Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	27 June 2025
Team ID	LTVIP2025TMID31381
Project Name	HealthAI
Marks	4 marks

2.1. Technology Stack

- **Programming Language:** Python 3.x
  - Chosen for its rich ecosystem of AI/ML libraries, straightforward web application development with Streamlit, and robust database connectivity.
- **Large Language Model (LLM):** IBM Granite model

  Framework: Hugging Face Transformers library.

  Purpose: The core AI engine for all generative text functionalities (symptom,analysis, remedy generation, treatment plan creation, health insights, and conversational responses).

  Inference: Leverages PyTorch (torch) for efficient, GPU-accelerated inference.
- **Database:** MongoDB

  Driver: pymongo (Python driver for MongoDB).

  Purpose: A NoSQL document-oriented database, ideal for storing flexible, semi-structured patient profiles and diverse health records without rigid schemas. It stores user accounts, patient demographics, and records of AI interactions.
- **User Interface (UI) Framework:** Streamlit

  Purpose: Enables rapid creation of interactive web applications purely in Python. Provides components for text input, buttons, selection boxes, and displays markdown/text outputs. Its session state management is utilized for user authentication.

Project Design Phase-II
Technology Stack (Architecture & Stack)

➢ Other Key Python Libraries:

- **os:** Essential for securely accessing sensitive credentials (like MongoDB username/password) from environment variables, preventing hardcoding.
- **datetime:** Used for timestamping database records (e.g., patient creation, health record entries).
- **urllib.parse:** Utilized for URL-encoding username and password components in the MongoDB connection string, ensuring correct parsing of special characters.
- **bson.objectid:** Provides functionality to work with MongoDB's ObjectId primary keys, including generation and validation, ensuring data integrity.
- **hashlib:** Employed for basic password hashing during user registration and login, contributing to fundamental security.
- **numpy and pandas (Conceptual):** While not explicitly driving the core LLM logic in the current version, these are crucial for potential future enhancements, particularly for advanced numerical data processing and visualization within the "Health Analytics" dashboard.

S.No	Component	Description	Technology
	User Interface	How user interacts with application	Streamlit
	• Application Logic-1	• Logic for a process in the application	• Python
	• Application Logic-2	• Logic for a process in the application	• IBM Watson service

Project Design Phase-II
Technology Stack (Architecture & Stack)

	• Application Logic-3	• Logic for a process in the application	• IBM Watson Assistant
	• Database	• Data Type, Configurations etc.	• MondoDB etc.
	• Machine Learning Model	• For easy problem resolution	• IBM granit model
	External API	API used in the application	Flask API.