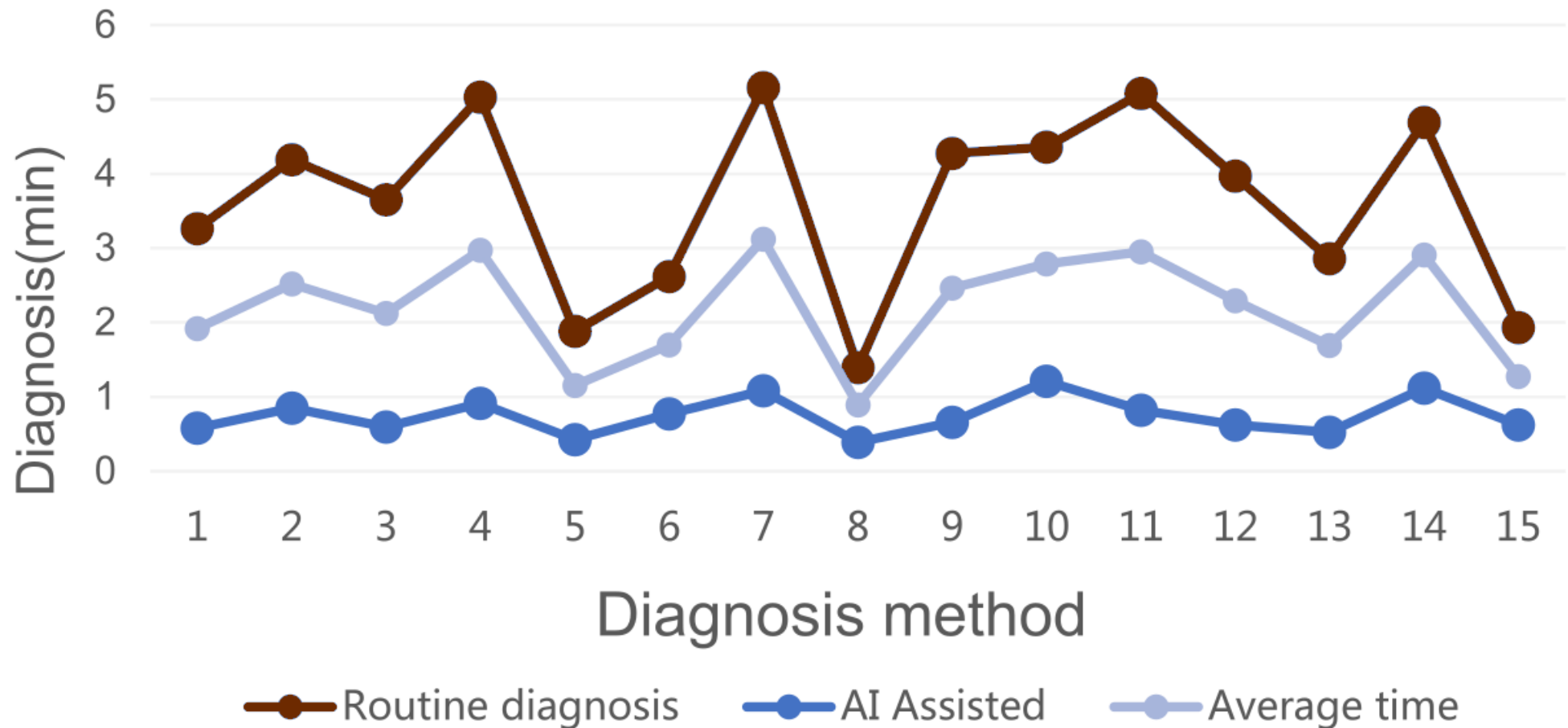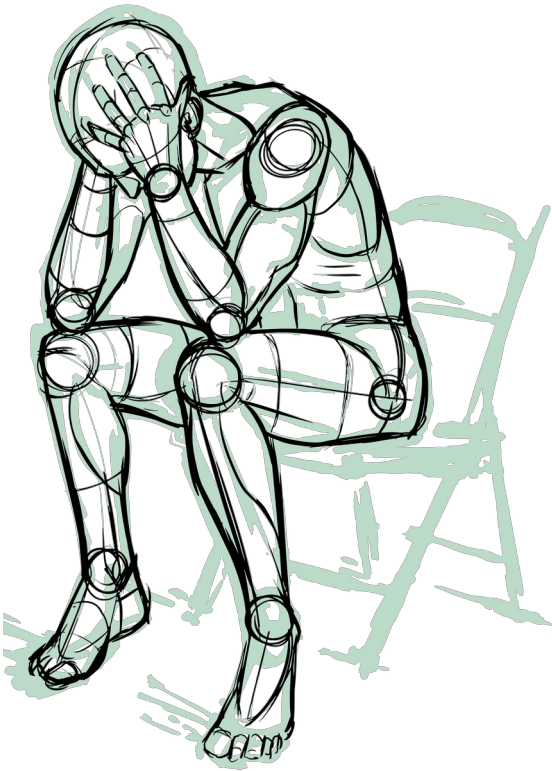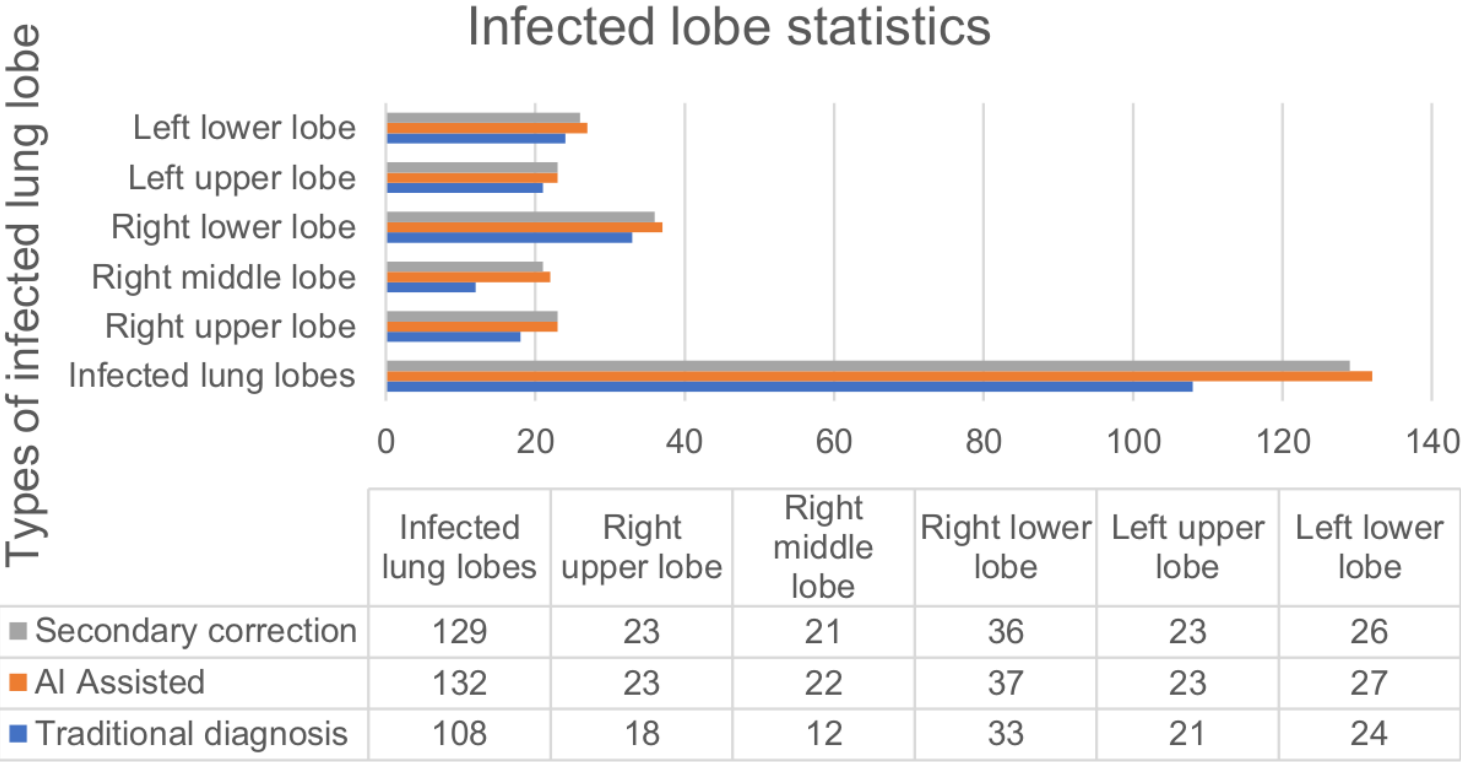# Computer-aided Diagnosis (CAD) Systems

Fernando Pujaico Rivera

The value of artificial intelligence and imaging diagnosis in the fight against COVID-19

experiência

The value of artificial intelligence and imaging diagnosis in the fight against COVID-19

Infected lobe statistics

Types of infected lung lobe

|	Infected lung lobes	Right upper lobe	Right middle lobe	Right lower lobe	Left upper lobe	Left lower lobe
■ Secondary correction	129	23	21	36	23	26
■ AI Assisted	132	23	22	37	23	27
■ Traditional diagnosis	108	18	12	33	21	24

Statistical data

■ Secondary correction   ■ AI Assisted   ■ Traditional diagnosis

Fadiga

Método de trabalho

An overview of the six main steps used in this study (COVID-19 pneumonia)

https://doi.org/10.1007/s00330-020-07087-y
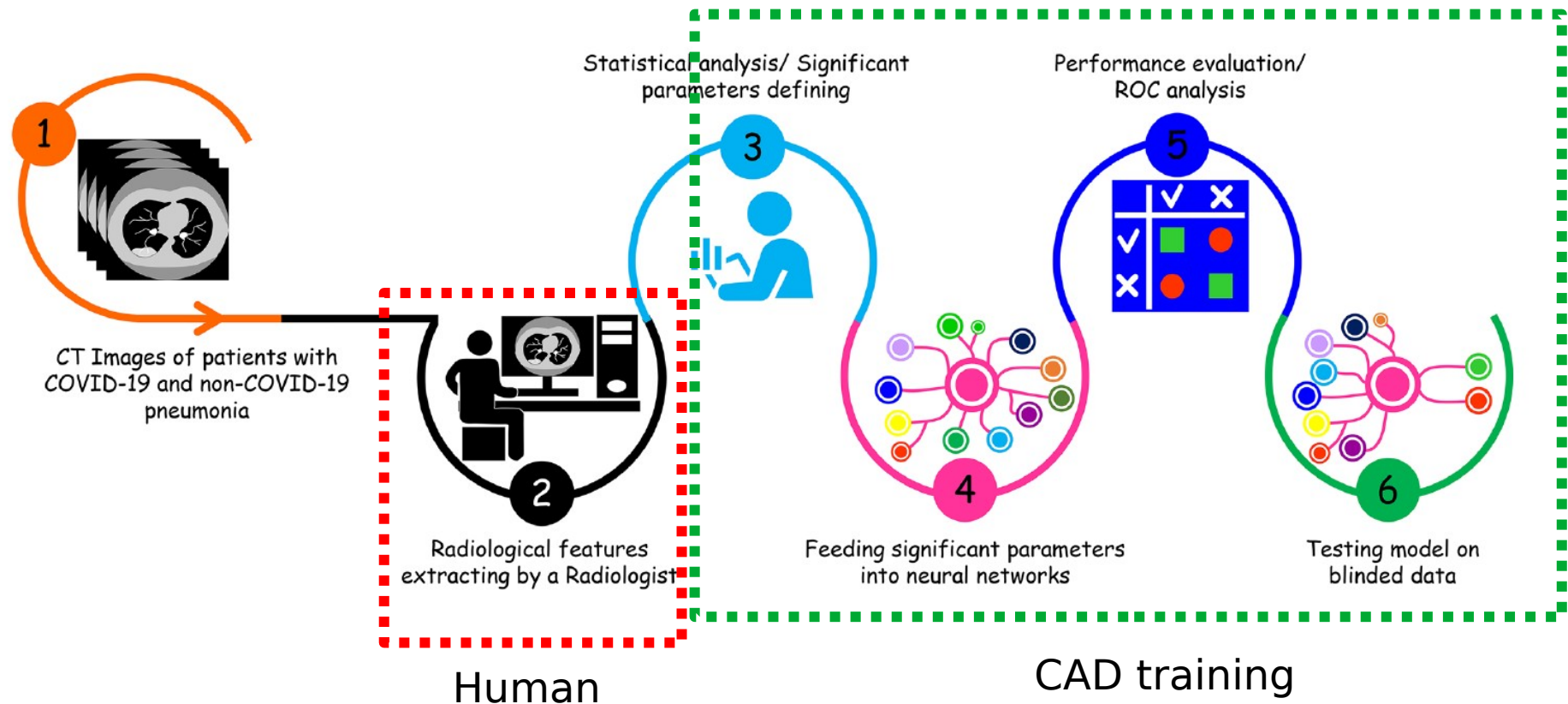
Casos (outros temas procurados)
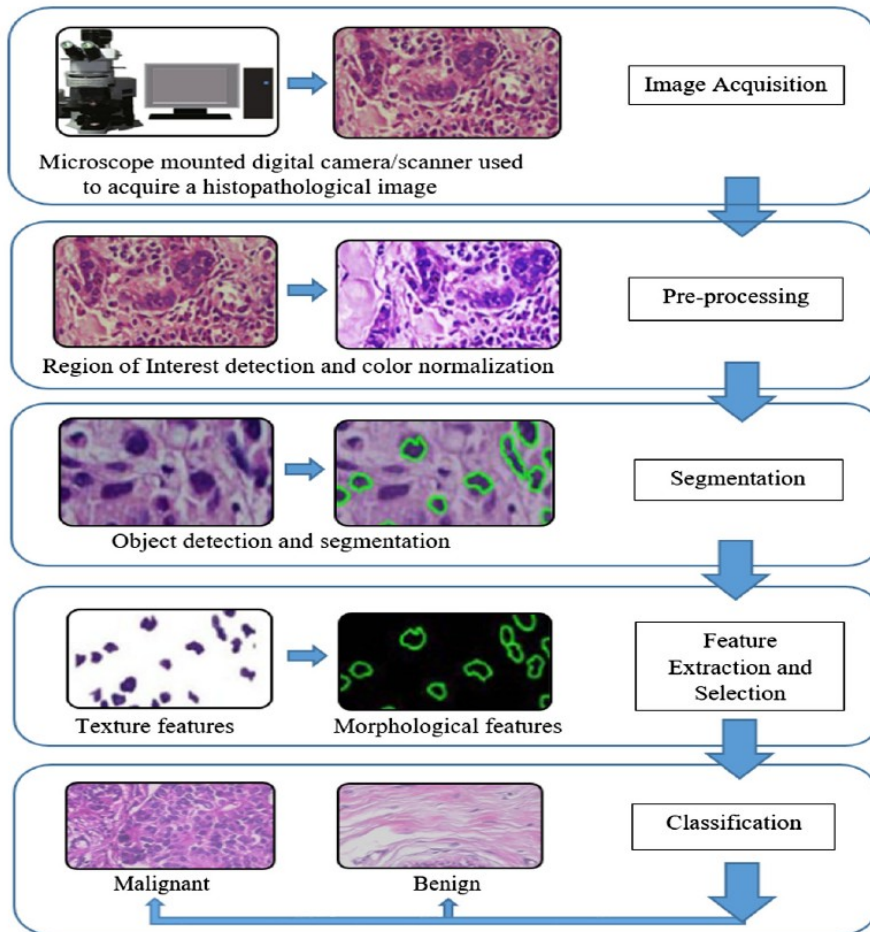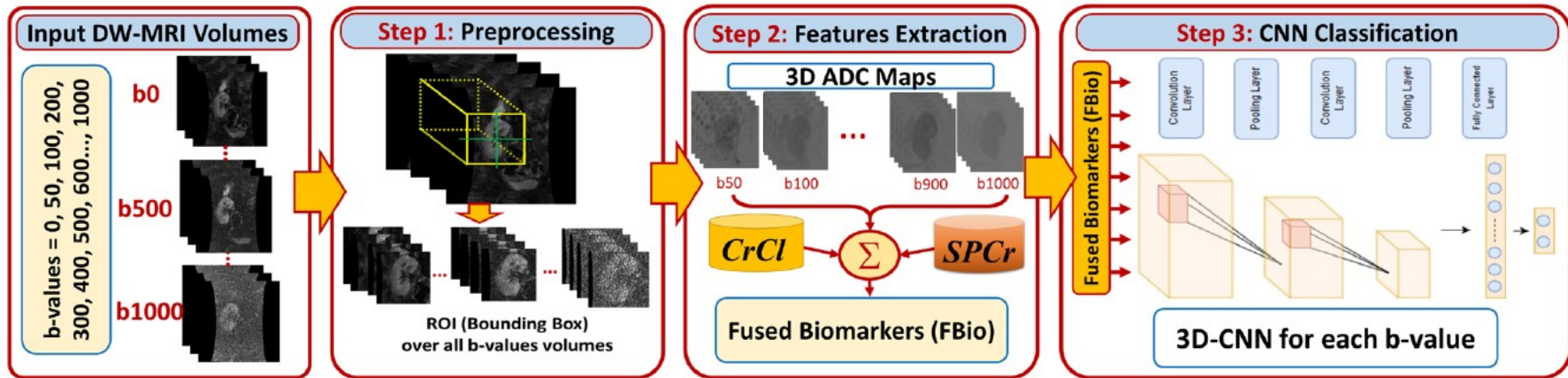
Breast cancer analysis

Fig. 4. Comprehensive view of CAD system for breast cancer using histopathology.

Input:

- Computerized Tomography,

- Magnetic Resonance Imaging,

- Ultrasound and Biopsy.

- Histopathological images.

Output: Malignant, bening

Kidney Dysfunction analysis

Input: Diffusion weighted (DW) magnetic resonance images (MRI)

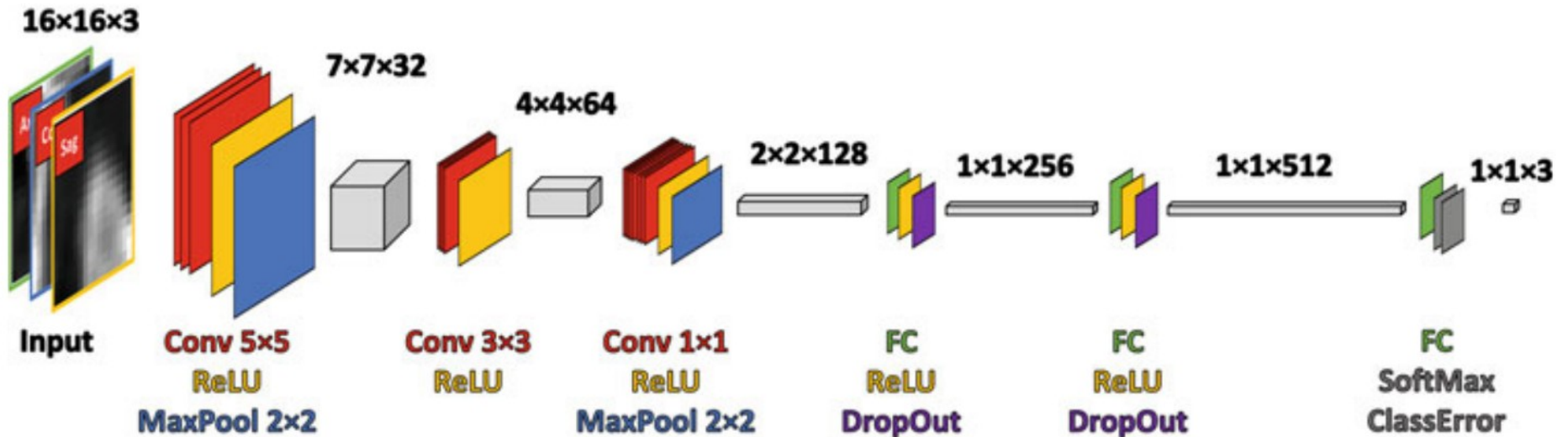**Output: classify renal allografts into non-rejection (NR) and acute rejection (AR)**

Quality of the Final Diagnosis				
Approach	ACC%≈	SENS%≈	SPEC%≈	AUC≈
$SAEs$ (CDFs)[42]	86	70	100	0.88
S_1 (ADC only)	82	80	83	0.83
S_2 (FBio)	93	93	92	0.93
SVM (ClinBio)	77	80	73	0.80

Skin lesion recognition

Classes	Acc. %	Sen. %	Spe. %	Err. %	Pre. %	FSc. %
MEL	98.03	94.00	98.70	01.97	92.38	93.18
NV	97.89	93.00	98.70	02.11	92.30	92.64
BCC	97.92	93.75	98.62	02.08	91.91	92.82
AKIEC	97.89	92.25	98.83	02.11	92.94	92.59
BKL	98.10	92.75	99.00	01.90	93.92	93.33
DF	98.46	94.25	99.16	01.54	94.96	94.60
VASC	98.39	93.50	99.20	01.61	95.16	94.32

Input: digital dermoscopic images

Output: skin pattern classifier: MEL, NV, BCC, AKIEC, BKL, DF or VASC

https://doi.org/10.1007/s11042-019-07988-1

Classification of Spinal Metastatic Lesions

Input: computed tomography (CT) Data

Output: classification of osteolytic and osteoblastic lesions in the spine

Authors	# Lesions	TPR (−)	FP (count per lesion)
Inter-rater	1046 (755)	0.63 (0.73)	0.02 (0.02)
Yao et al. [3]	16 (372)	0.94 (0.84)	5.90 (1.30)
Jan et al. [6]	1046 (755)	0.70 (0.80)	1.50 (1.50)
Roth et al. [4, 5]	−(532)	−(0.70)	−(0.30)
Proposed CAD	1046 (755)	0.94 (0.92)	3.30 (2.80)