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

Date	27 June 2025
Team ID	LTVIP2025TMID38995
Project Name	Revolutionizing Liver Care : Predicting Liver Cirrhosis Using Adavanced Machine Learning
Maximum Marks	4 Marks

Technical Architecture:

The system uses a web-based frontend (HTML/CSS) for inputting clinical test values, which are processed by a Flask backend. A pre-trained Random Forest machine learning model is used to predict the risk of liver cirrhosis. The model and scaler are loaded from `.pkl` files, and the app runs locally or on the cloud.

Example: Order processing during pandemics for offline mode
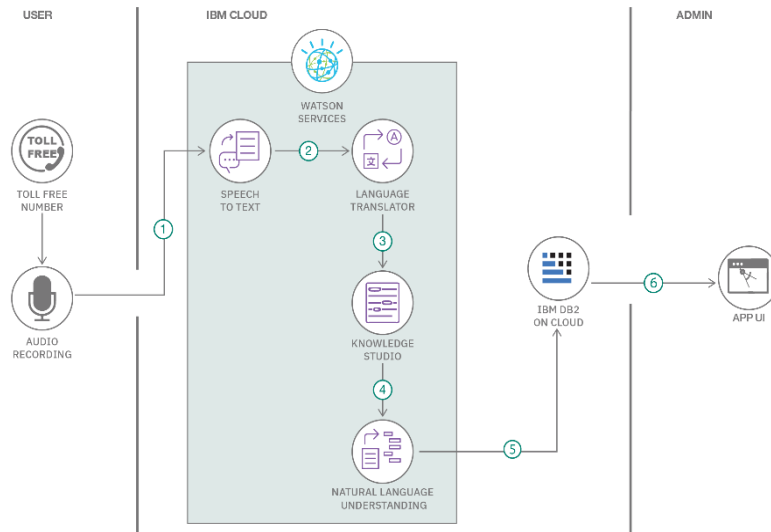
Guidelines:

This project aims to build a web-based tool that predicts liver cirrhosis using clinical test data and a machine learning model (Random Forest). The system is developed using Python and Flask for backend processing, and HTML/CSS for the frontend. Input values like age, bilirubin, and enzymes are normalized and passed to the model for prediction. The application provides instant results to doctors or patients, aiding early diagnosis. No sensitive data is stored, and a medical disclaimer is included. The tool is deployable locally or on cloud platforms like Render or Heroku.

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Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI where users (doctor/patient) input clinical data.	HTML, CSS, Bootstrap, JavaScript
2.	Application Logic-1	Backend logic for form handling and prediction	Python with Flask
3.	Application Logic-2	(Not used) Speech-to-Text functionality	Not applicable
4.	Application Logic-3	(Not used) Chatbot functionality	Not applicable
5.	Database	Optional storage for input and prediction logs	SQLite / CSV file (if used)
6.	Cloud Database	(Optional) Cloud storage of records or logs	Firebase Realtime DB / IBM Cloudant (if used)
7.	File Storage	Stores model and scaler files	Local filesystem (`rf_model.pkl`, `scaler.pkl`)
8.	External API-1	Not applicable (no weather service needed)	Not used
9.	External API-2	Not applicable (no Aadhar or identity API used)	Not used
10.	Machine Learning Model	Predicts cirrhosis using clinical test data	Random Forest Classifier (scikit-learn).
11.	Infrastructure (Server / Cloud)	Local or cloud deployment of Flask app:	Localhost / Render / Heroku

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Frameworks and libraries used for development	Flask, scikit-learn, Pandas, NumPy
2.	Security Implementations	Basic input validation, no sensitive data stored, disclaimer shown	Flask Form Validation, HTML5 Input Checks
3.	Scalable Architecture	Can be deployed with scalable backend and separate	Flask with WSGI, Docker (optional)

S.No	Characteristics	Description	Technology
		model service if needed	
4.	Availability	Runs locally; can be deployed on cloud with near 24/7 availability	Render / Heroku / AWS EC2
5.	Performance	Lightweight model, returns predictions within seconds, good for small devices	Pre-loaded `.pkl` files, Local inference