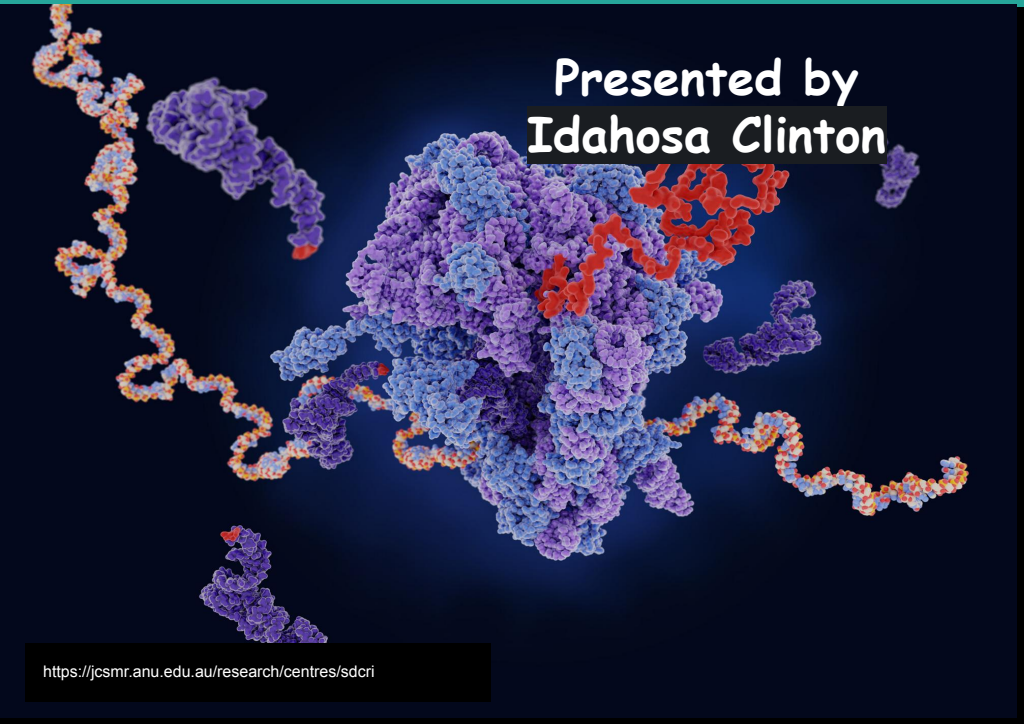
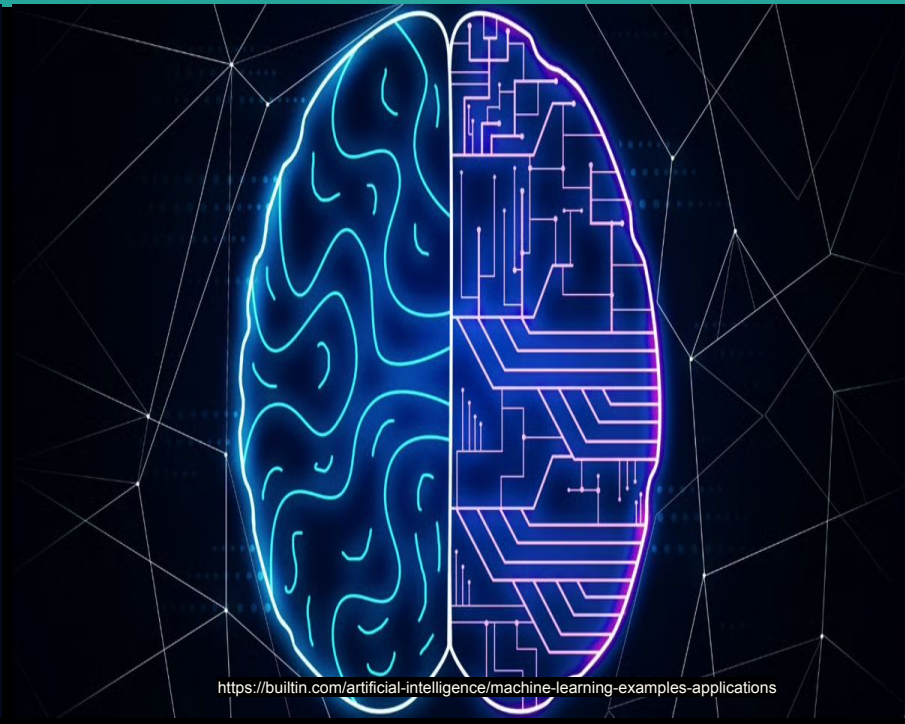
Utilizing Machine Learning for Colon Cancer Staging, Classification, Diagnosis, and Prognosis Prediction.



https://jcsmr.anu.edu.au/research/centres/sdcri



https://builtin.com/artificial-intelligence/machine-learning-examples-applications

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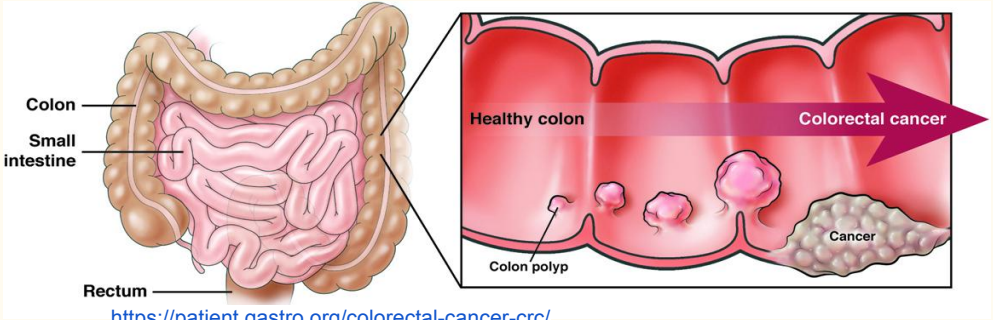
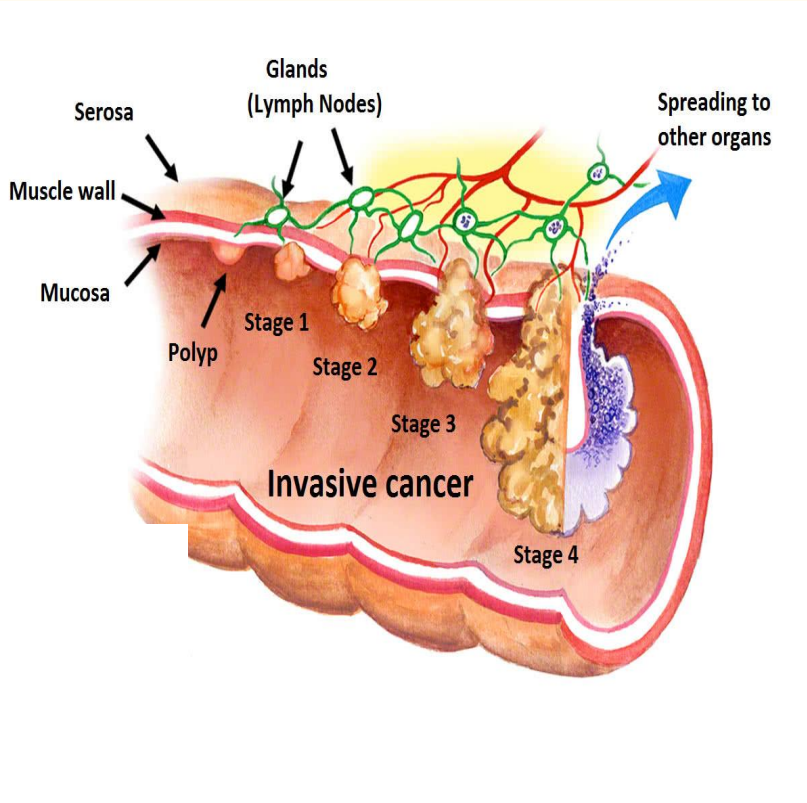
Introduction



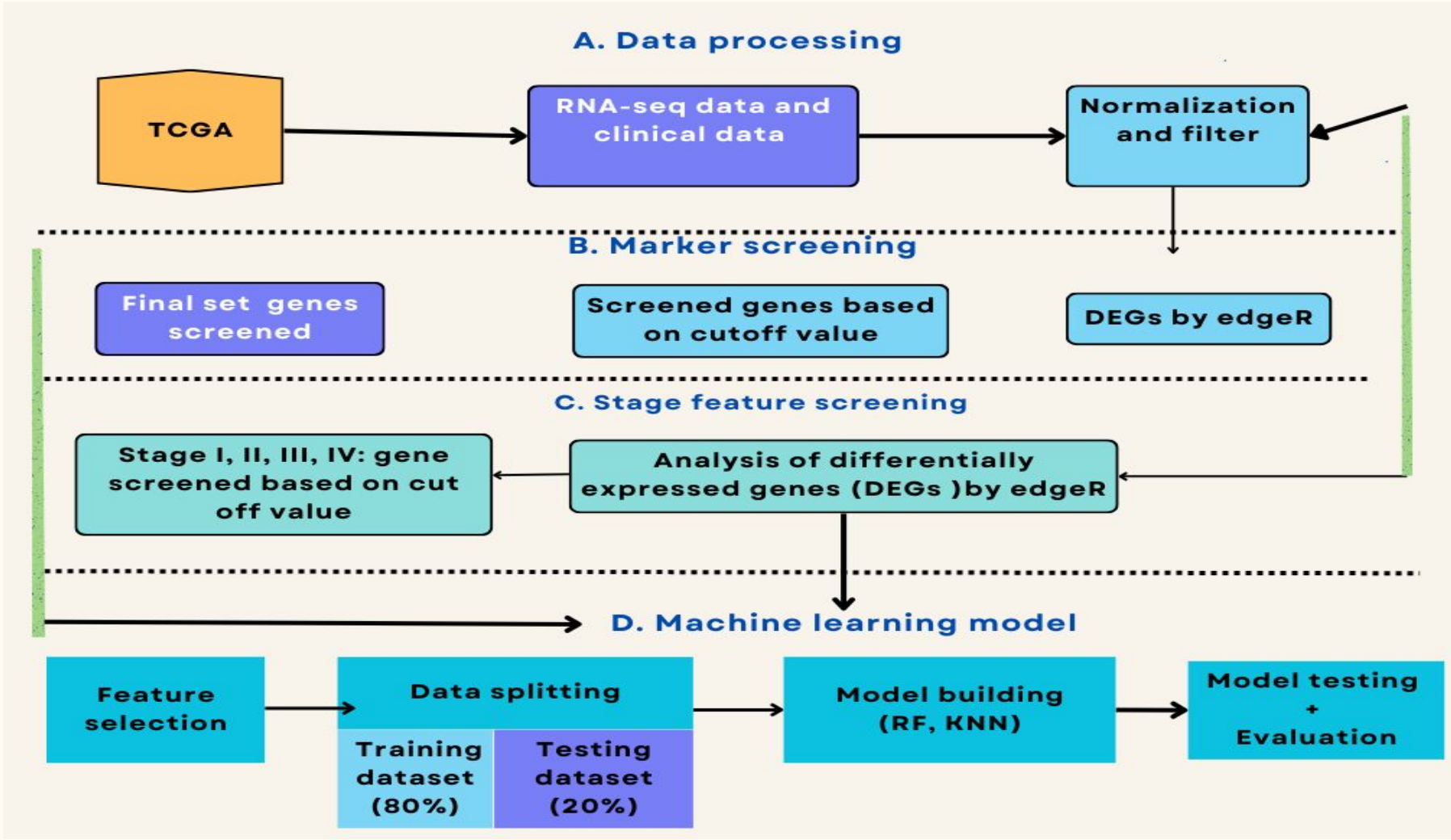
https://patient.gastro.org/colorectal-cancer-crc/

Problem

- Lymph node involvement
- Tumor heterogeneity
- Metastasis
- Post-surgical recurrence risk
- Over /under staging



https://www.baysidecolorectal.com.au/colon-and-rectal-cancer/


A. Data processing
TCGA
RNA-seq data and clinical data
Normalization and filter
B. Marker screening
Final set genes screened
Screened genes based on cutoff value
DEGs by edgeR
C. Stage feature screening
Stage I, II, III, IV: gene screened based on cut off value
Analysis of differentially expressed genes (DEGs)by edgeR
D. Machine learning model
Feature selection
Data splitting
Training dataset (80%)
Testing dataset (20%)
Model building (RF, KNN)
Model testing + Evaluation

Expected results

Improved accuracy in staging and diagnosis

- Random forest best perform colon and cancer staging diagnosis
- Accuracy of colon diagnosis >98% [3]

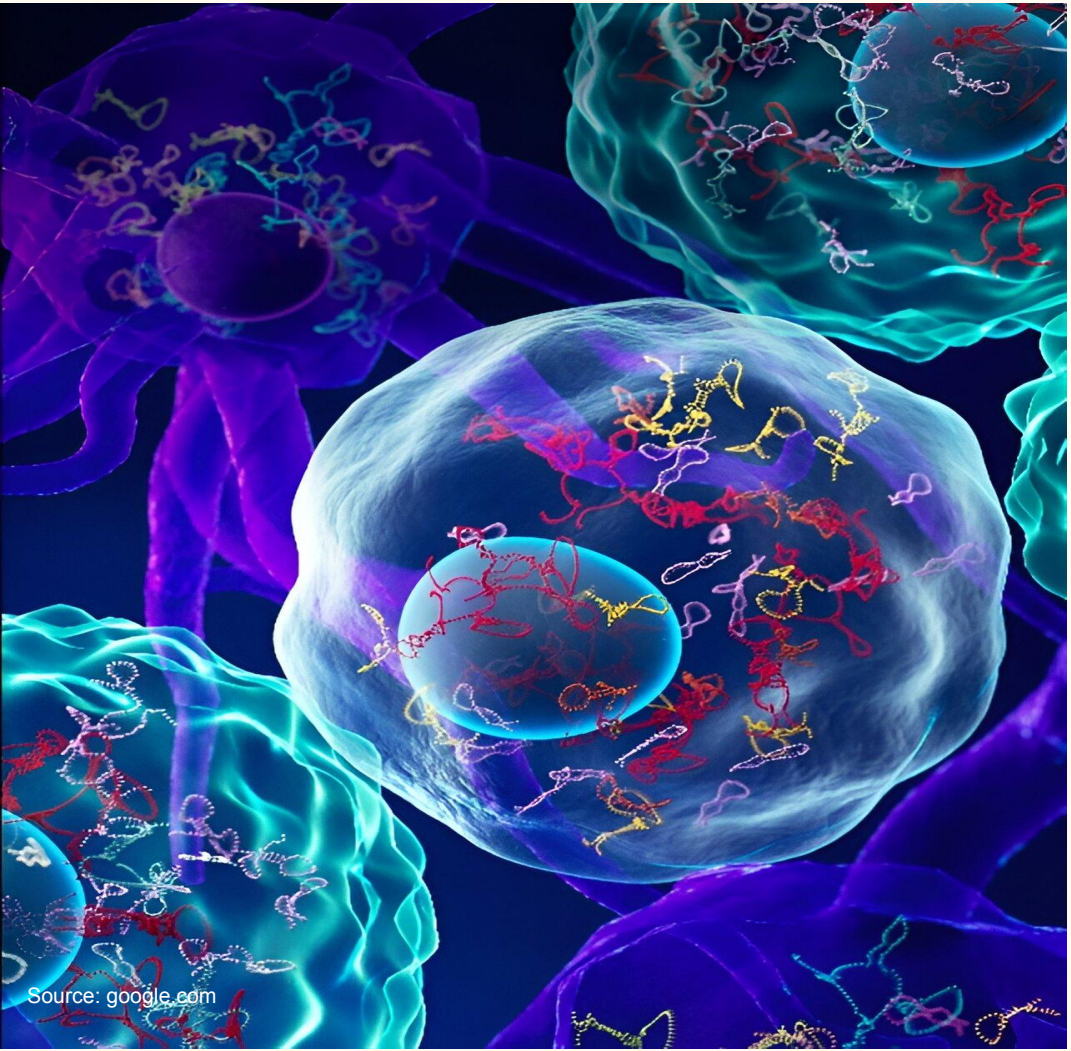
Predicting recurrence risk and survival

- Predict recurrence risk (gene expression profiles) stage II and III [4]

Identify biomarker

- Colon cancer prognosis associated genes

- ML screens new biomarker genes which enhances cancer treatment and targeted therapies.
- Enhanced ML model provides accurate diagnostic cancer staging.



Thank You

References

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