Define Problem / Problem Understanding

Liver cirrhosis is a chronic liver condition caused by long-term damage, leading to scarring and eventual liver failure. Early detection is crucial but challenging due to limited access to specialized tests in many healthcare settings. This project aims to develop a machine learning model that can predict liver cirrhosis based on patient medical data, making early diagnosis faster, easier, and more accessible.

Specify the Business Problem

Current diagnostic methods for liver cirrhosis often involve expensive or invasive procedures like liver biopsies, MRIs, and ultrasounds. These are not always available in rural or underfunded areas. A machine learning model trained on clinical data (like blood tests) can serve as a cost-effective and non-invasive solution to assist doctors in identifying high-risk patients.

Business Requirements

- Accurate and reliable prediction model.
- User-friendly interface for medical staff.
- Real-time prediction to assist in clinical decision-making.
- Scalable and low-cost solution suitable for remote or under-resourced clinics.
- Easy integration with existing web-based health systems.

Literature Survey

- Machine learning has been used in various liver disease prediction studies, with models like Random Forest, SVM, and Logistic Regression achieving good results.
- Public datasets like the Indian Liver Patient Dataset (ILPD) have been commonly used for research.

- Research shows that early-stage predictions using ML models can reduce mortality and improve the efficiency of healthcare systems.
- Many prior studies focus on accuracy, but few focus on real-world deployment - which this project addresses via a web interface.

Social or Business Impact

Social Impact:

- Early detection leads to better survival rates.
- Helps reach rural and underserved populations.
- Reduces unnecessary treatments and anxiety through early reassurance or intervention.

Business Impact:

- Saves hospitals money on diagnostics.
- Can be packaged into a clinical decision support tool (CDSS).
- Opens doors for startups or health-tech companies in preventive diagnostics.