

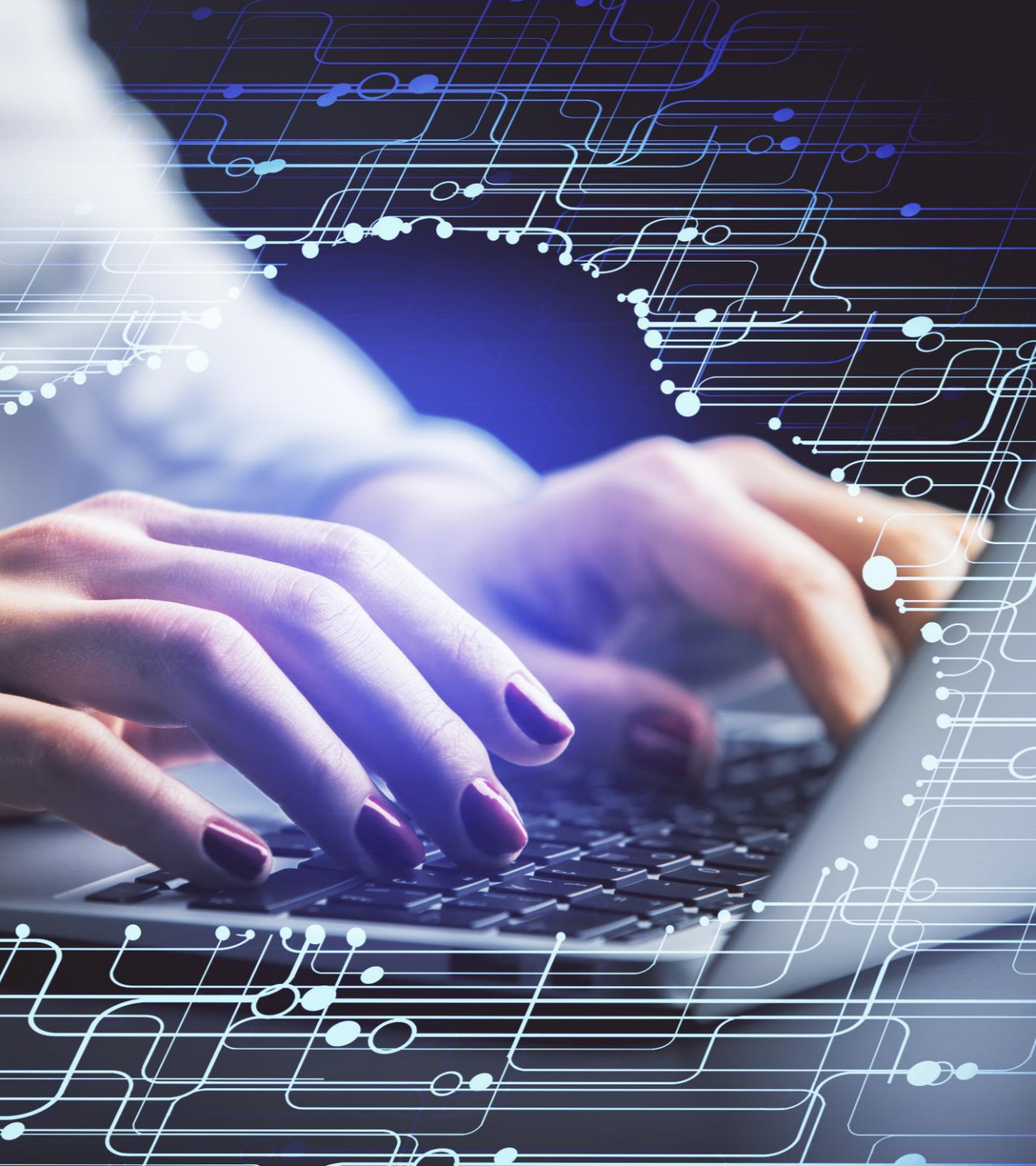
19. May 2025

ARCTUR

CLASSICA

Digital classification of rectal cancer during endoscopy

Tomi Ilijaš, ARCTUR d.o.o.



About us

The largest
private-owned HPC provider in
Central Europe.

500+
years of combined experience.

50+
European research projects over the
last 15 years

Top 20
Research institution in Slovenia.



Management standards

At Arctur, we hold ourselves to the highest standard of excellence in all aspects of our daily operations.

ISO 9001

Quality management system

ISO 27001

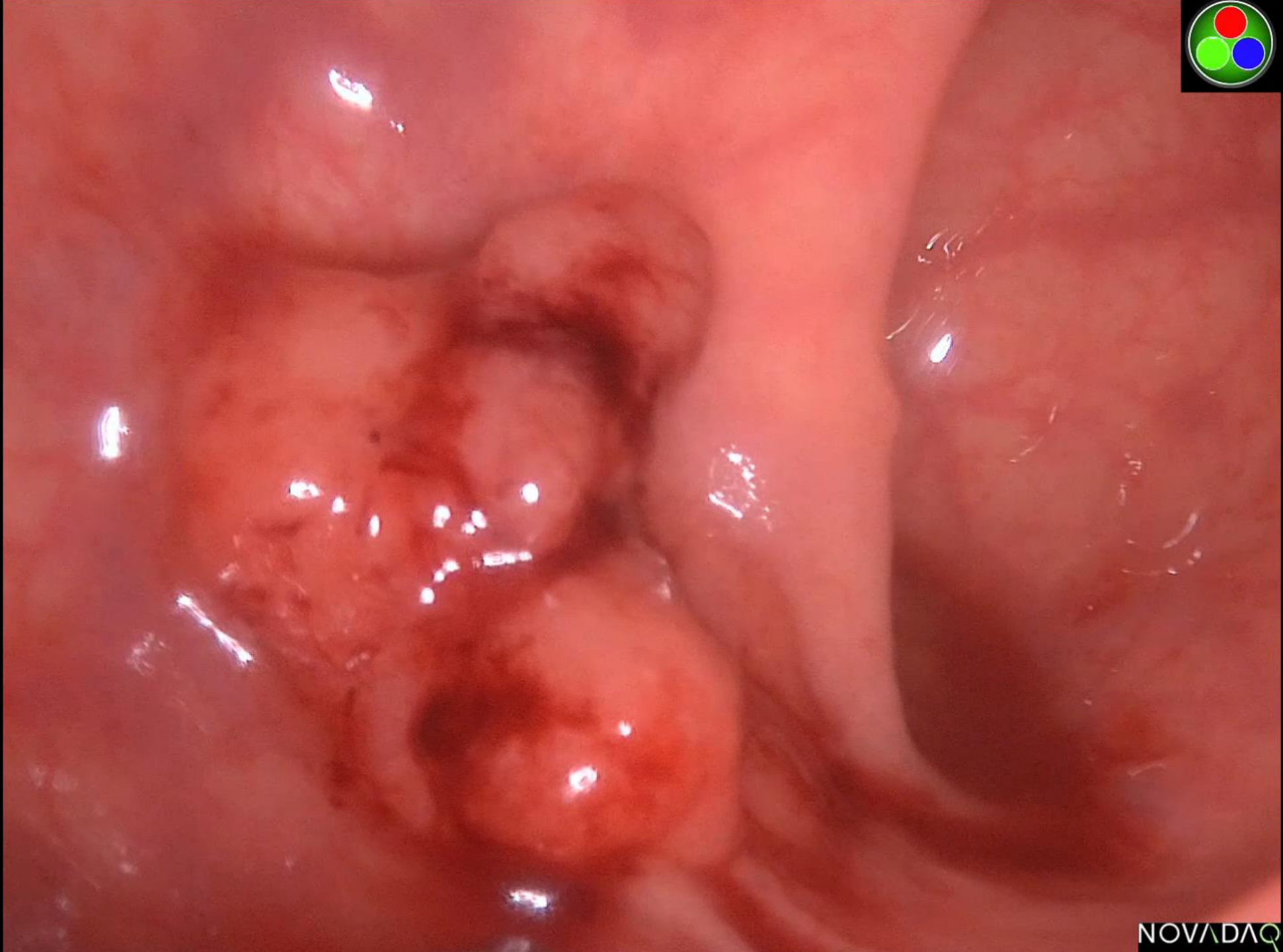
Information security, cybersecurity and privacy protection

ISO 14001

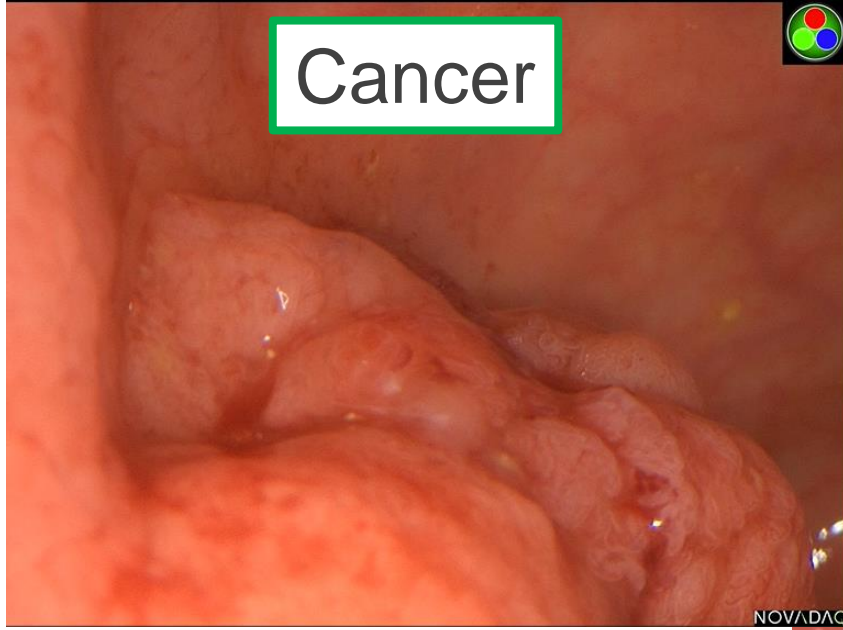
Environmental management system

ISO 13485

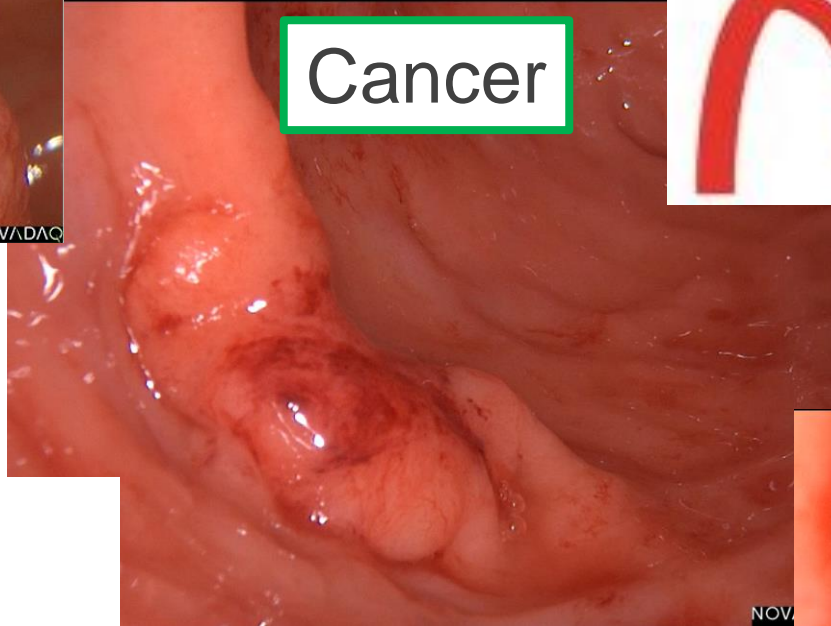
Medical devices



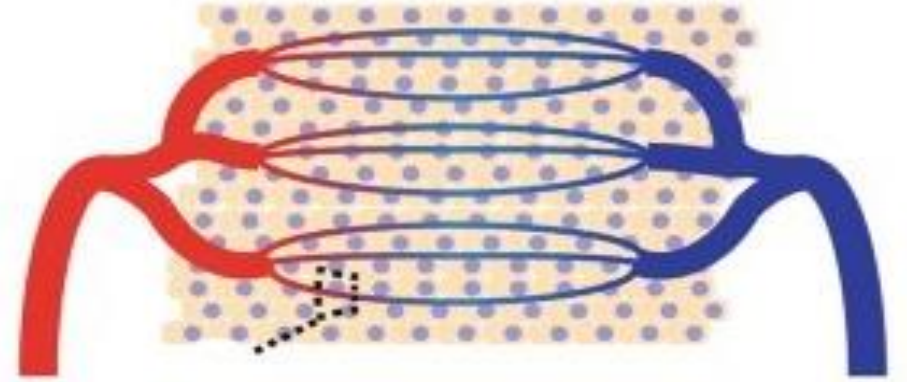
Cancer



Cancer

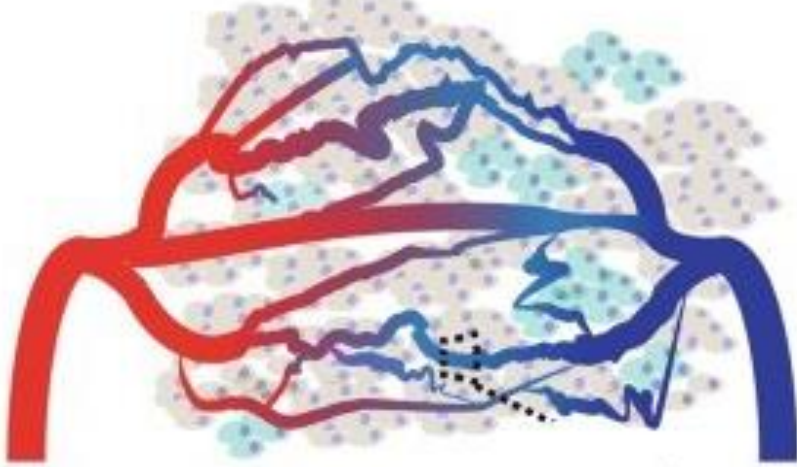


Healthy tissue

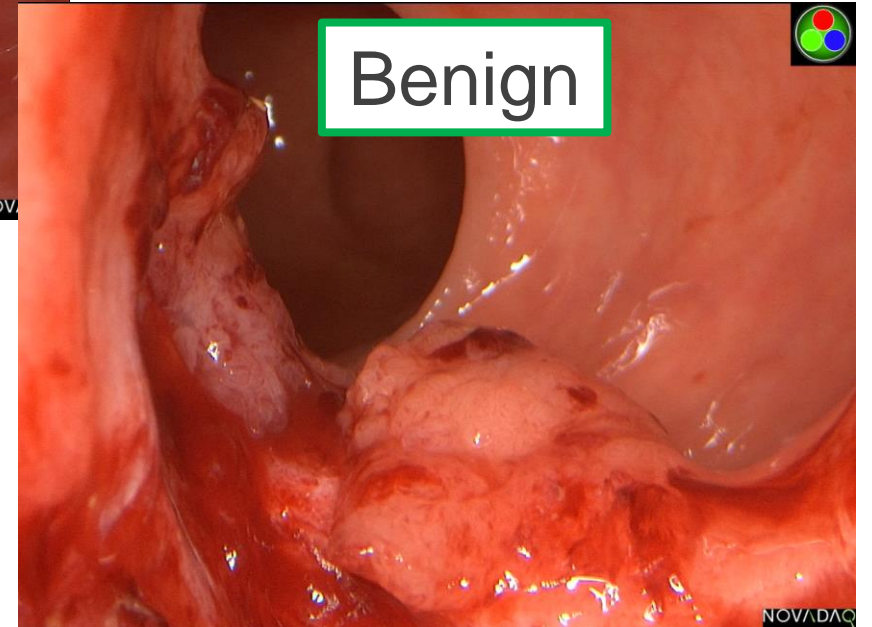


ARCTUR

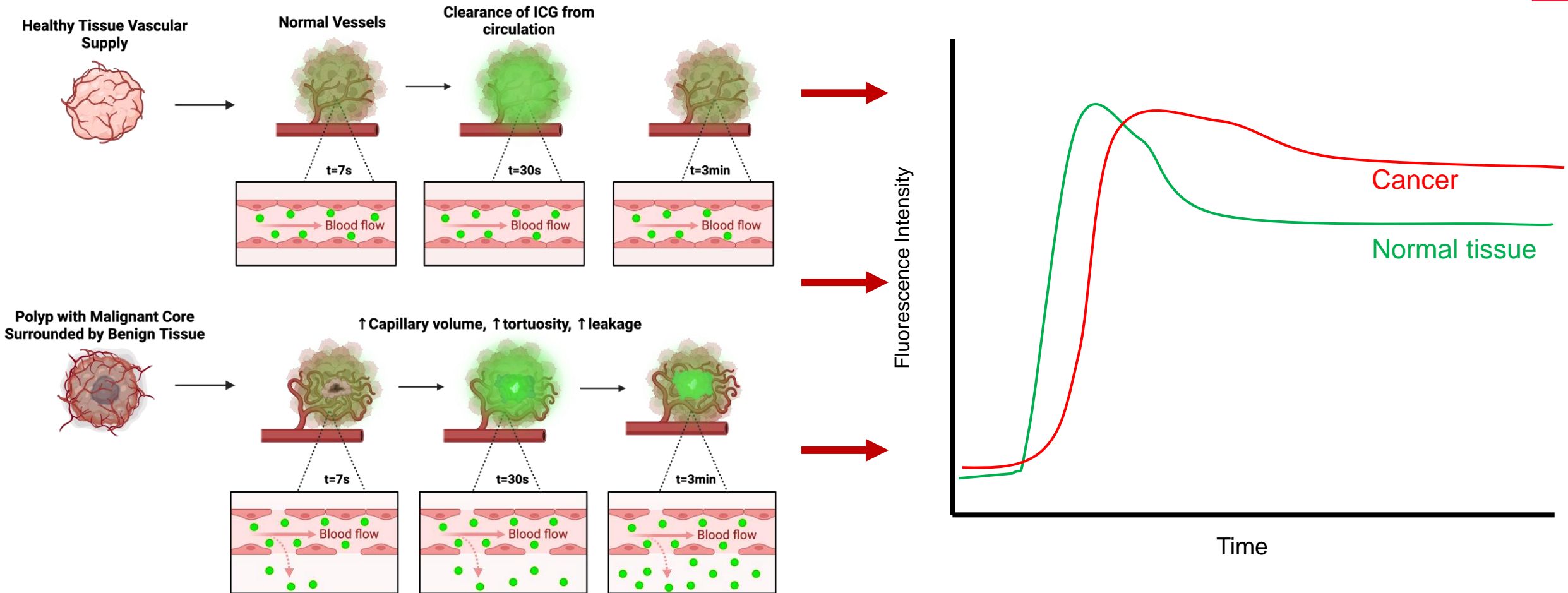
Tumor tissue



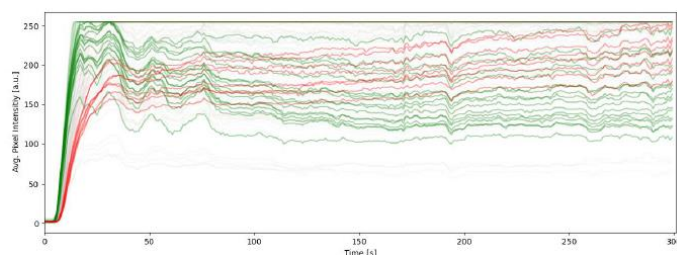
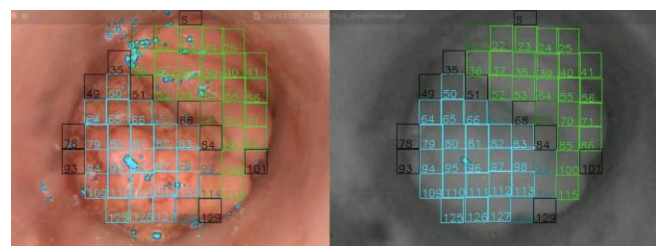
Benign



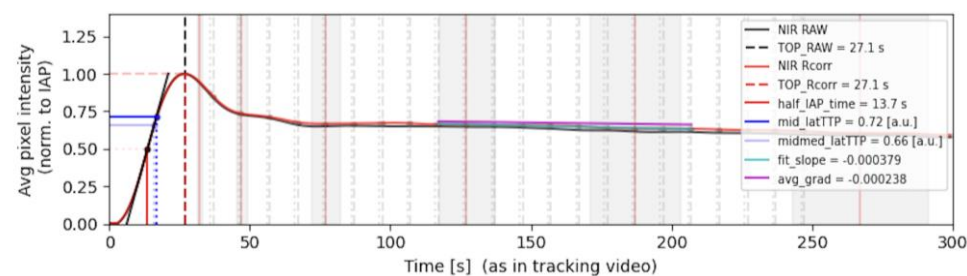
ICG and Colorectal Cancer Perfusion Patterns



Classical AI pipeline



Multispectral video ROI tracking and NIR data readout

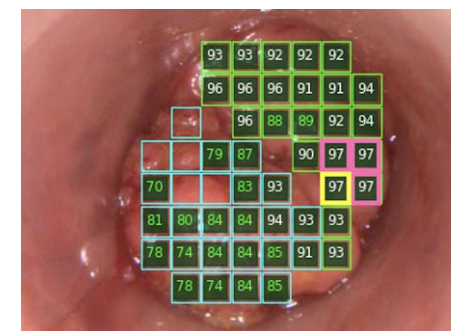


NIR curves processing and feature extraction

Pathology findings

annotation

Model training



AI Training & Classification

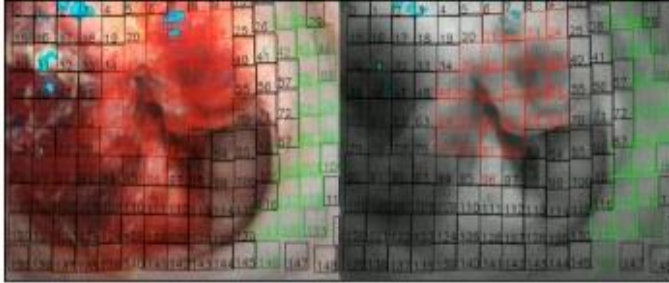


Transparent and Trustworthy AI Design

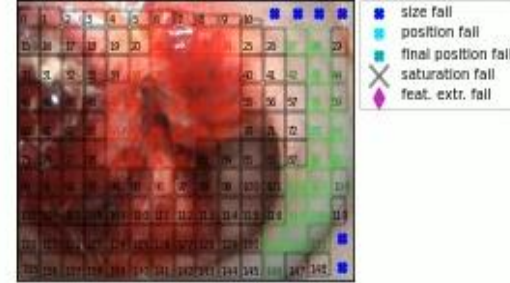
- Designing AI Models for Transparency
- Addressing Bias in AI Algorithms
- Inspection Tool for detailed Analysis

Realtime curve processing for video "16091401"

RGB & NIR live tracking
JC: 'Frame time: 13.05s, compute duration: 19.0s'



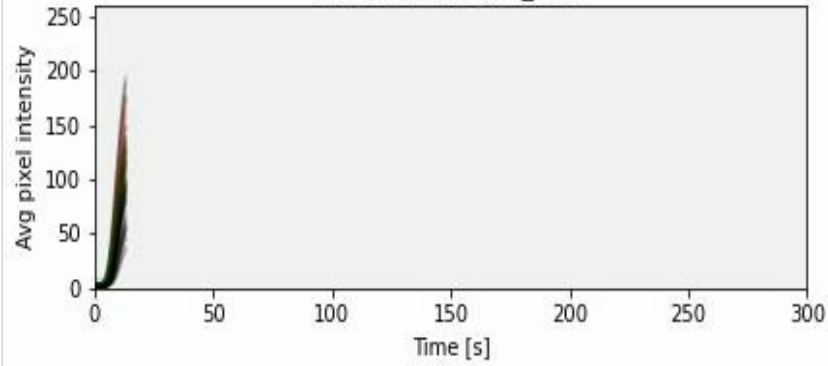
Tracking FAIL info on RGB initial frame



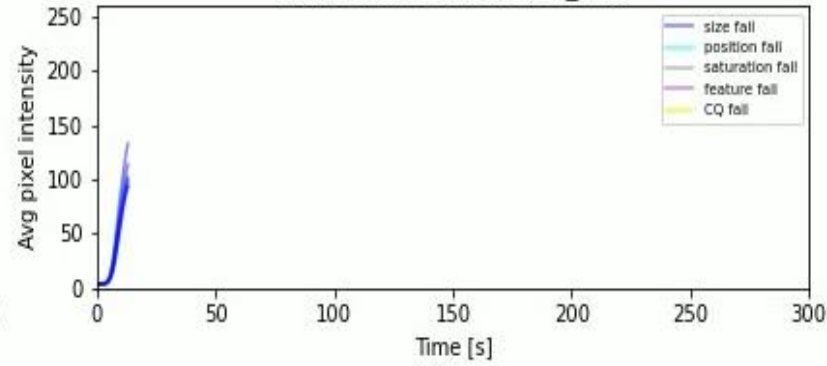
Curve quality heatmap on RGB initial frame
(BC & R-corr & GS_fin)



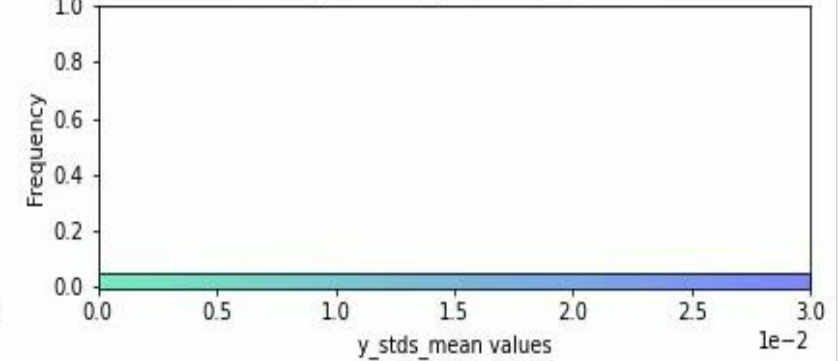
NIR readouts (GS_init)



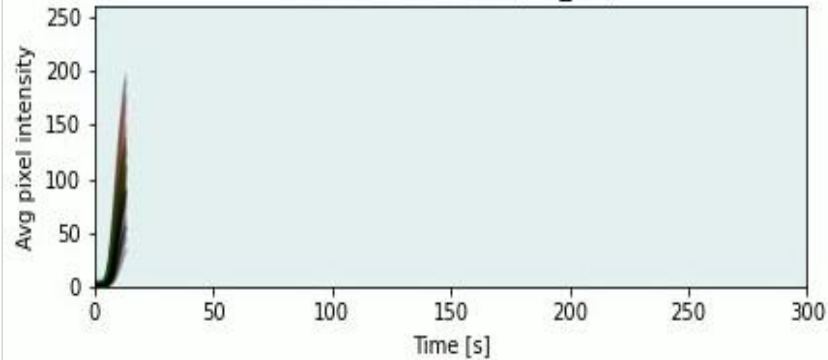
FAILED NIR readouts (GS_init)



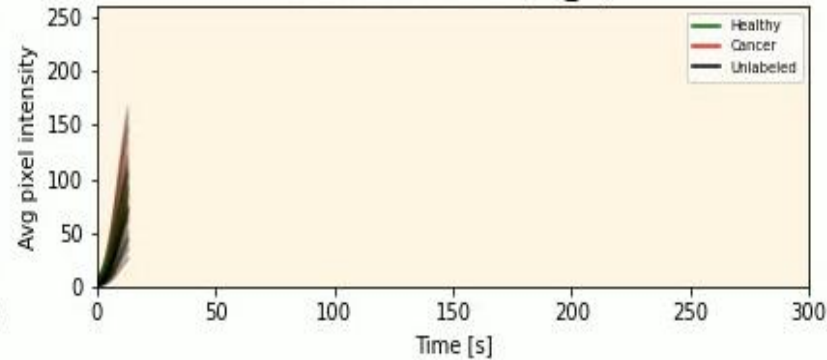
Histogram of CQ values for all ROIs



R-corr NIR readouts (GS_init)



R-corr NIR readouts (GS_fin)



Extracted feature heatmap on RGB initial frame

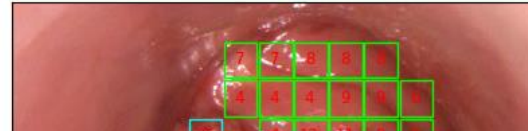


Comparison of annotation labels against supervised classification predictions probabilities for NON-failed ROIs only video: 16093301

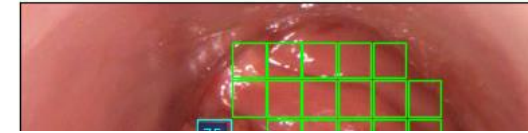
Train set: xgboost
Test set: 150_ROI_grid

Preprocessing
per patient scaling: xgboost
outlier detection: xgboost
oversampling method: xgboost
imputer: xgboost

Annotation vs. Cancer prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



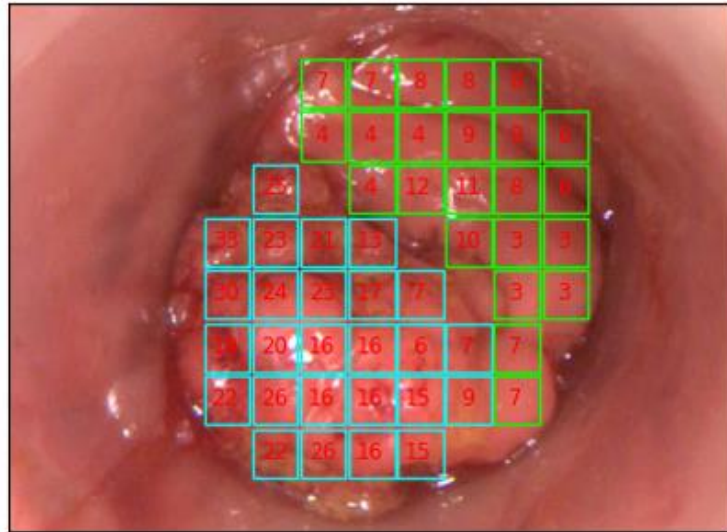
Annotation vs. Benign prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



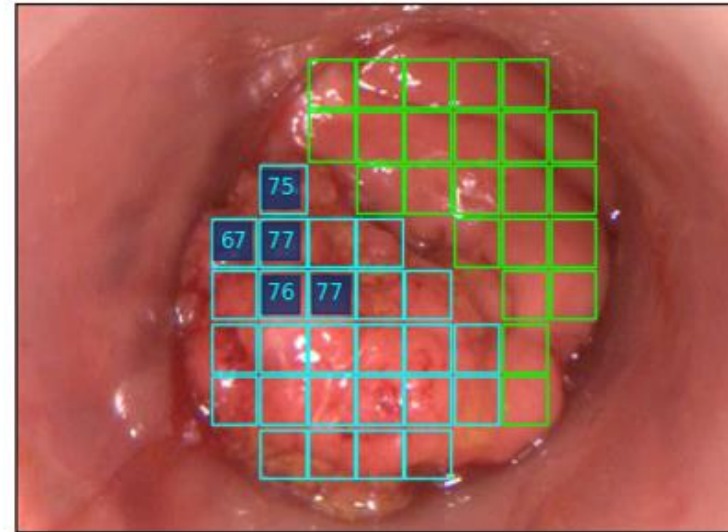
Annotation vs. Healthy prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



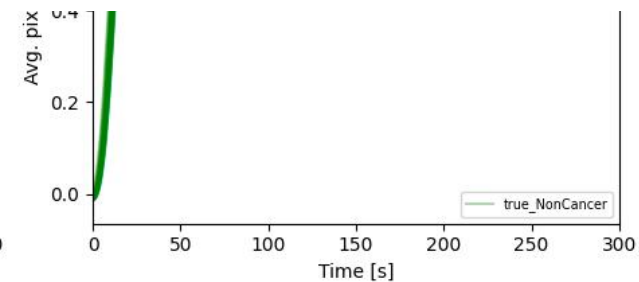
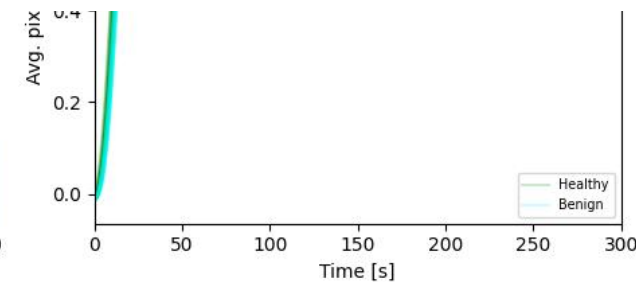
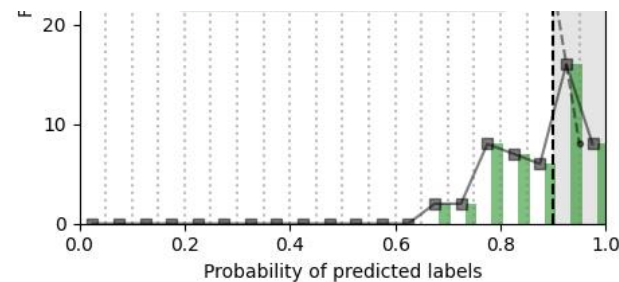
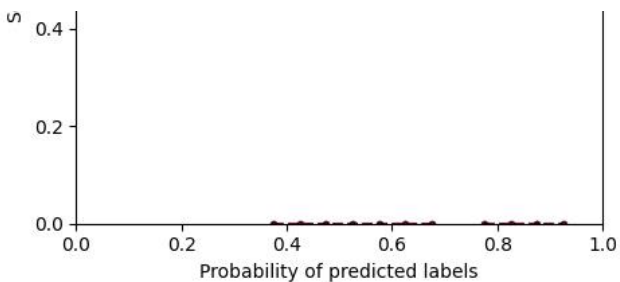
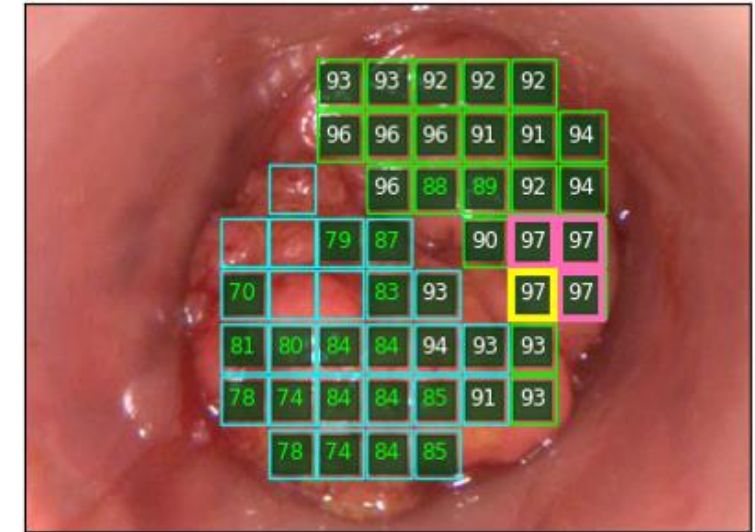
Annotation vs. Cancer prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



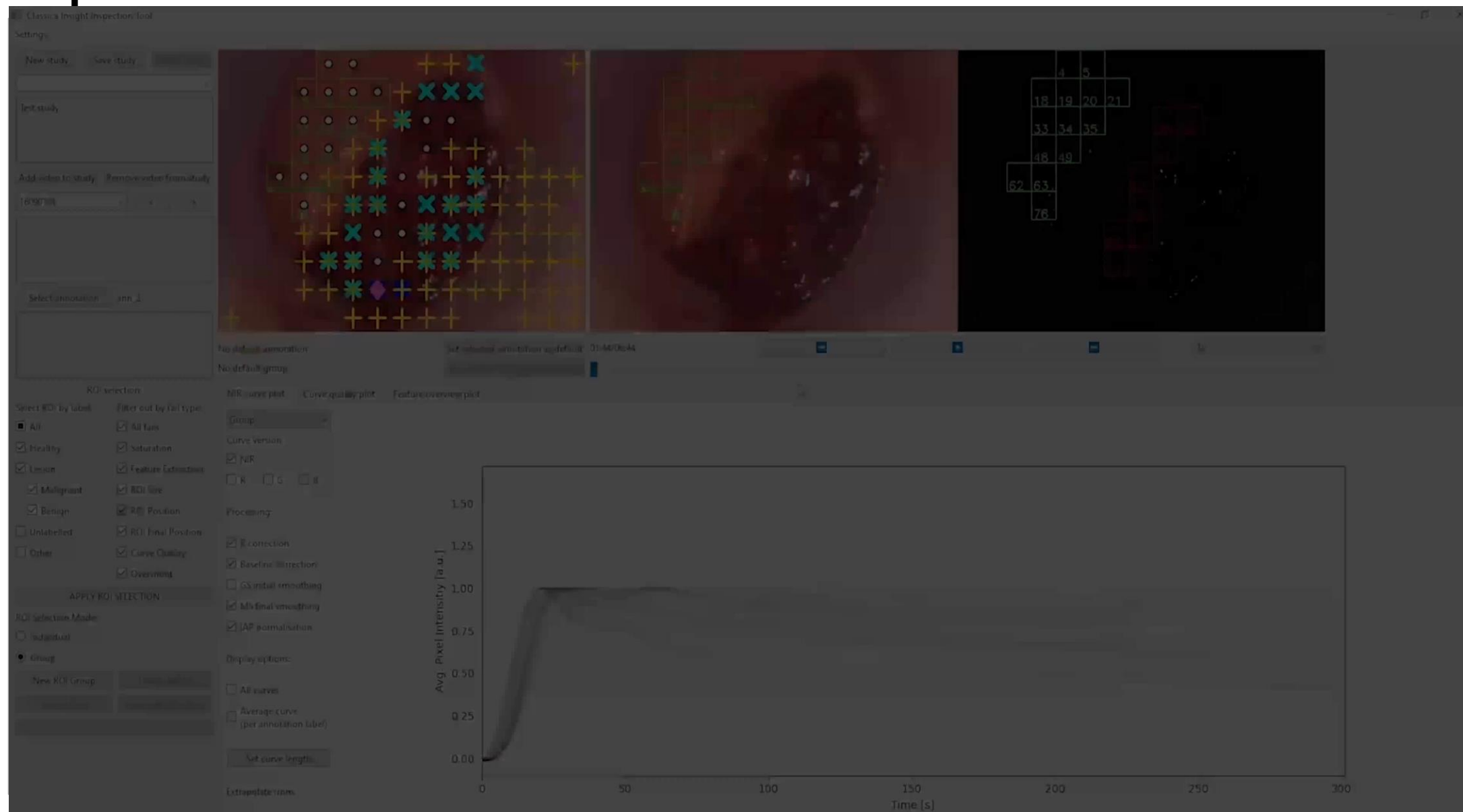
Annotation vs. Benign prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



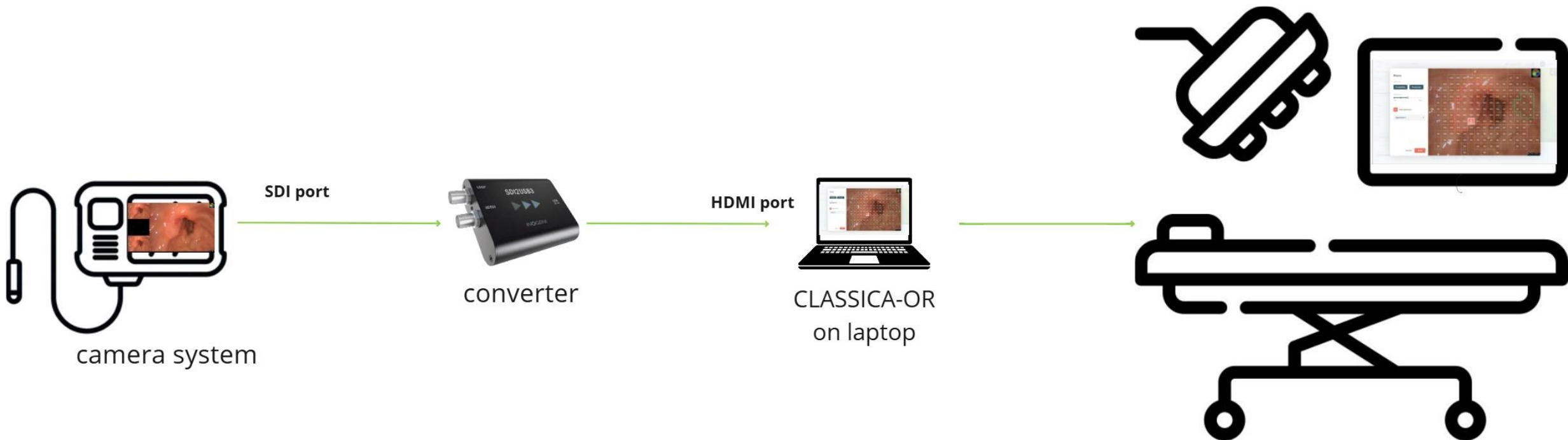
Annotation vs. Healthy prediction prob.
(ROI edge: true label, ROI face: prediction, X:Fail)



Inspection tool



CLASSICA-OR in action





Case ID: 1682673872

Track

Inspect

Summary

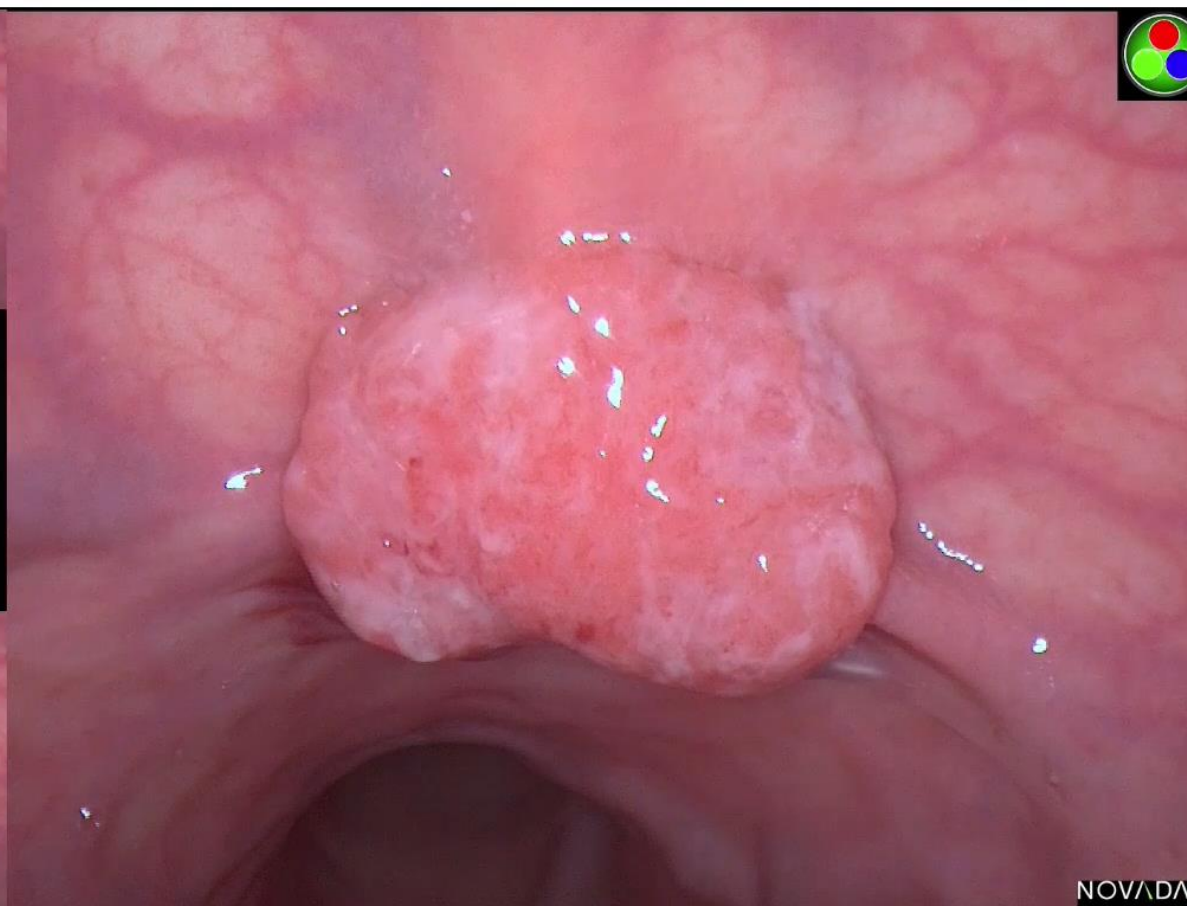
Tracking will begin automatically at inflow.

ROI STATUS n / a



Waiting for inflow ...

Stop recording



NOVA/DAC

TRACKING QUALITY

0%

0

100

200

300

CURVE QUALITY

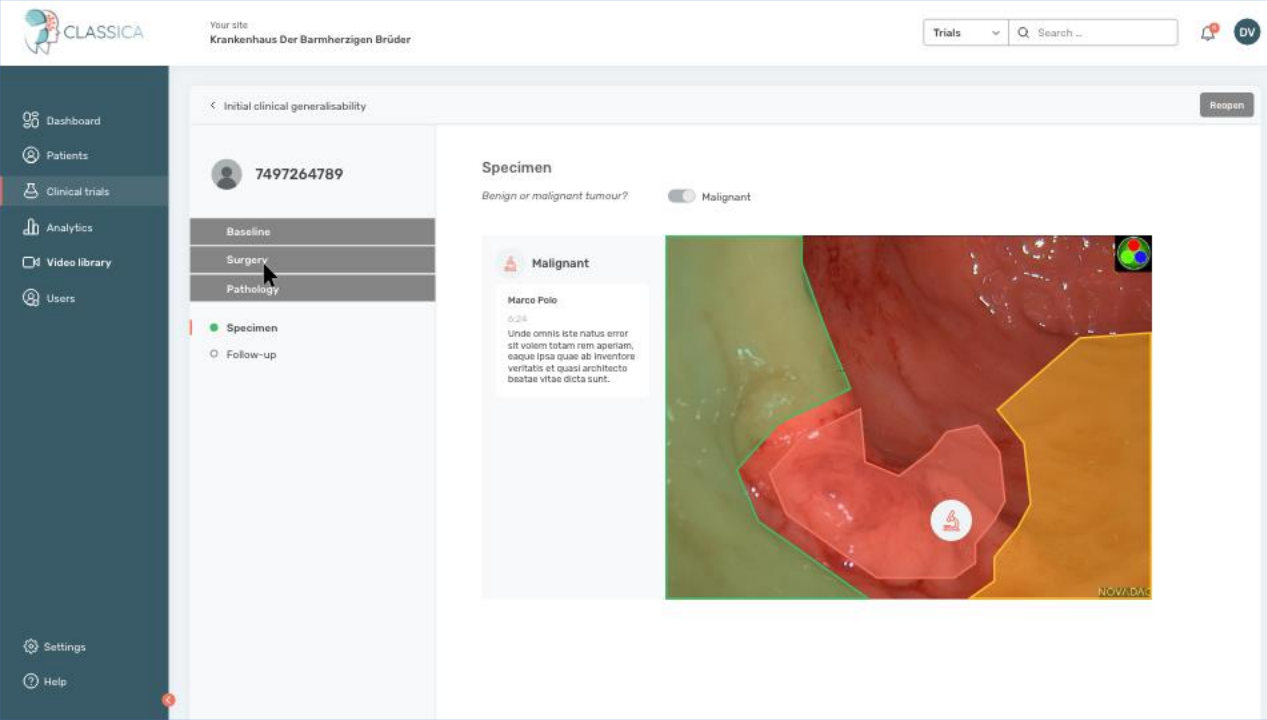
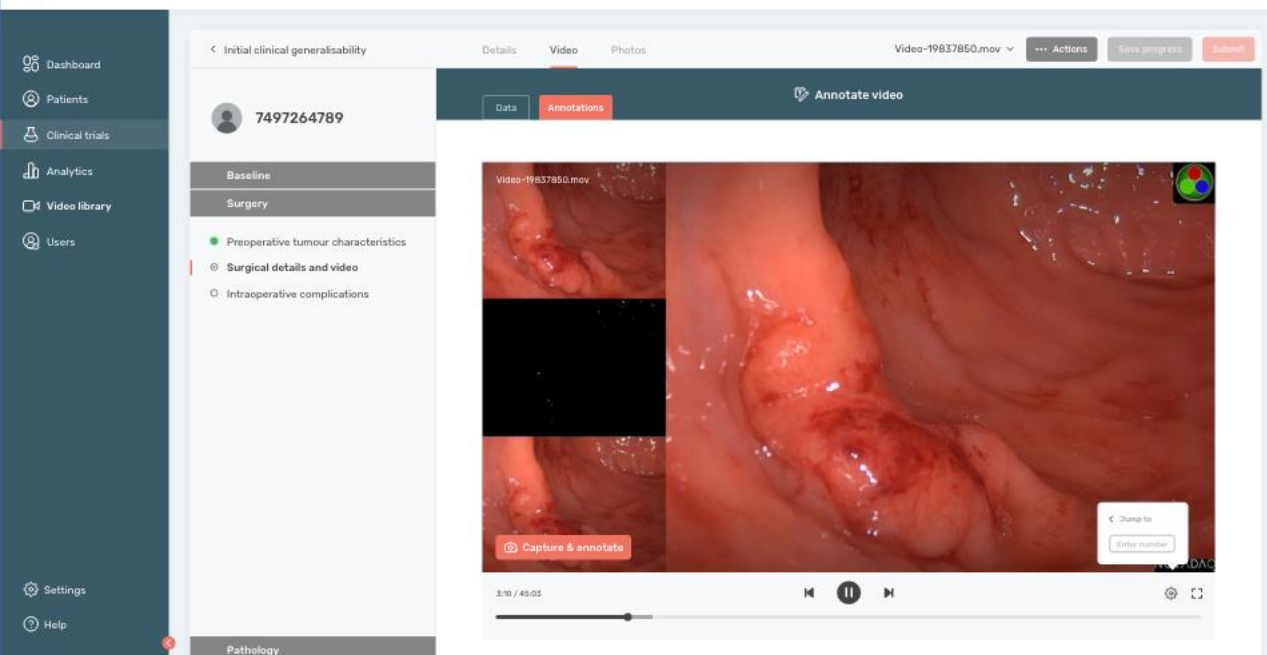


0

100

200

300



Clinical trial support

CLASSICA-Web

- eCRF data management
- multisite administration
- secure storage
- annotation tool
- AI core
- Data export for analytics



Main workflow

- Adding a new patient in CLASSICA-Web
- Entering CRF data
- Preparing data for the intervention
- Using CLASSICA-OR during the intervention in the OR
- Uploading OR local data, videos, and images to the Classica Platform
- Using Classica-Web to manage, export and analyse case data



AI-Powered Clinical Decision Support

- Enhancing Model Accuracy
- Building Clinician Trust in AI Technology
- Co-Design with Clinical Professionals and integration in OR Workflow



Thank you!



The future of AI assisted cancer surgery

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