C&A, IITG

KRACK THE HACK

Problem Statement: HEALTHCARE

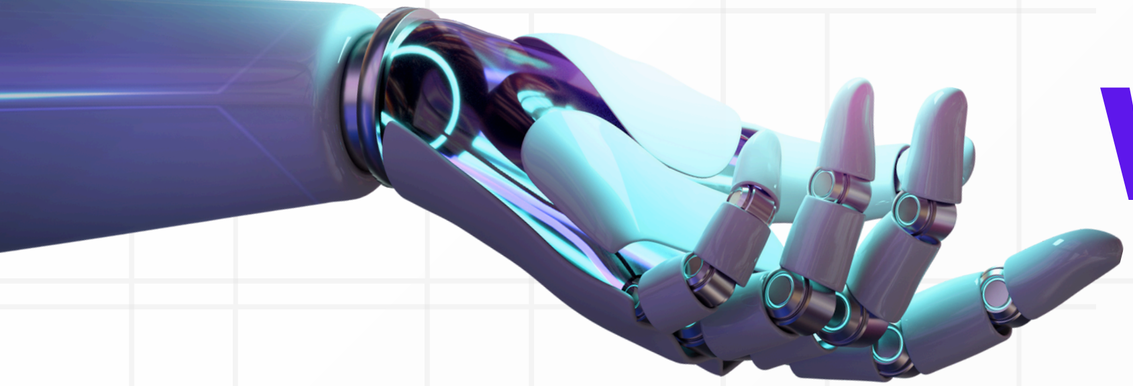
Key focus Areas

1. **Clinical Decision Support Systems:**
   Implement AI-driven systems to assist healthcare professionals in making informed decisions.
2. **Personalized Medicine:**
   Use genetic and patient data to personalize treatment plans and improve patient care outcomes.

*If developed further, we can also tackle: **Healthcare Analytics for Patient Care**

Motivation behind choosing the given Problem and Focus Areas

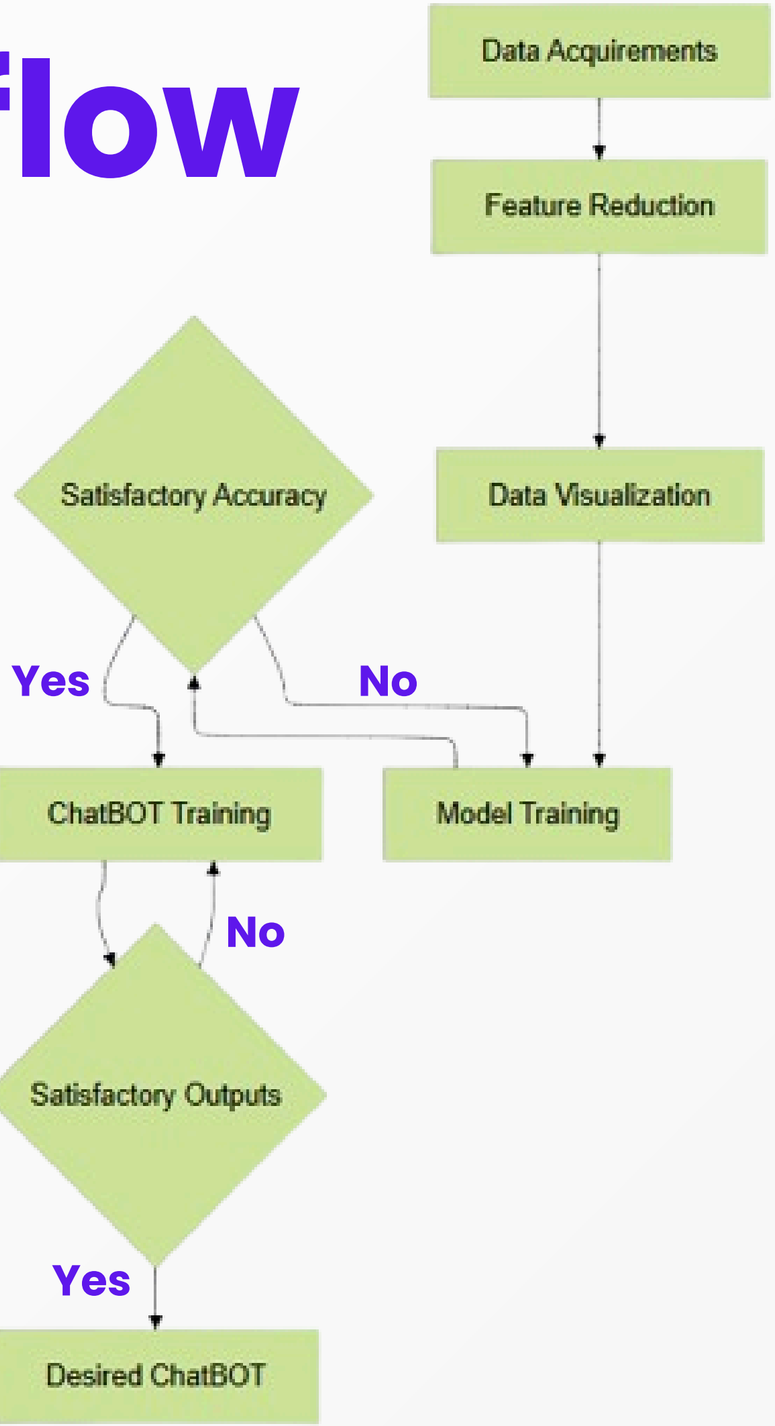
We chose Clinical Decision Support Systems and Personalized Medicine as our main focus areas, because of the increasing intricacy in the decision-making process in health care. AI-powered models can facilitate the process by making decisions precisely and faster, which translates into fewer mistakes and better patient outcomes. Also, traditional methods of treatment overlook many variations among patients in either their genetic or case history aspects. With personalized medicine, treatments could be provided that actually cater to the distinctive profile of a patient, thus allowing improved care outcomes. This system incorporates AI with machine learning, thus rapidly processing data to enhance decision support making. Given the bigger mission of improving healthcare efficiency, reducing costs, and advancing superior patient care, these areas will become key in the future of medicine.

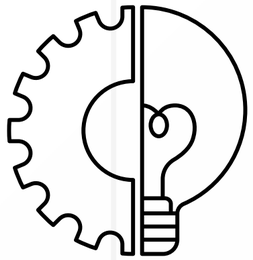


Workflow

TECH-STACK

Python
Langchain
Chroma DB
Neural Networks
Standard ML Models
Pandas
Matplotlib/Seaborn
HuggingFace





Our Approach

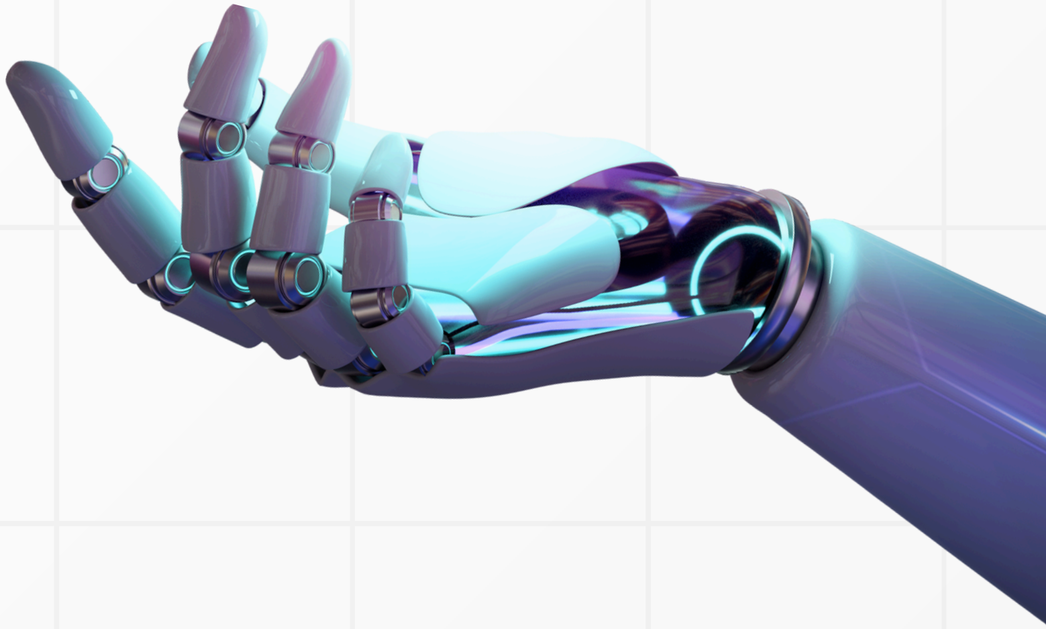
Disease Detection

In our disease detection project, we worked with a dataset comprising 132 features, with the prognosis as the target variable. To optimize model performance, we began with feature reduction based on specific criteria: we dropped columns with high correlation (greater than 0.95) to prevent multicollinearity, and removed columns with very low variance (less than 0.03), as these provided little information. Following this preprocessing, we experimented with a range of machine learning and deep learning models, including Decision Trees, SVM, Naive Bayes, and Neural Networks. After training and evaluation, we achieved a test accuracy of 98.5%, which we deemed highly satisfactory for the given problem.

Chatbot

For our chatbot project, we used a dataset that included preventive measures and descriptions of diseases. We found two common and trusted medicines for each disease and combined all the information into a single dataset. Using this, we created three chatbots with Hugging Face and other open-source tools. The first chatbot had a lot of hallucination issues, but the later versions performed much better. However, there is still room for improvement. We could use bigger datasets and improve the way the chatbot understands the data. With more work, this chatbot could help doctors with basic diagnoses and decision-making.

Thank You!



TEAM MEMBERS:

SUMIT PRABHAKAR

MANSI SHARMA

Datasets Used