

Supplementary Materials

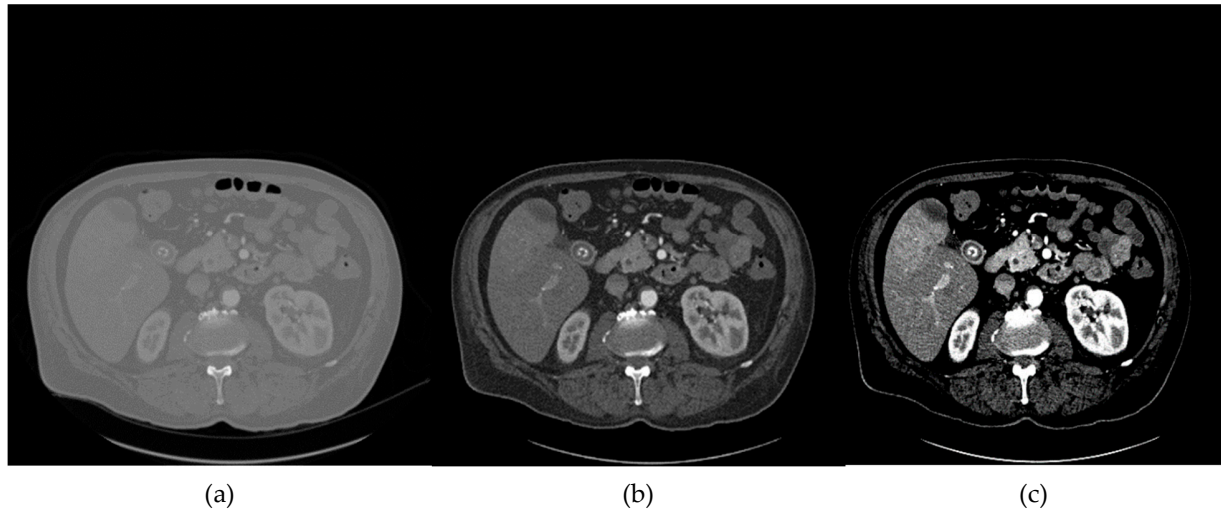


Figure S1. 2D Kidney CT slices of varying HU. **(a)** Total HU range, original slice, **(b)** range between [-200, 500], as used in the current study, and **(c)** [-30, 200].

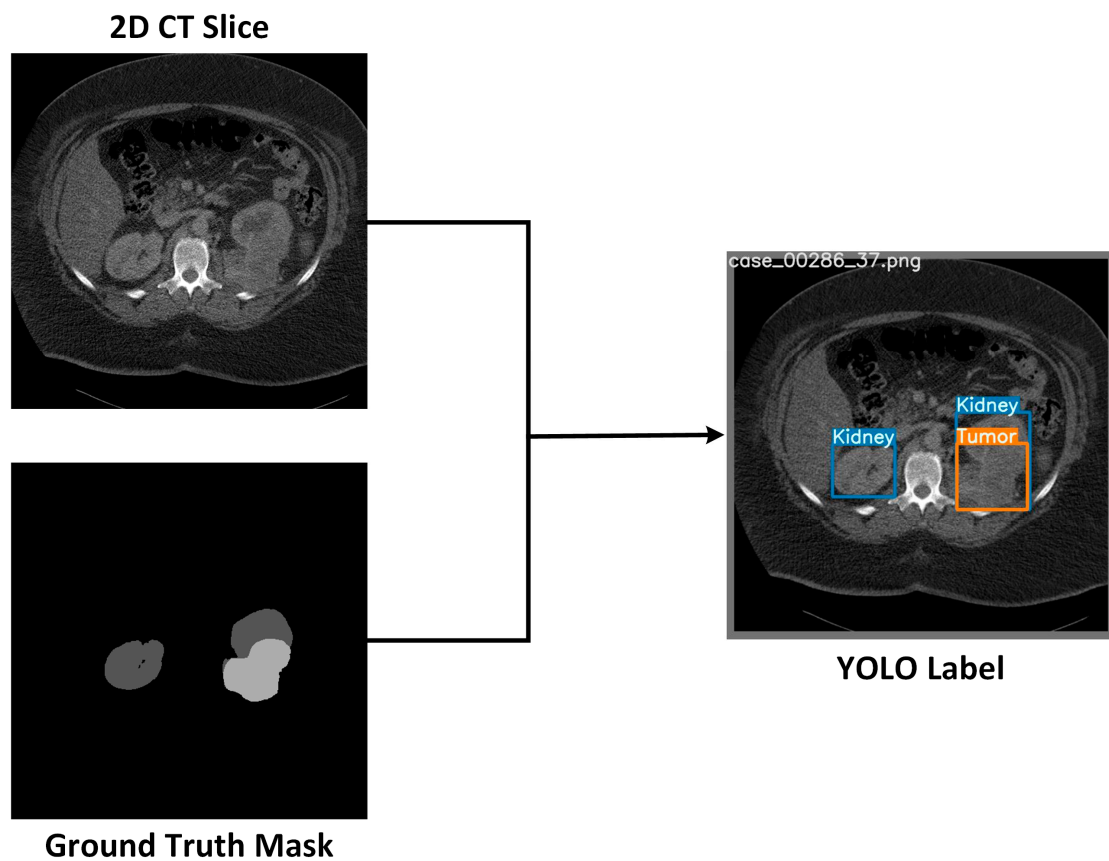


Figure S2. Bounding box creation process for training YOLO frameworks.

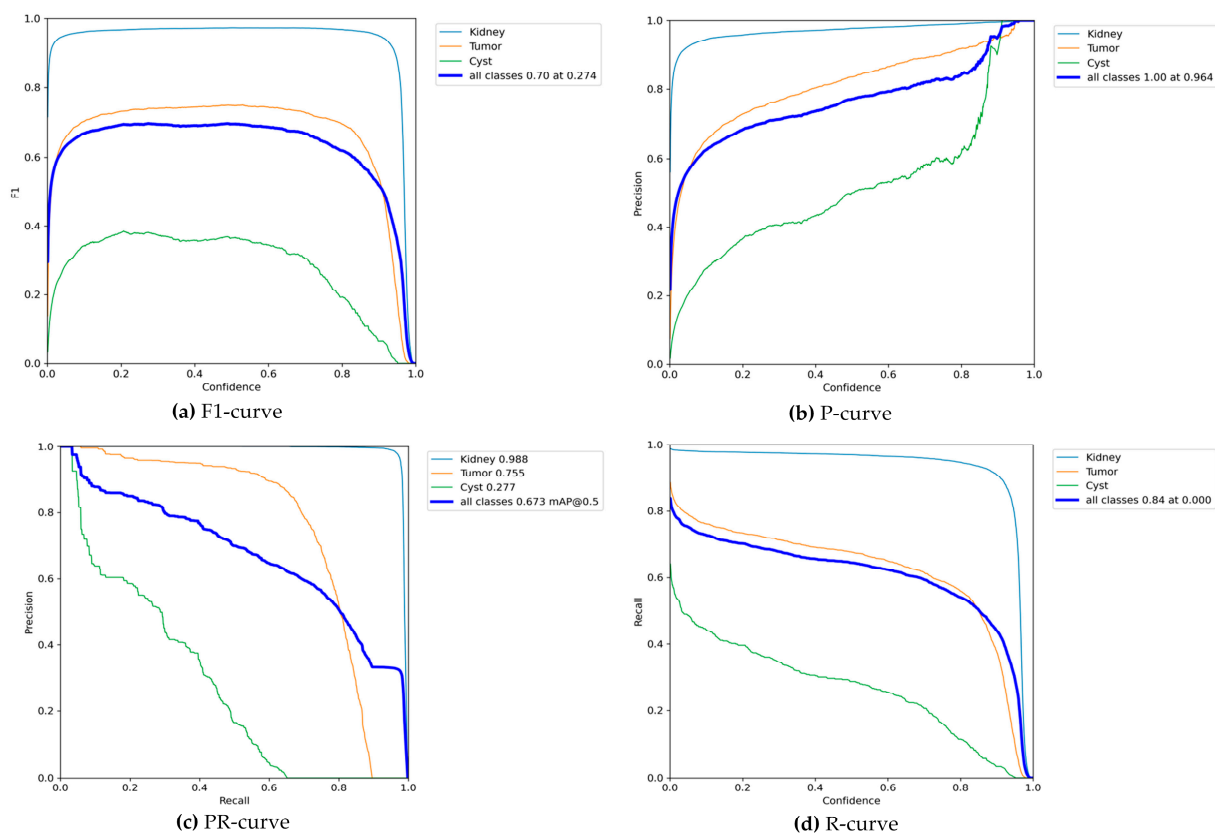


Figure S3. YOLOv7 model performance curves plotted for each object type (kidney, tumor, and cyst), alongside combined performance.

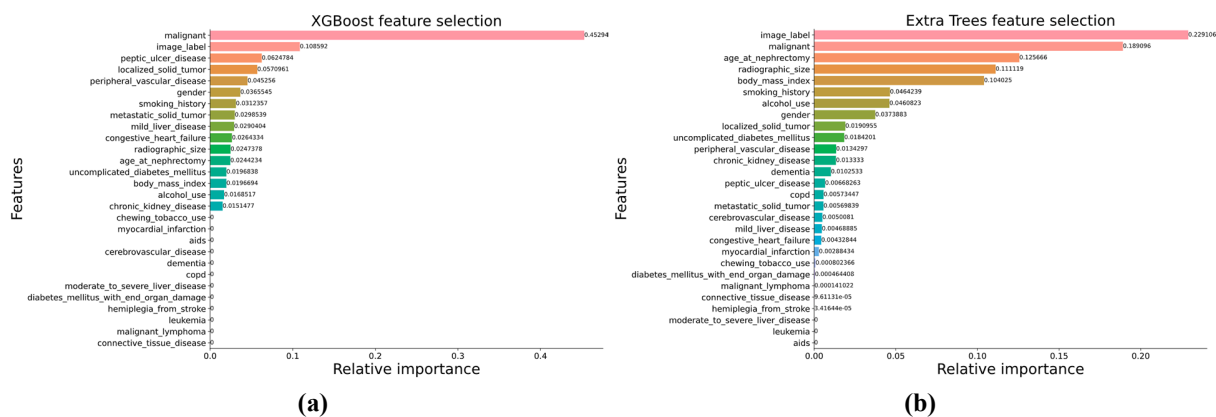


Figure S4. XGBoost **(a)** and Extra Trees **(b)** classifier-based feature selection outcomes for the kidney tumor classification. Ranked features from the Extra trees and Random Forest algorithms were very similar.

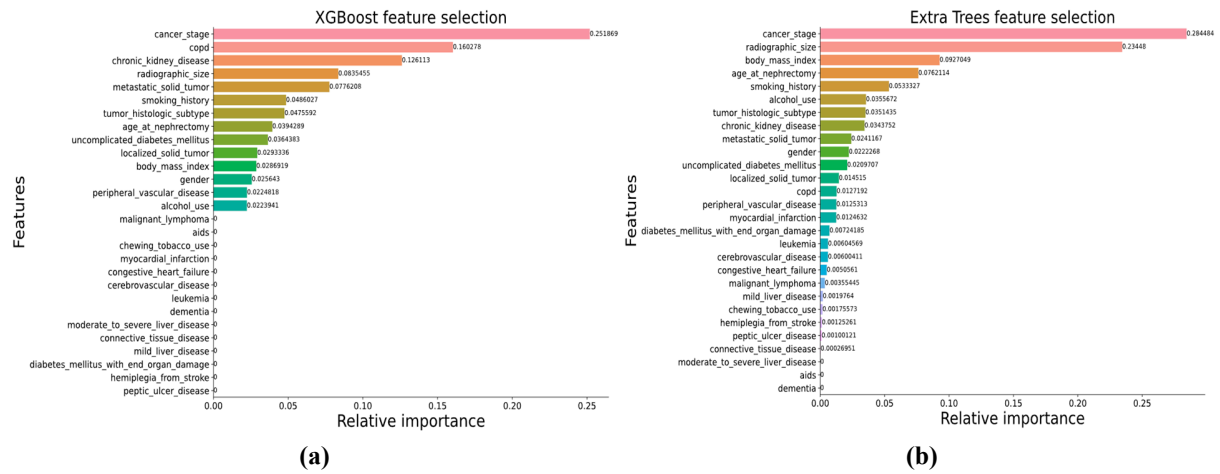


Figure S5. XGBoost **(a)** and Extra Trees **(b)** classifier-based feature selection outcomes for the surgery procedure classification. Ranked features from the Extra trees and Random Forest algorithms were very similar.

Table S1. Subject-wise split five-fold information regarding the subject range

Fold Num	Train (Sub Range)	Validation (Sub Range)	Test (Sub Range)
1	"1-192"	"193-240"	"241-300"
2	"(1-132)+(241-300)"	"133-180"	"181-240"
3	"(1-72)+(181-300)"	"73-120"	"121-180"
4	"(1-12)+(121-300)"	"13-60"	"61-120"
5	"109-300"	"61-108"	"1-60"