

## **Abstract**

Fatty liver disease (FLD), also known as hepatic steatosis, is a growing global health concern due to its association with metabolic disorders such as obesity, type 2 diabetes, and cardiovascular diseases. Early diagnosis and intervention are crucial to prevent progression to more severe conditions like non-alcoholic steatohepatitis (NASH), cirrhosis, and liver failure. Traditional diagnostic methods such as liver biopsy and ultrasound are invasive, time-consuming, and often expensive.

This research proposes the use of Convolutional Neural Networks (CNNs), a powerful class of deep learning models, to predict the presence and severity of fatty liver disease using medical imaging data, such as ultrasound or CT scans. By leveraging CNNs' ability to automatically extract and learn hierarchical features from images, this study aims to develop an accurate, efficient, and non-invasive tool for diagnosing FLD.

The proposed model is trained on a dataset of liver images labeled with varying degrees of fatty infiltration, using techniques such as data augmentation, transfer learning, and fine-tuning to improve model performance. The CNN model is evaluated against existing diagnostic methods and compared in terms of accuracy, sensitivity, specificity, and computational efficiency.

The results demonstrate that the CNN-based approach outperforms traditional methods, achieving high classification accuracy while reducing diagnostic time and costs.