

**HACKBIO INTERNSHIP
MACHINE LEARNING AND DATA SCIENCE TRACK
TOPIC: CLASSIFICATION OF CLINICAL STAGES OF
LIVER CANCER USING MACHINE LEARNING**

GROUP NAME: DATA ALCHEMISTS

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DATE: 12TH OCTOBER, 2024.

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BACKGROUND OF THE STUDY

Liver cancer is the sixth most common and the third leading cause of cancer death globally (NCI, 2024).

Accurate detection and classification are crucial for timely treatment (Jesi & Daniel, 2024).

AI improves accuracy and efficiency in interpreting medical images such as CT-scans and MRIs (Khalifa & Albadawy, 2024).

Our study will leverage machine learning to improve liver cancer stage classification, aiming for earlier intervention and personalized therapies.

Data Collection

Source: TCGABiolinks

Description: Liver cancer patient data, transcriptome profiling and clinical data



Data Pre-processing

Data Cleaning and Normalization

Feature Selection: Select relevant features (e.g., top genes, clinical markers) for classification.



Model Development

Train-Test Split: Split the data into training (80%) and testing (20%) sets.

Machine Learning Algorithms (KNN and Random Forest)

Cross Validation



Evaluation & Validation

Metrics: Use accuracy, precision, recall, and confusion matrices to assess performance.



Manuscript Development

PROJECT WORKFLOW FLOWCHART

EXPECTED OUTCOME AND POTENTIAL OF THE STUDY

✓ Expected Results:

- ☐ Analysis of the machine learning models using transcriptomic data and Clinical metadata for liver cancer classification.
- ☐ Evaluation of model performance through accuracy, precision, and recall.
- ☐ Investigate the long term potential of this research in improving early detection enabling personalized treatment and contributing to advancement in liver cancer and diagnostics.

Q&A