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

Date	JUNE 2025
Team ID	**LTVIP2025TMID40719**
Project Name	Revolutionizing Liver Care: Predicting Liver Cirrhosis using Advanced Machine Learning Techniques
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

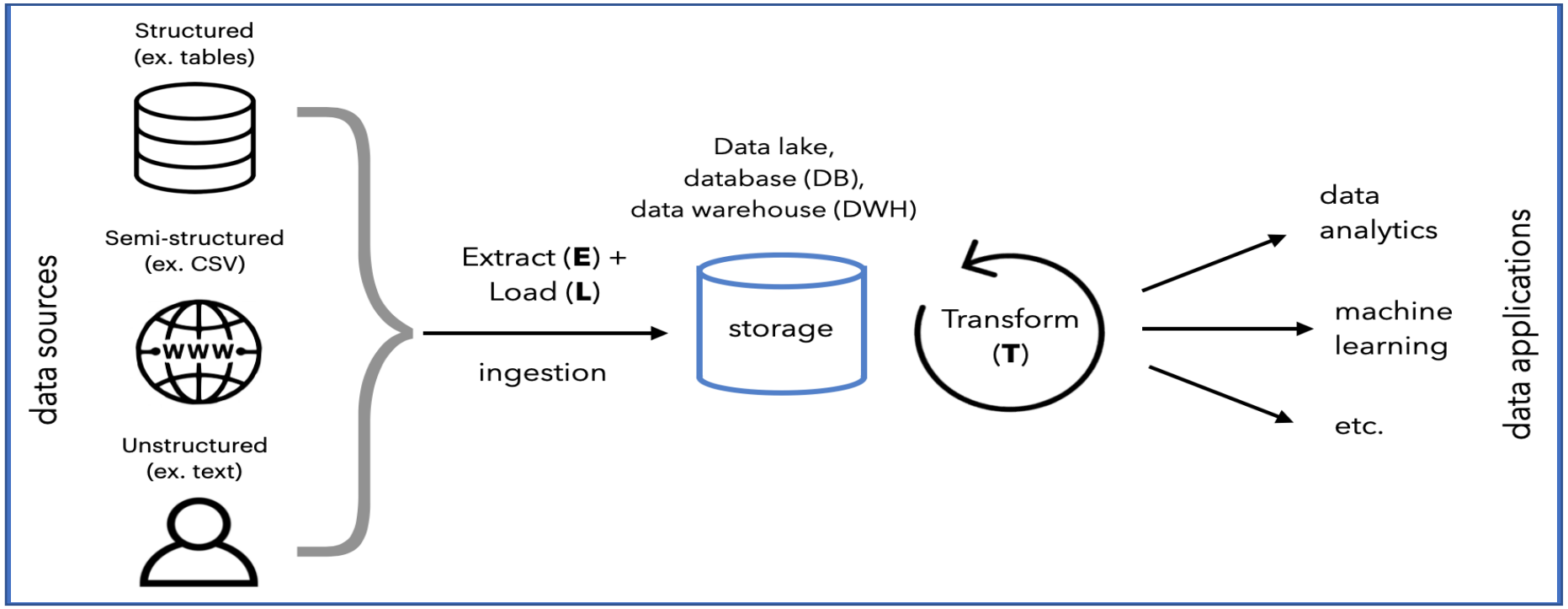

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Web UI for user interaction	HTML, CSS, JavaScript, Bootstrap
2	Application Logic-1	Model serving and user request handling	Python (Flask)
3	Application Logic-2	Preprocessing health records and feature engineering	Pandas, NumPy
4	Application Logic-3	Model evaluation, prediction logic	scikit-learn, XGBoost
5	Database	Stores user data and prediction results	MySQL / SQLite
6	Cloud Database	Cloud-hosted DB for scalability	AWS RDS / IBM Cloudant
7	File Storage	Storage of ML models and logs	Local FileSystem / AWS S3
8	External API-1	User location-based health analytics	OpenWeather API (optional)
9	External API-2	OTP/email confirmation	SendGrid API / Google OAuth
10	Machine Learning Model	Liver cirrhosis classification	Random Forest, XGBoost (Tuned), Logistic Regression
11	Infrastructure (Server)	Deployed as a cloud app with scaling	AWS EC2 / IBM Cloud / Heroku

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology Used
1	Open-Source Frameworks	Open-source Python libraries & Flask framework	Flask, scikit-learn, pandas, XGBoost
2	Security Implementations	Secure access, hashing passwords, secure API keys	SHA-256, Flask-Login, HTTPS, OAuth
3	Scalable Architecture	Follows MVC architecture, Flask REST API, container deployable	Docker, Kubernetes-ready (optional)
4	Availability	Can use cloud load balancers & auto-scaling	AWS Load Balancer, Horizontal Scaling
5	Performance	Optimized ML models, caching, preprocessing pipeline	joblib for model loading, Redis (optional)