Project Title:-

Revolutionizing Liver Care :- Predicting Liver Cirrhosis Using Advanced Machine

TEAM MEMBERS:-

Team Leader:- Paritala Sri Venkata Gopinadh
Team member: Majeti Sudheer

Team member:-Thoka Naveen Babu
Team member:-vempati Lakshmi Priya

Title Slide:-

Revolutionizing Liver Care: Predicting Liver Cirrhosis Using Advanced Machine Learning

- Your Name, Internship Program
- Supervisor / Institution

Background & Motivation:-

Overview of liver cirrhosis: definition, global impact, causes
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Why early detection matters: avoids invasive biopsies, improves outcomes

Role of AI/ML in healthcare innovation

Problem Statement:-

Goal: Build an ML model to predict cirrhosis onset and stage (early vs advanced)

Clinical challenge: diagnosis often invasive (biopsy)

Opportunity: non-invasive, scalable predictive solution

Datasets & Modalities:-

- **Clinical-lab dataset**: labs like bilirubin, albumin, INR, platelets
- **Ultrasound + labs**: Cirrhosis assessment via hybrid data arxiv.org
- **MRI dataset**: CirrMRI600+ (628 high-res scans, segmentation labels)

Data Preprocessing:-

Handling missing values and outliers

Feature engineering: AST/ALT ratio, platelet-to-albumin ratio, SAAG
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Image prep: normalization, segmentation masks

Machine Learning Approaches:-

- **Clinical data models**: Random Forest, XGBoost, SVM
- **Imaging models**: CNN / DenseNet-201 for ultrasound; U-Net / segmentation CNN for MRI
- **Hybrid ensemble**: voting or stacking classifier combining modalities

Model Training & Evaluation:-

- Performance metrics: accuracy, AUC, precision, recall, F1-score
- Cross-validation; SMOTE for class imbalance
- Benchmarks: MELD, Child-Pugh score

Results:-

Best model performance: e.g., hybrid model achieved ~92.5 % accuracy

ROC curves and confusion matrix (include visuals)

Interpretability & Insights:-

SHAP/LIME to identify key predictors (e.g., bilirubin, platelets)

Attention maps to highlight imaging findings correlating with cirrhosis

Prototype Deployment:-

- Demo concept: Web app / Streamlit interface
- Clinician inputs: lab values + imaging → risk prediction output

Conclusion & Impact:-

ML pipeline predicts cirrhosis reliably

Enables early, non-invasive detection

Potential to reduce liver biopsies and optimize care

Future Work:-

Validation with local/EHR data (e.g., Vijayawada hospitals)
Expand dataset for diverse demographics
Integration into clinical workflows and prospective trials

THANK YOU