding our database and exploring new algorithms that can further increase the tool's accuracy
- Enhance User Experience

Thank You

Dr. Shyama Prasad Mukherjee International Institute of Information Technology, Naya Raipur