

Model Development Phase Template

Date	24 June 2025
Team ID	SWTID1749708868
Project Title	Revolutionizing Liver Care : Predicting Liver Cirrhosis Using Advanced Machine Learning Techniques
Maximum Marks	5 Marks

Feature Selection Report Template

Features were selected based on their clinical relevance to liver cirrhosis, correlation with the target variable, and ability to improve model performance. Demographic (e.g., age, gender), lifestyle (e.g., alcohol history), infection status (Hepatitis B/C), clinical symptoms (jaundice, ascites), and lab test results (bilirubin, liver enzymes, albumin) were retained due to their strong association with liver function. Redundant, weakly correlated, or non-specific features (e.g., location, fever, tuberculosis) were excluded to reduce noise and overfitting.

Feature	Description	Selected (Yes/No)	Reasoning
S.NO	Record index number	No	Identifier only; not useful for modeling.
Age	Patient's age in years	Yes	Age impacts liver health progression.
Gender	Biological sex of patient	Yes	May influence disease susceptibility.
Place (location where the patient lives)	Rural/urban location	No	Geographical info not directly relevant.
Duration of alcohol consumption (years)	Years of alcohol use	Yes	Chronic alcohol use is a major factor.

Feature	Description	Selected (Yes/No)	Reasoning
Quantity of alcohol consumption (quarters/day)	Daily alcohol intake	Yes	Quantity impacts liver deterioration.
Type of alcohol consumed	Type (branded/local)	No	Too categorical, less predictive.
Hepatitis B infection	HBV infection status	Yes	Strong liver disease contributor.
Hepatitis C infection	HCV infection status	Yes	Directly causes liver complications.
Diabetes Result	Diabetes status	Yes	Associated with liver metabolic issues.
Hypertension Result	Hypertension presence	No	Less direct impact on cirrhosis.
Tuberculosis Result	Tuberculosis history	No	Not strongly correlated with liver cirrhosis.
Family history of liver disease	Genetic liver history	Yes	Increases genetic predisposition.
Ascites	Fluid retention symptom	Yes	Clinical marker for liver failure.
Jaundice	Yellowing of skin/eyes	Yes	Strong clinical liver symptom.
Weakness	General fatigue	No	Too general; low specificity.
Anorexia	Loss of appetite	Yes	Common sign in cirrhosis patients.
Nausea	Feeling of sickness	Yes	Indicator of digestive distress in liver issues.

Feature	Description	Selected (Yes/No)	Reasoning
Abdominal Pain	Pain in abdomen	Yes	Liver inflammation symptom.
Fever	Raised body temperature	No	Nonspecific symptom.
Abdominal Distension	Swelling in abdomen	Yes	Typical physical sign of liver dysfunction.
Gastrointestinal Bleeding	Bleeding from GI tract	Yes	Late-stage symptom in cirrhosis.
Altered Sensorium	Mental confusion or drowsiness	Yes	Sign of hepatic encephalopathy.
Pedal Edema	Swelling in legs	Yes	Common cirrhosis symptom due to fluid imbalance.
Sepsis	Systemic infection	No	Too rare and not liver-specific.
Hemoglobin (gm/dl)	Blood hemoglobin level	Yes	Affected in liver-related anemia.
Total Leucocyte Count (cells/cumm)	White blood cell count	Yes	Helps assess immune response in liver disease.
Platelet Count (lakhs/cumm)	Platelet concentration	Yes	Often reduced in cirrhosis.
Serum Bilirubin Total (mg/dl)	Total bilirubin level	Yes	Elevated in liver dysfunction.
Direct (mg/dl)	Direct bilirubin	Yes	Helps detect type of liver issue.
Indirect (mg/dl)	Indirect bilirubin	Yes	Component of total bilirubin.

Feature	Description	Selected (Yes/No)	Reasoning
Total Protein (g/dl)	Blood protein level	Yes	Decreases in liver disease.
Albumin (g/dl)	Albumin protein	Yes	Low levels indicate liver damage.
Globulin (g/dl)	Globulin proteins	Yes	Elevated in chronic liver disease.
A/G Ratio	Albumin/Globulin ratio	Yes	Altered in liver dysfunction.
ALP (U/L)	Alkaline phosphatase enzyme	Yes	Marker of bile duct obstruction.
SGOT/AST (U/L)	Liver enzyme level	Yes	Indicates liver cell injury.
SGPT/ALT (U/L)	Liver enzyme level	Yes	Enzyme specific to liver damage.
USG Abdomen (diffuse liver or not)	Ultrasound liver results	Yes	Imaging-based liver health indicator.
Predicted Value (Outcome - Cirrhosis or not)	Actual diagnosis outcome	Yes	Target variable for ML prediction.