



Research topics currently active at UFF

Temas de investigación actualmente activos en la UFF



Aura Conci

Universidade Federal Fluminense

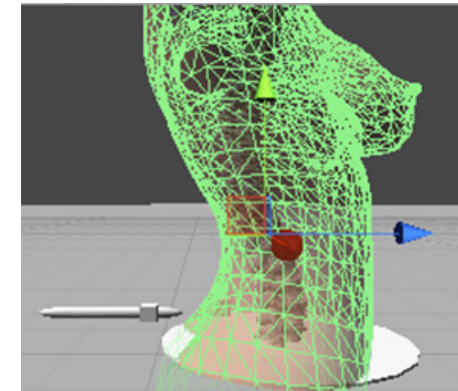
aconci@ic.uff.br - www.ic.uff.br/~aconci

octubre 2018

ANALISIS DE IMAGEN BIOMEDICA



- ▶ Reconstrucción,
- ▶ detección de enfermedades (tumores),
- ▶ segmentación de órganos,
- ▶ registro y fusión de imágenes deformables,
- ▶ modelado de órganos,
- ▶ anatomía computacional,
- ▶ estudios de población,
- ▶ comprensión del cerebro.



- ▶ Todas las imágenes mostradas aquí son de trabajos desarrollados por nuestro grupo!

objetivos



Análisis de imágenes biomédicas: adaptación y el desarrollo de técnicas novedosas para problemas desde adquisiciones médicas a subsecciones subsiguientes para brindar contribuciones en sistemas de apoyo a la decisión: sistemas DSS, CADe y CADx.

- ▶ Main area of our researches in
 - Tiroides / thyroid
 - Pecho / breast
 - Cerebro /brain
 - grasa del corazón / heart fat diseases (cholesterol)

TERMOGRAFIA:



▶ Parceiros:

■ Área técnica:

▶ Eng. Mecânica – UFPE

■ Eng Elétrica e Informática- UFMA

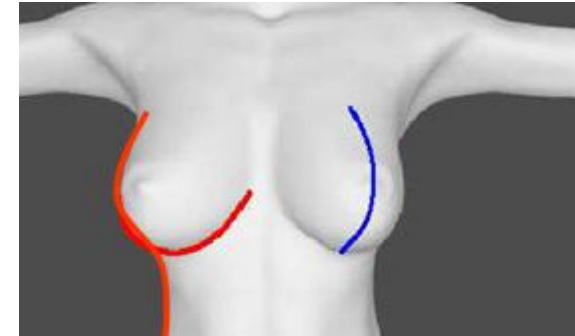
■ Politecnica de Bucarest (RV)

■ Área médica:

▶ no HC/UFPE

▶ HUAP/UFF

▶ HCE – Rio de Janeiro

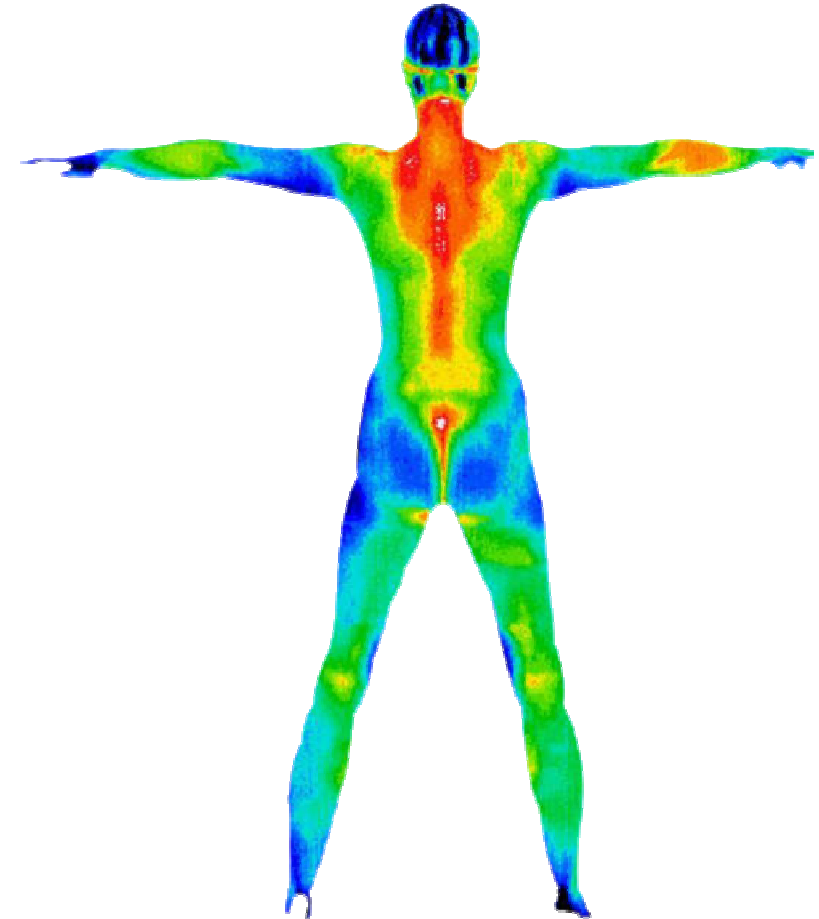


Nombre del Evento, Lugar

O que se faz

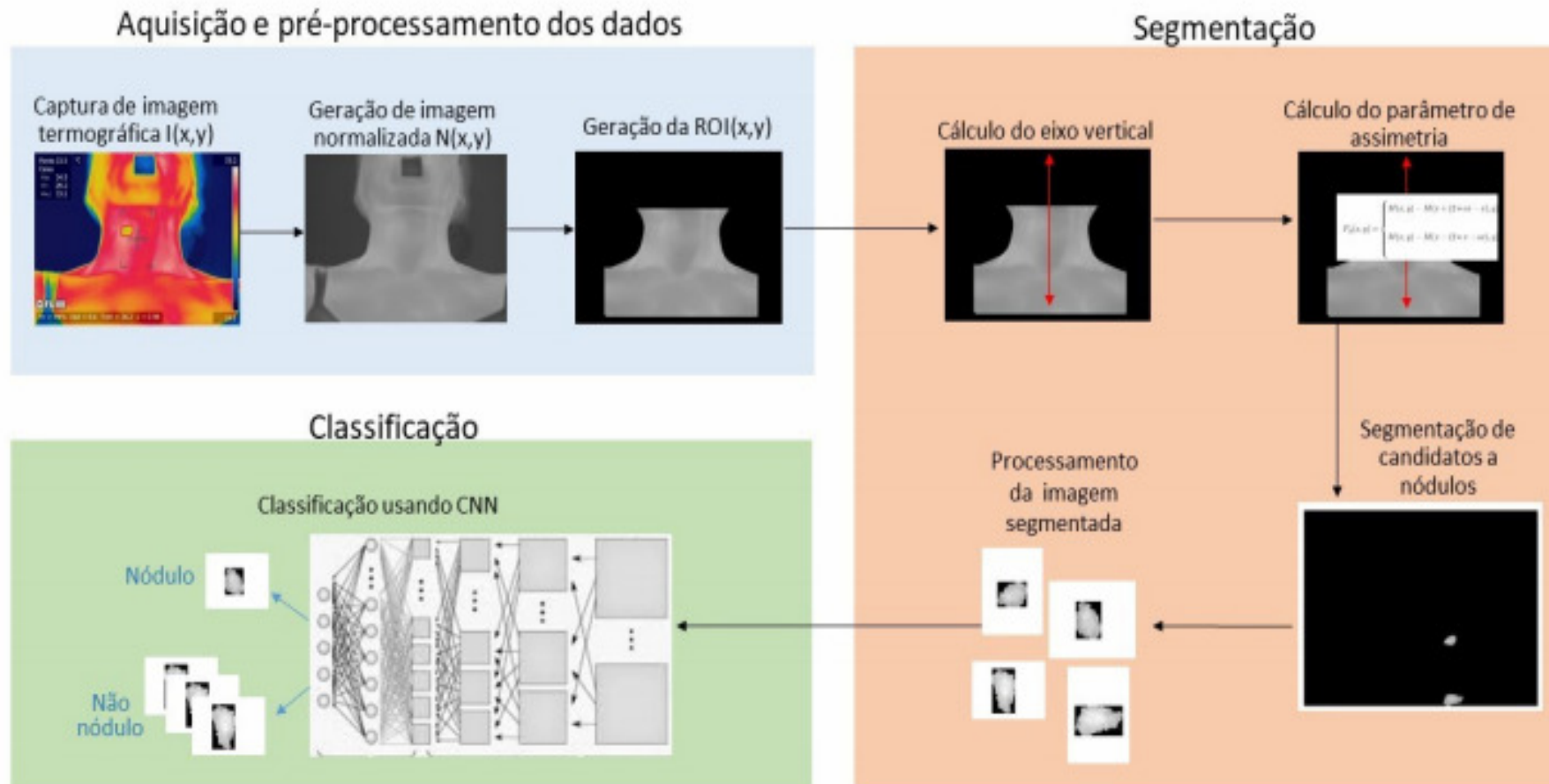


- ▶ Banco de dados de mama
- ▶ Sistema de Auxilio ao diagnóstico
- ▶ Reconstrução
- ▶ Análise do Problema Inverso
- ▶ Segmentação
- ▶ Fusão de Informações
- ▶ Registro de imagens

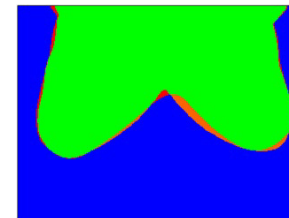
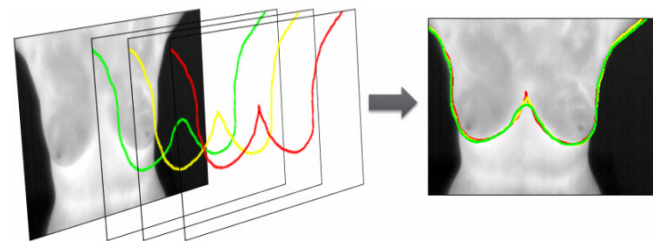
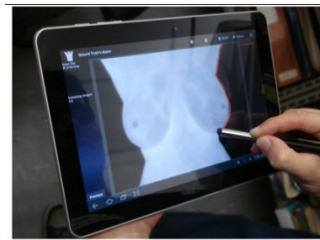


Nombre del Evento, Lugar

tiroides



Help on manual segmentation



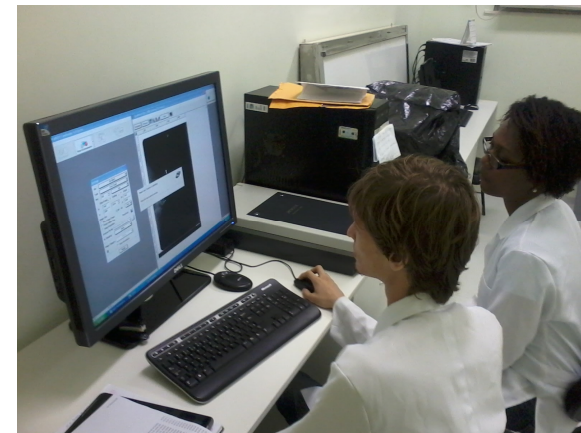
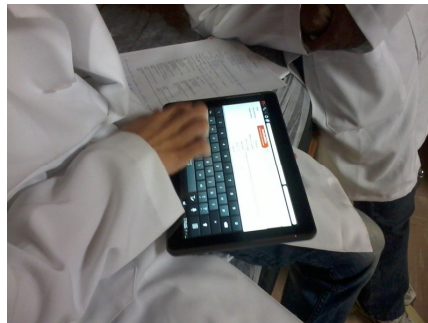
Nombre del Evento, Lugar

		software	
		healthy	disease
Real	healthy	TP	FN
	disease	FP	TN

Pesquisas em Sistemas de Apoio à Decisão - **SAD**



- ▶ Doenças Associadas ao Envelhecimento
- ▶ Projeto SiADDi-E
- ▶ 2 Teses de doutorado com prêmio SUS de teses na área médica
- ▶ Parceria com UFRJ e CEPE
- ▶ Parceria com Pro Laudo (Brasil)

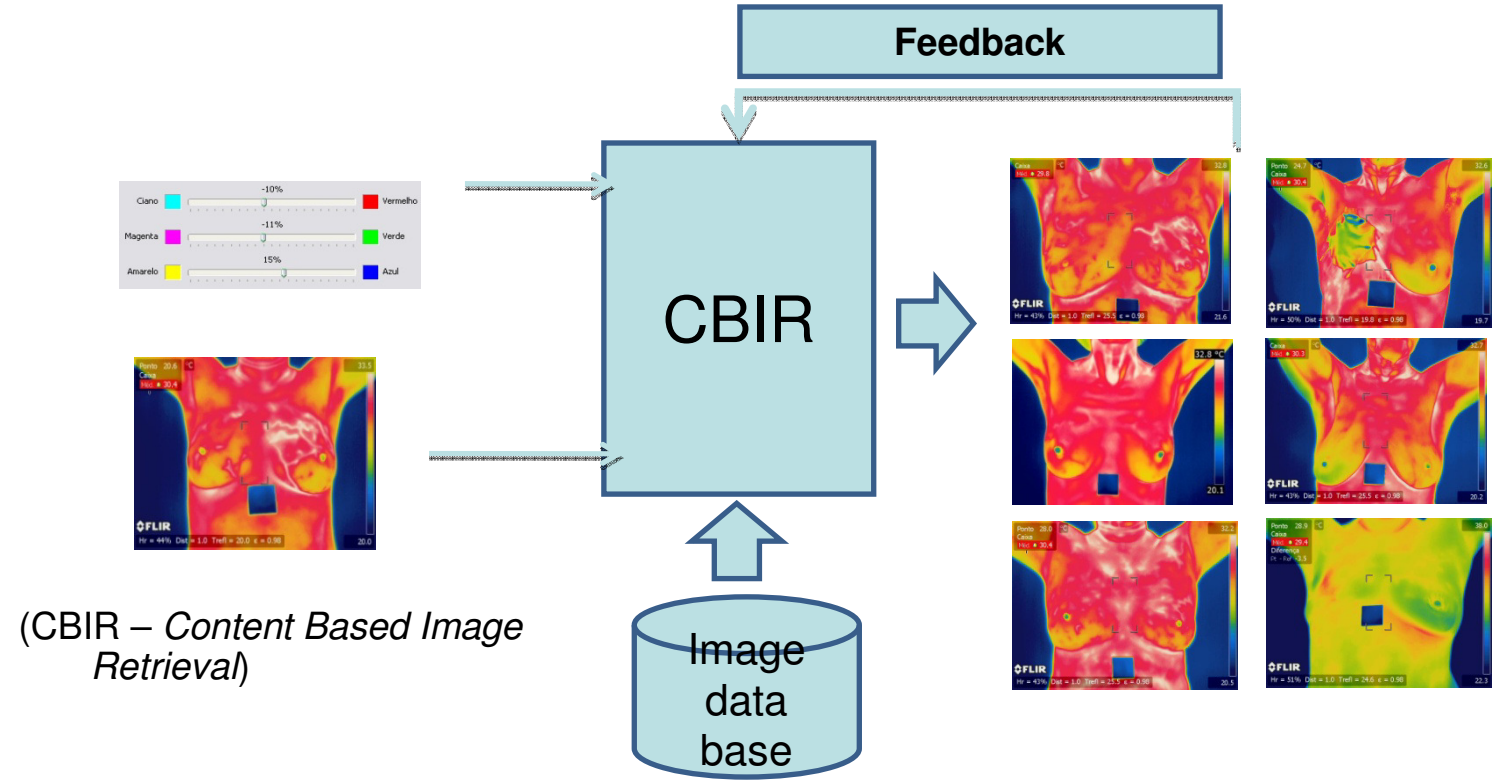


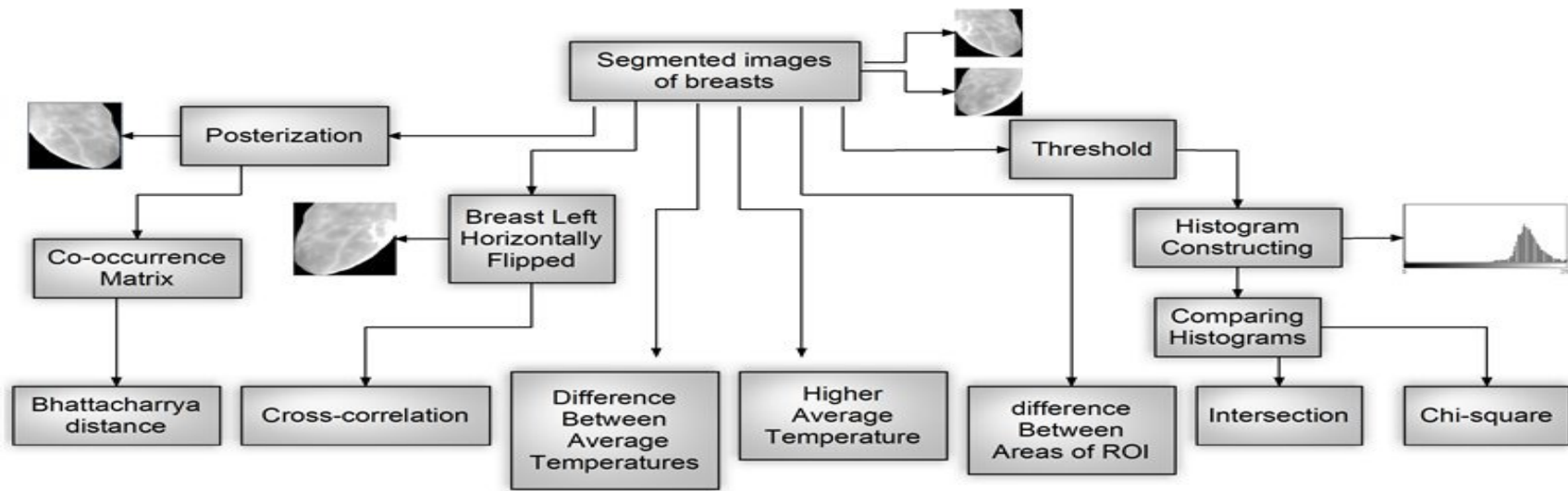
Nombre del Evento, Lugar

Data base organization and managing

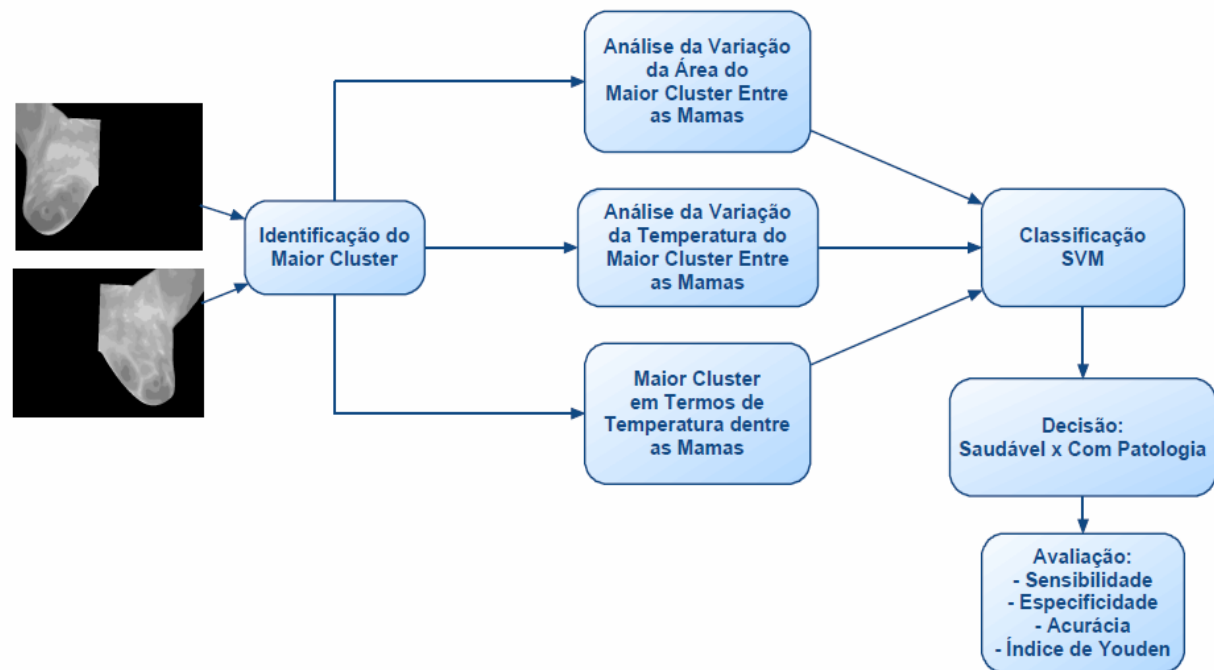
Pesquisa - Search

Número do arquivo - File number:
 Prontuário - Patient ID:
 Idade - Age:
 Tipo de captura - Acquisition type:
 Diagnóstico - Diagnosis:
 Data do exame - Exam date:



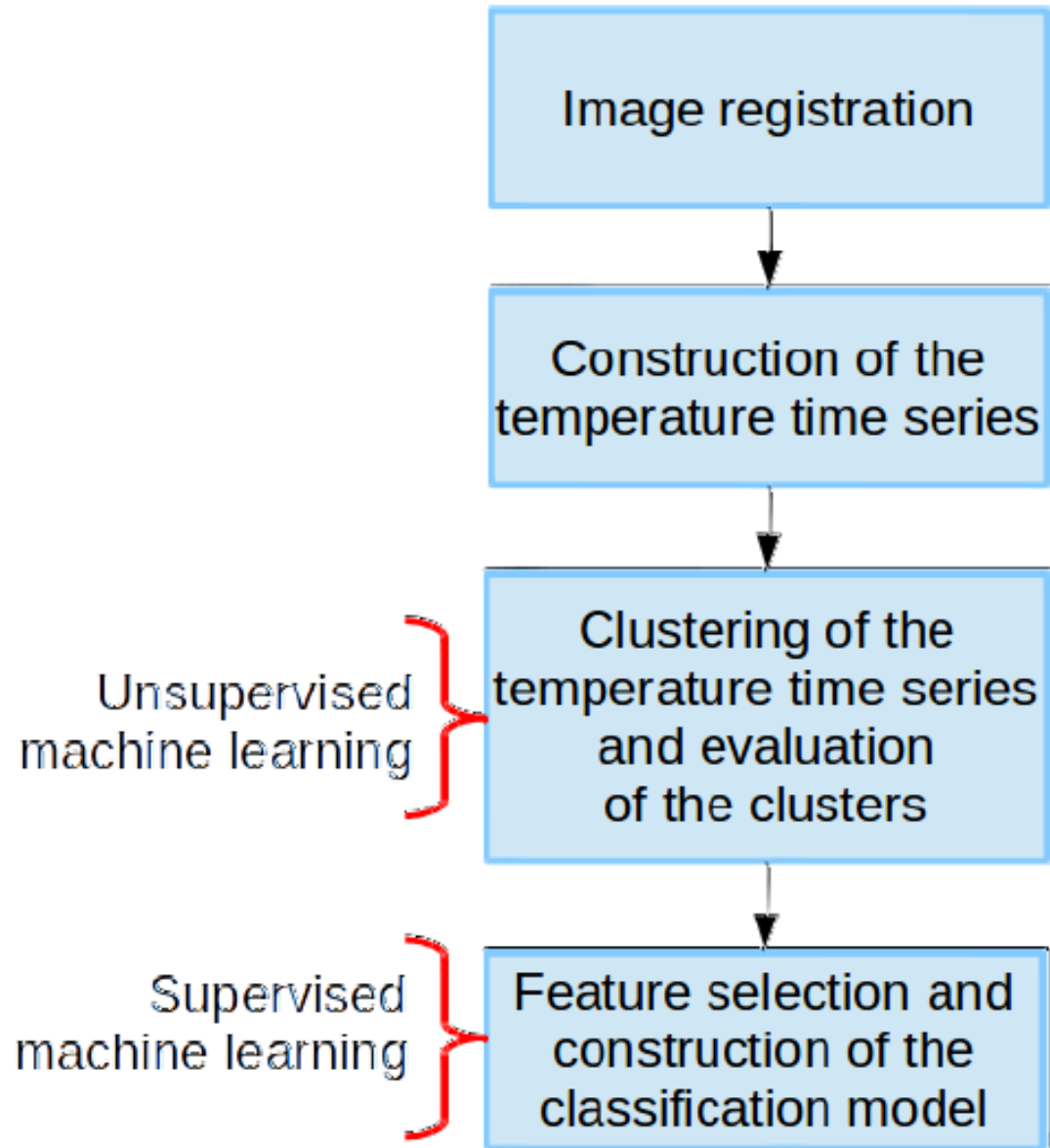


Análise Estática



Protocolo dinâmico

- ▶ Usando o regime transitório



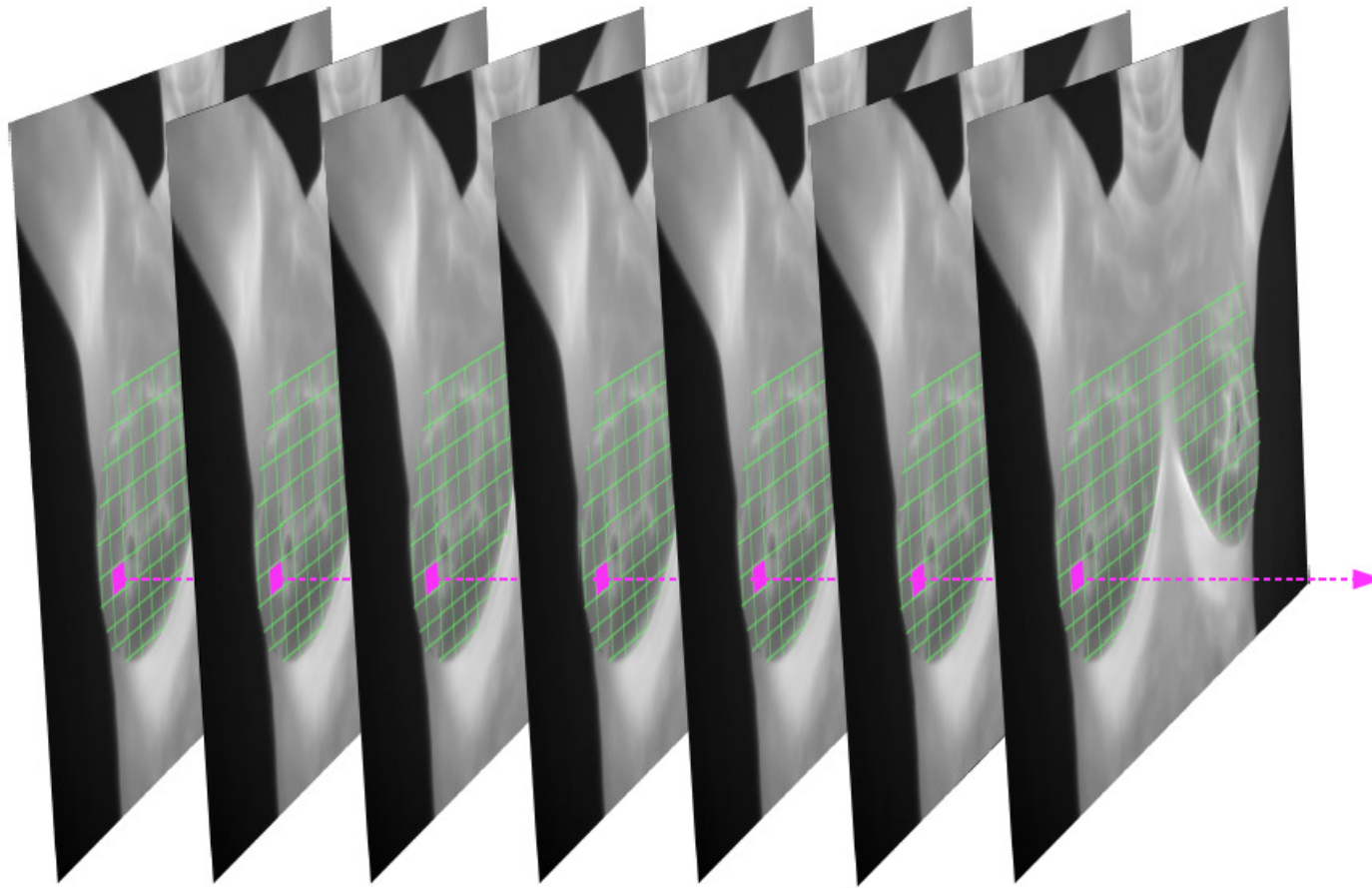


Figure 5: Observing the higher temperature of a breast square region in all thermograms of the sequence to form a time series.

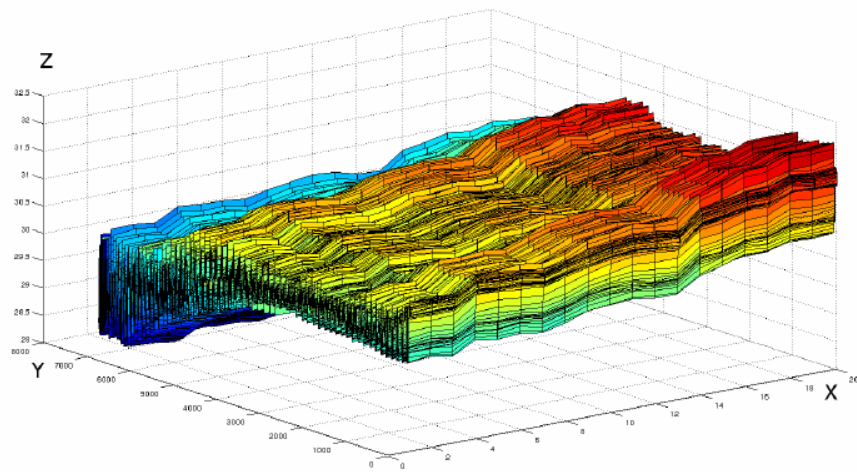


Figure 7: Temperature time series of a healthy patient.

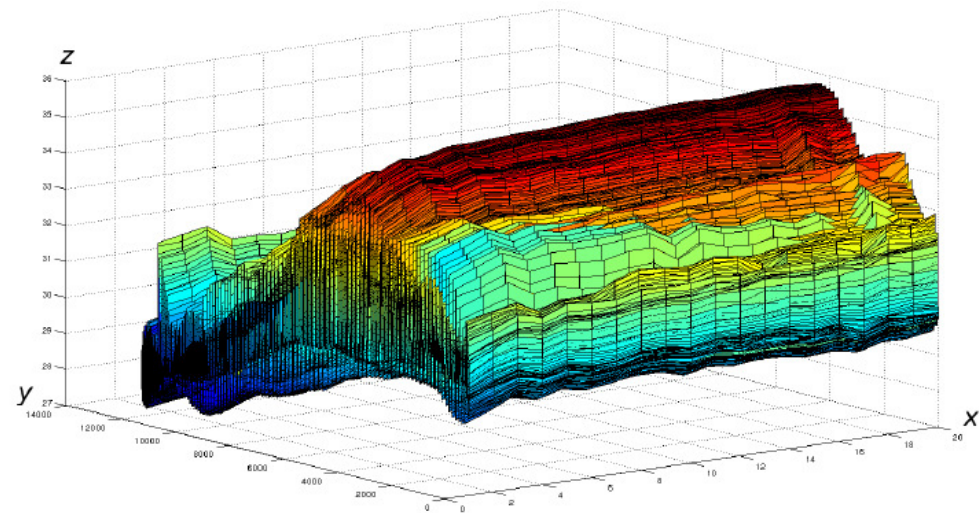
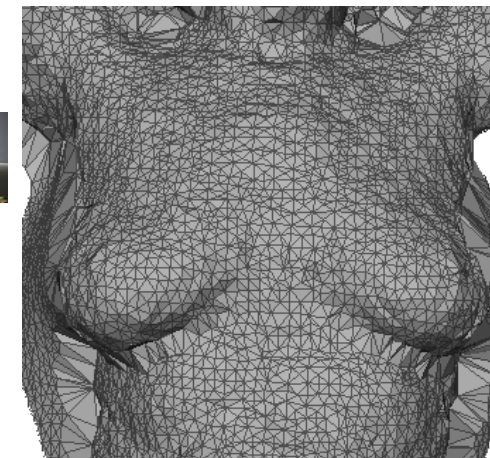
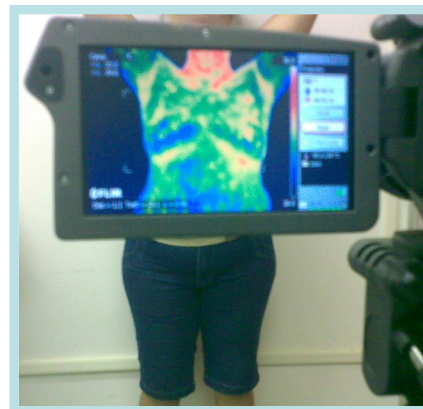
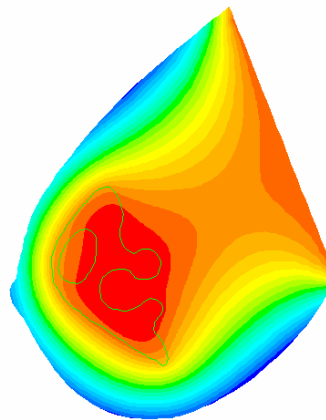
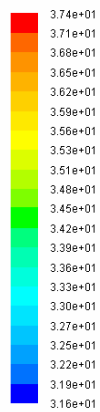
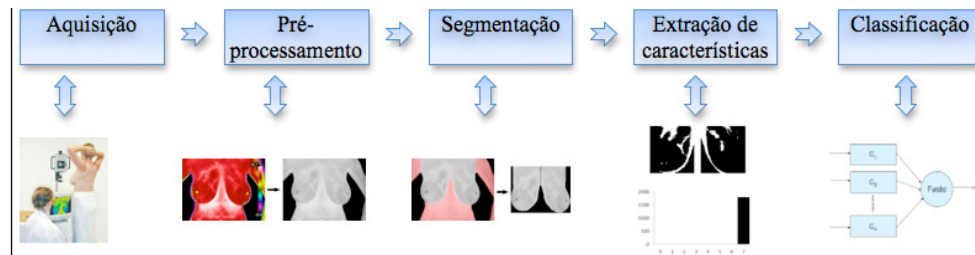
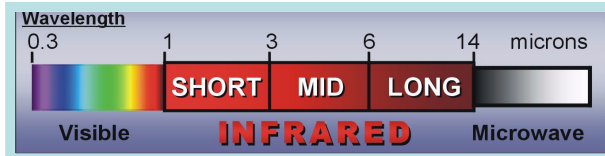
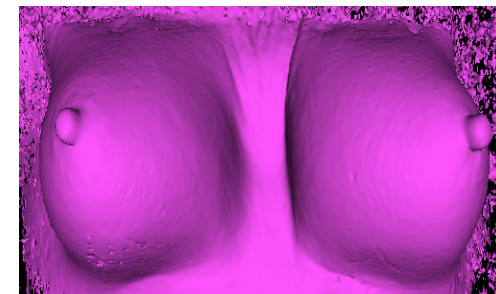
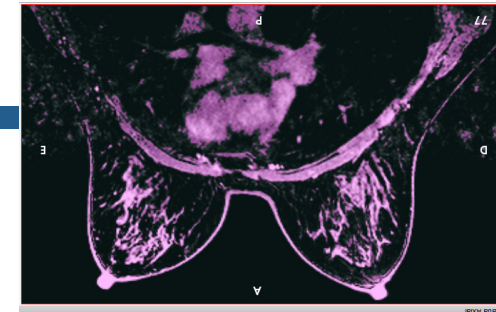
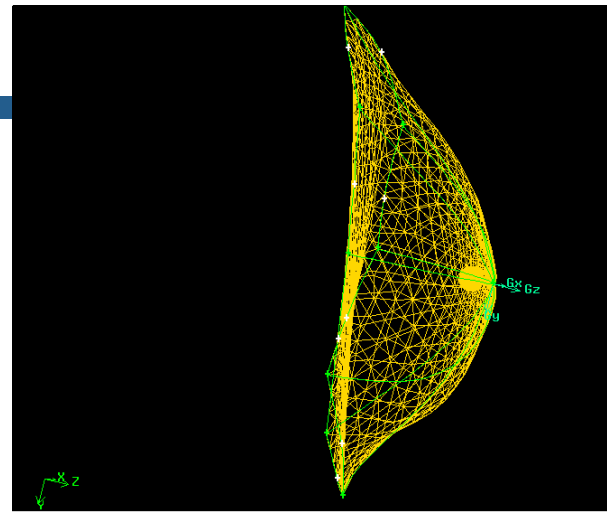
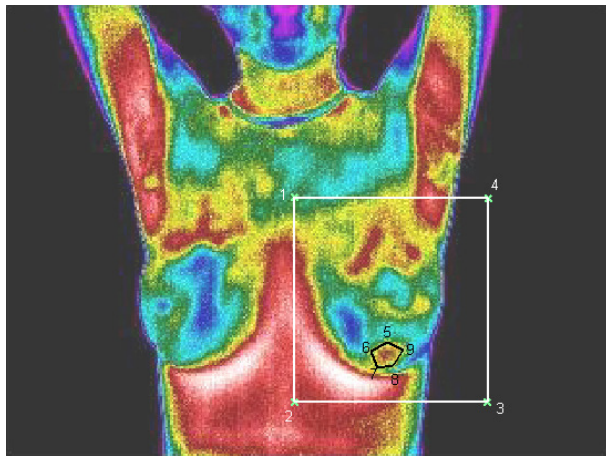
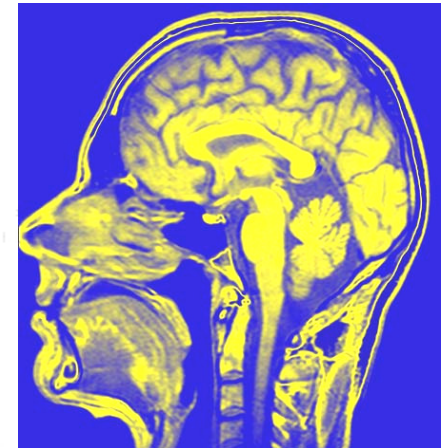
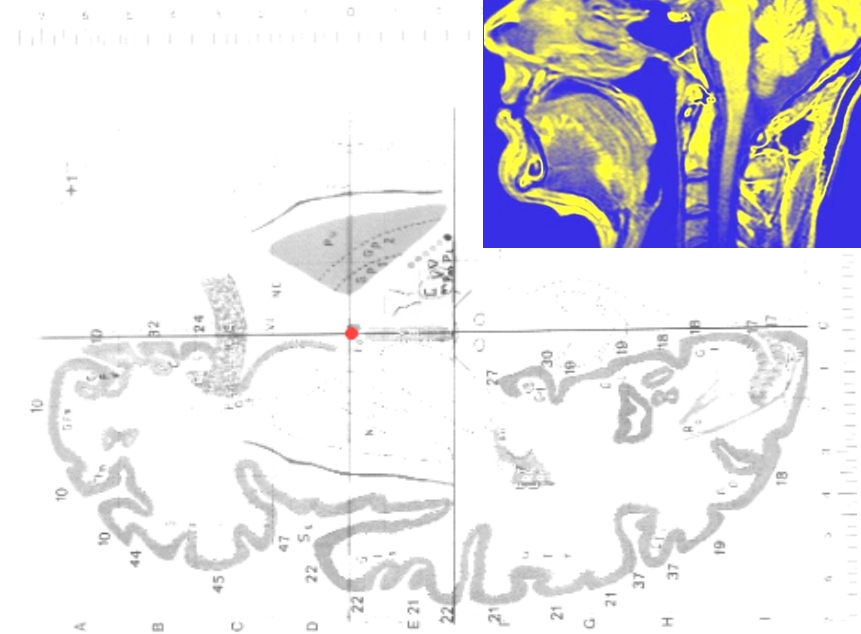


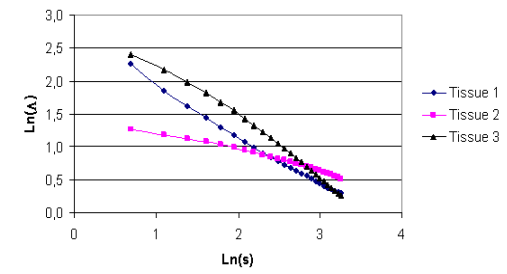
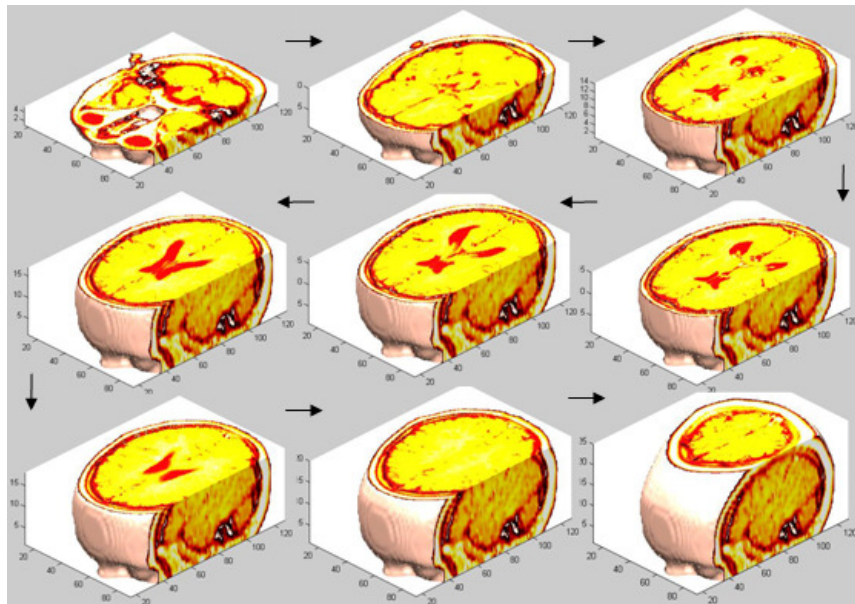
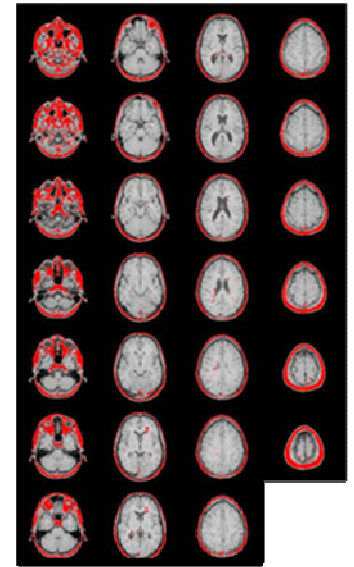
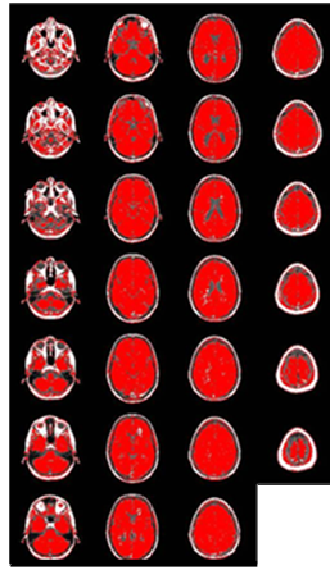
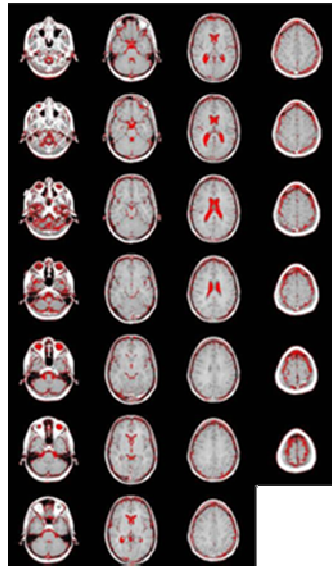
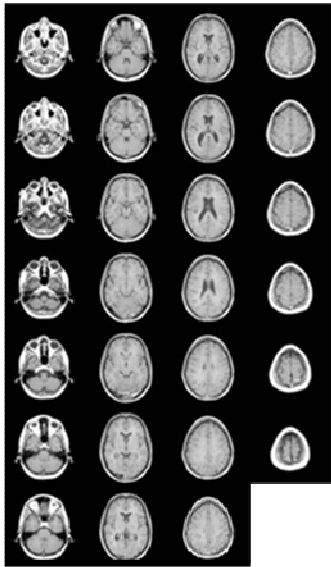
Figure 6: Temperature time series of a patient with cancerous tumors.



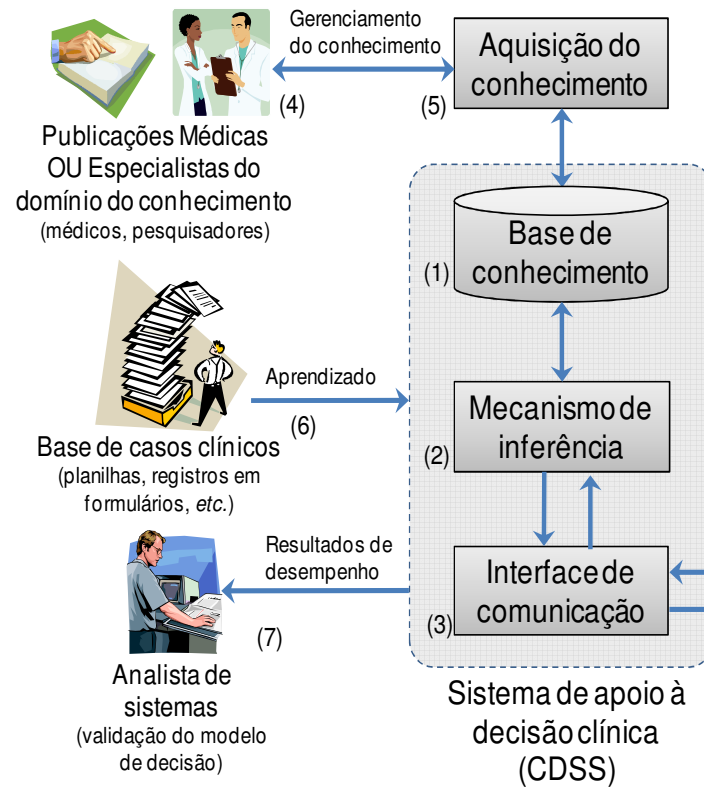
Decision support systems – DSS

- ▶ Our researches in brain
 - Tecidos do Encéfalo
 - Neuro degenerativas
 - **ressonância magnética (RM)**
 - **doença de Alzheimer**
 - **Depressão**
 - **Parkinson**
 - **DEMENTIA**

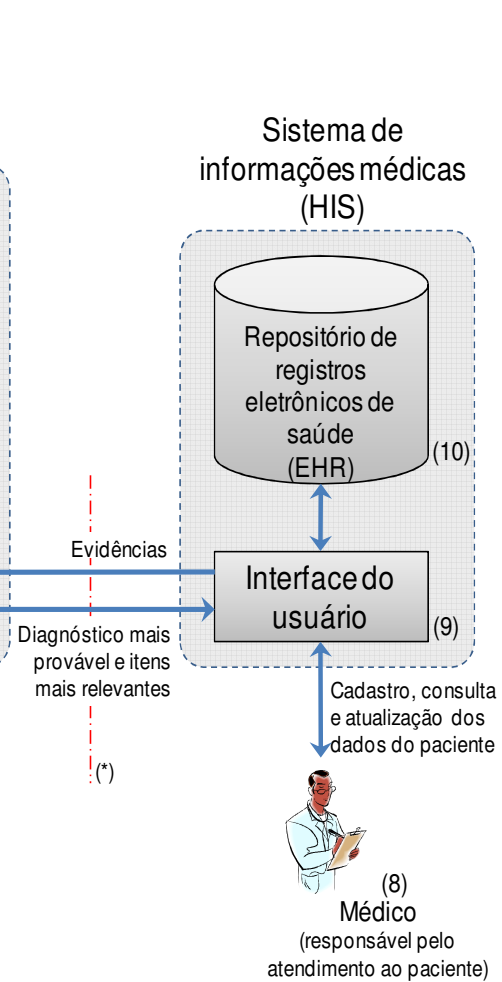




Modelagem



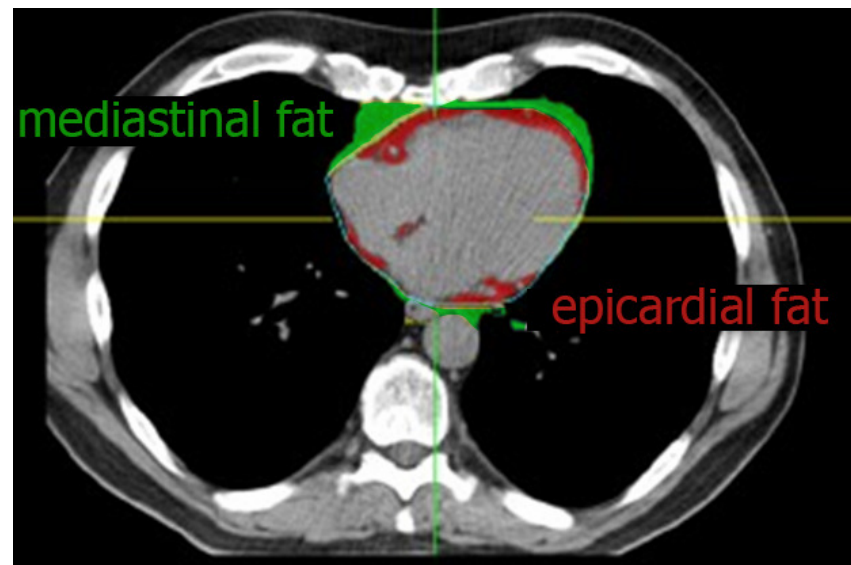
Rotina clínica



(*) Interoperabilidade e semântica entre os sistemas

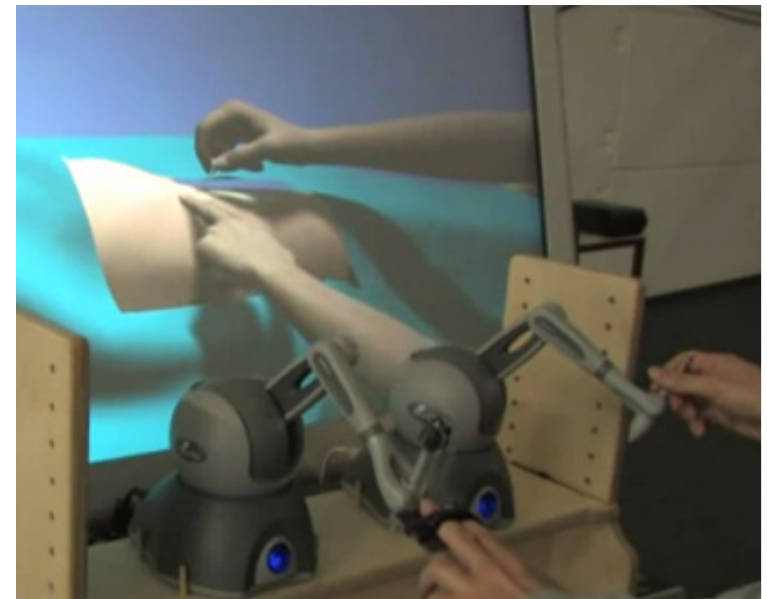
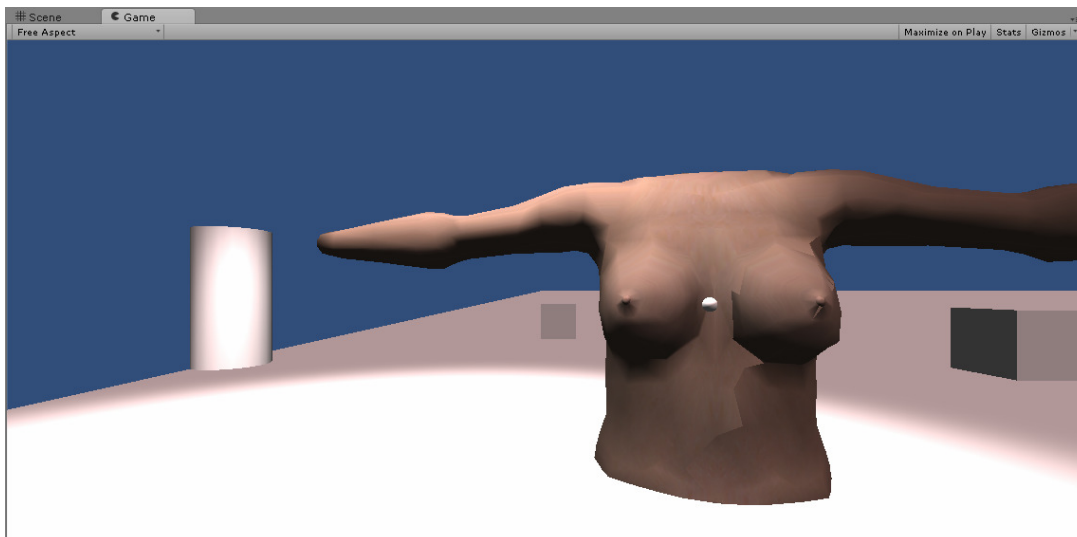
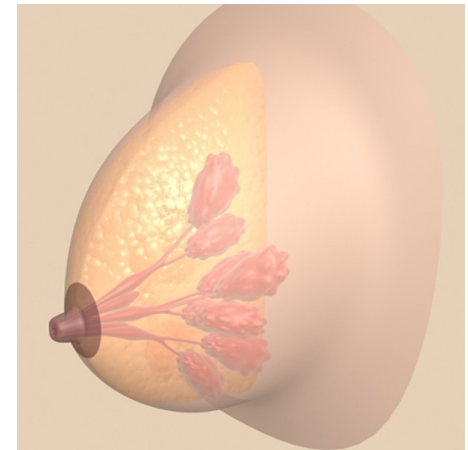
Diversos outros projetos menores

- ▶ Classificação de gorduras cardíacas em imagens de CT (UFRJ – Pro Laudo)
- ▶ Games para Treinamento de Anestesia peridural (HUAP/ CDI)
- ▶ Identificação de estágio depressivos (CEPE/UFRJ)
- ▶ Ontologias para exames de ressonância cerebrais (Pro Laudo)
- ▶ www.visual.ic.uff.br



Treinamento usando realidade virtual e gamificação

- ▶ Biopsias



anestesia

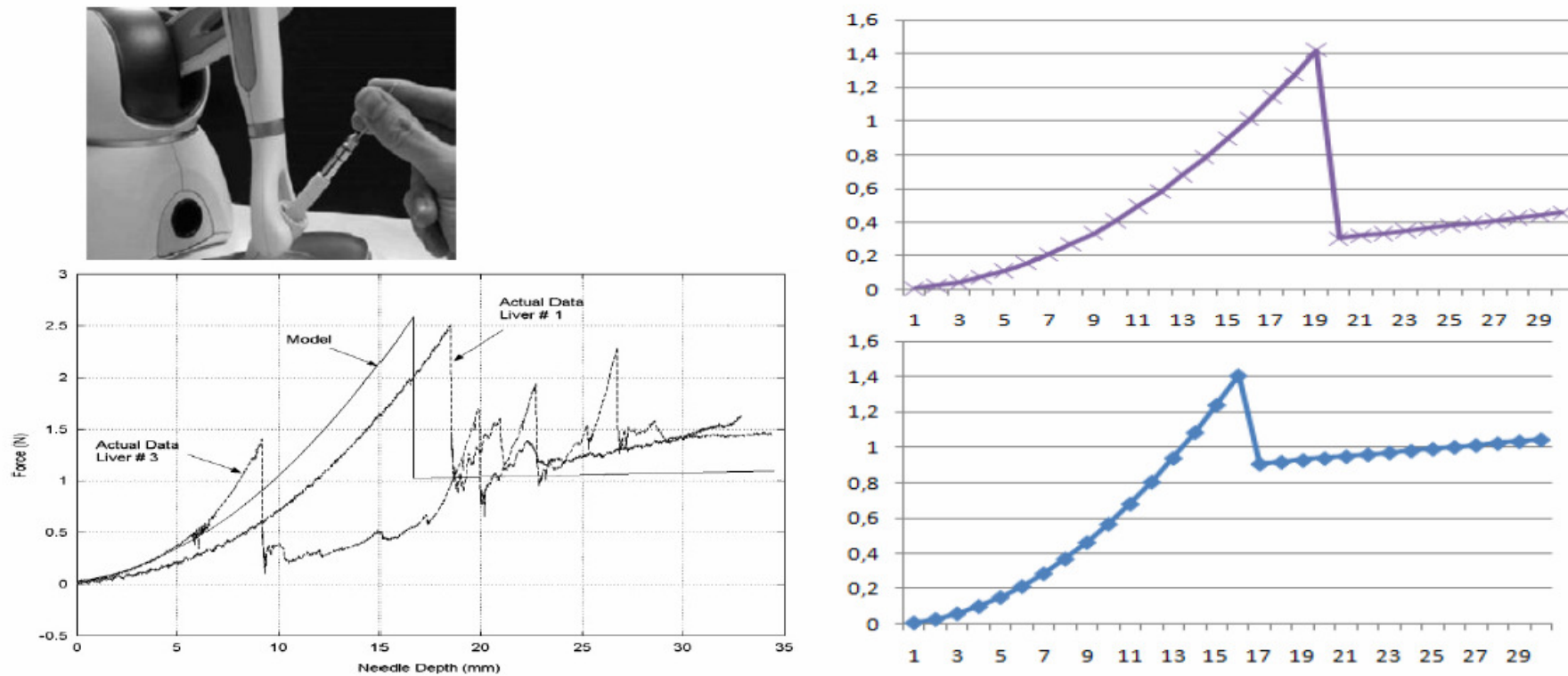


Fig. 4: Modelo de Força x deslocamento para a penetração da agulha apresentado em [4]. Curvas correspondente a $f_r(z)$ do modelo [4] implementada em nosso trabalho: na horizontal se apresenta a posição da agulha em milímetros (mm) e na vertical $f_r(z)$ em Newtons.

Gamificação e visualização

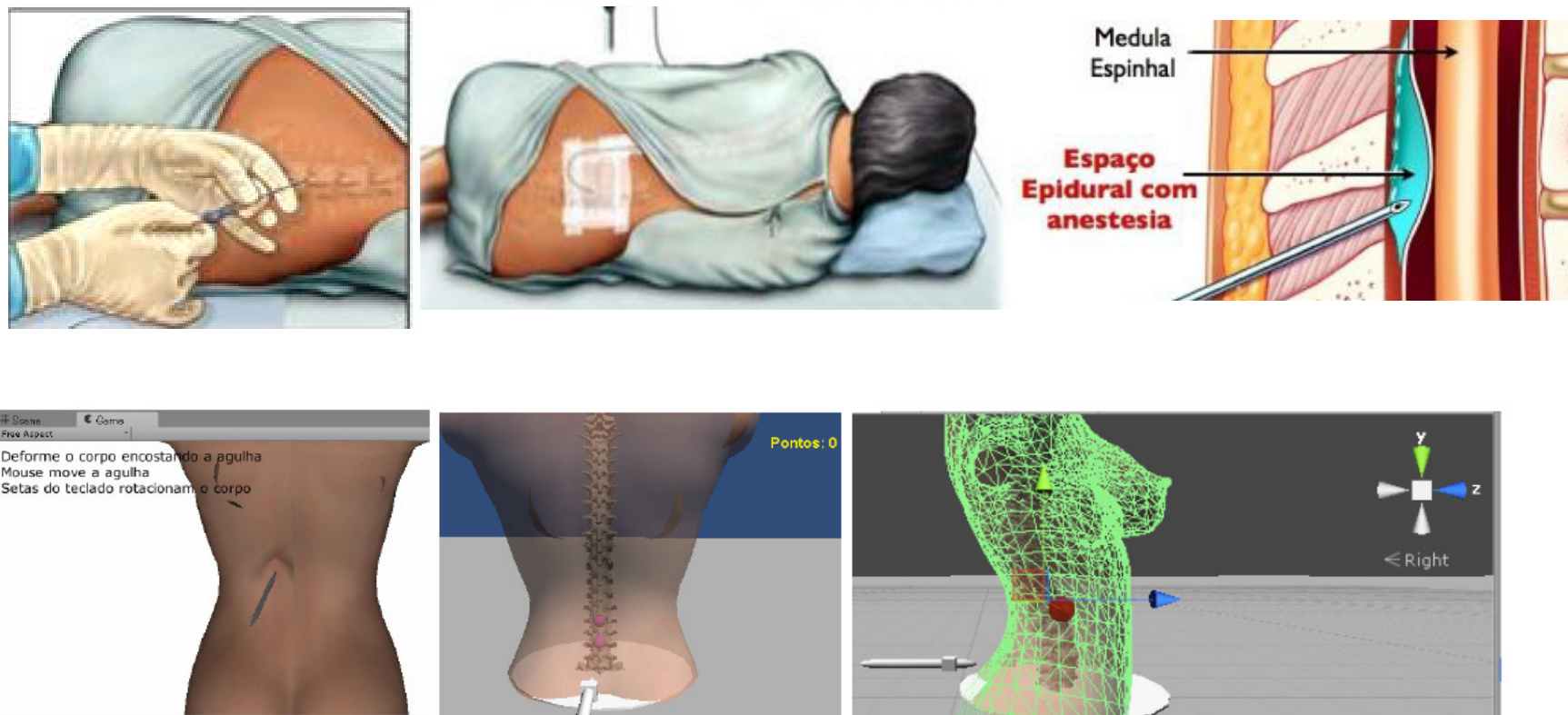


Fig. 5: Modelo de visualização do deslocamento da agulha no tecido para simular o deslocamento modelado já programados e incluídos no sistema até agora.

Arrhythmia Detection **from** ECG data.

- ▶ Monitoring cardiac fail for senior citizen /
- ▶ Monitoreo de falla cardiaca para personas mayores

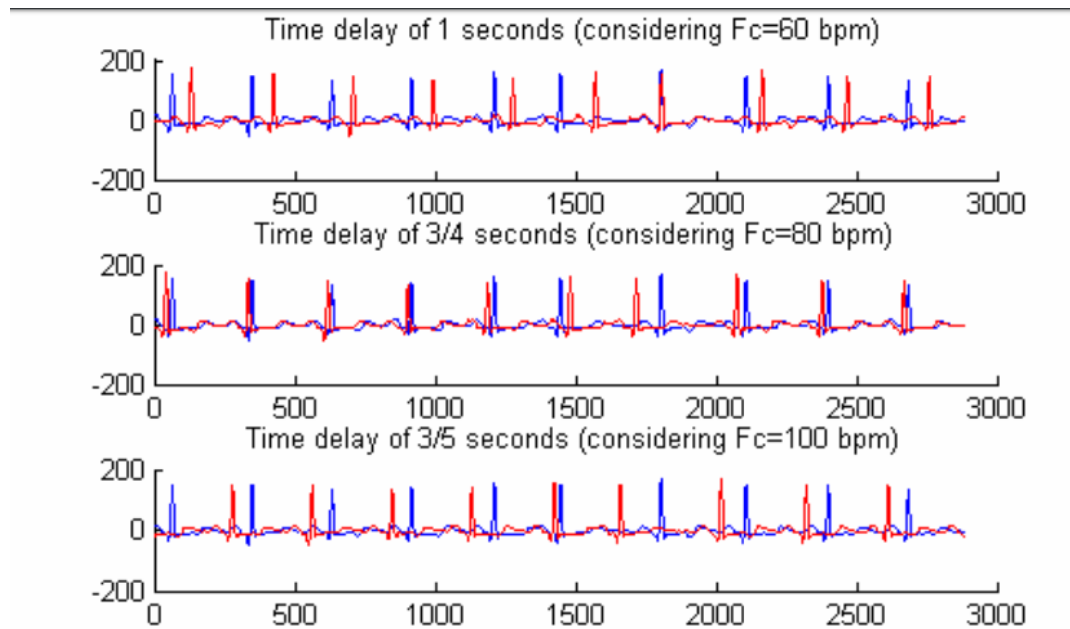


Figure 3. Original and delayed ECG with 1s, 3/4s and 3/5s of time-delays.

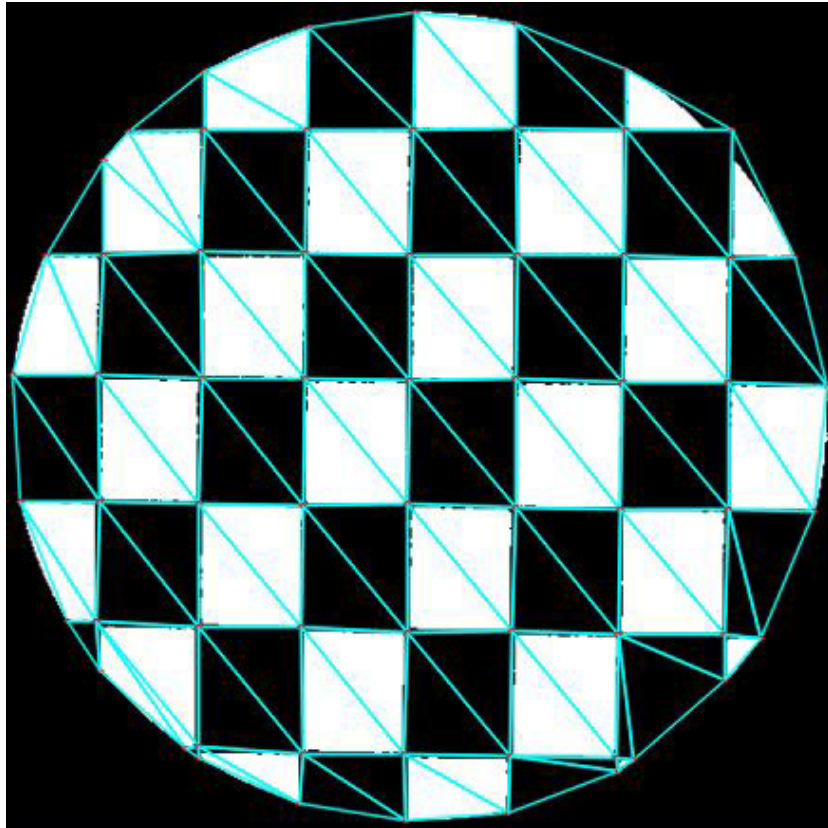
Correcting Endoscope Image



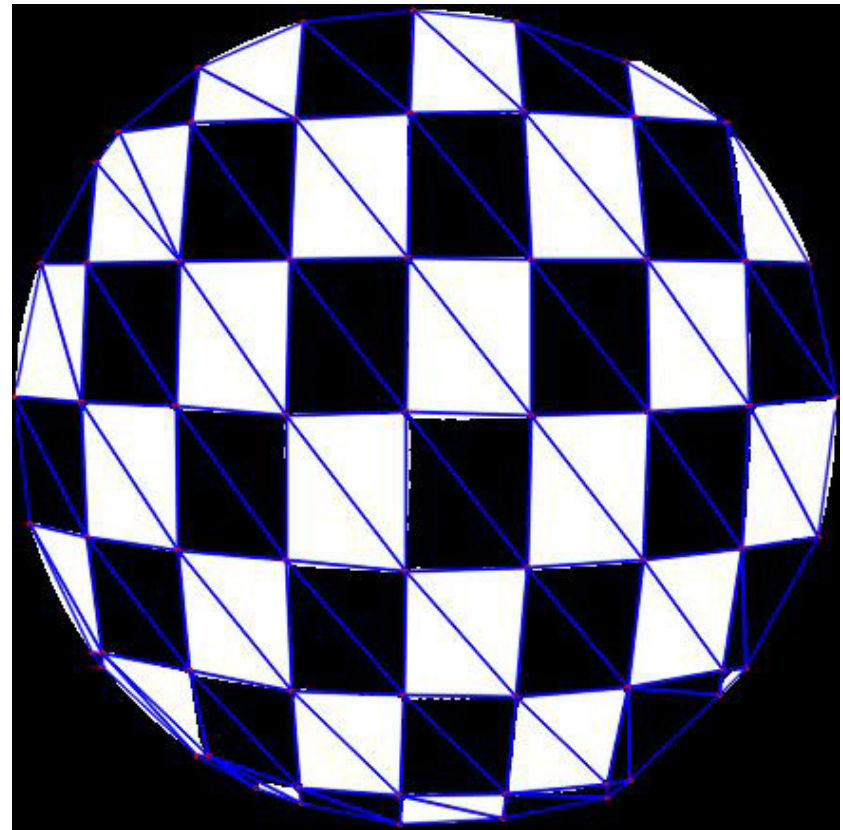
Real examination endoscopic image

Corregir la imagen del endoscopio

Triangular Mesh



Mesh generated in Chess-pattern



Mesh generated in endoscope image

Results – Comparative Images



Real endoscopic image



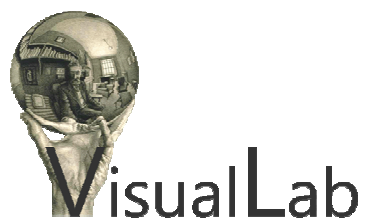
processed by correction method

Invitación



**27th International Conference on Systems, Signals and Image Processing,
IWSSIP 2020**

<http://iwSSIP2020.ic.uff.br/>



Nombre del Evento, Lugar

