



## Tissue Image Analysis Tool For Cancer Diagnostics

### Client Overview

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The client is a diagnostics company focused on delivering next generation cancer diagnostics and prognostics through a unique approach to tissue analysis and also the evaluation of the tumor as a system composed of multiple interacting cell types, including tumor, immune, and stromal cells. Its patent-protected technology platform, uniquely analyzes whole slide digital images with multiplexed fluorescence, and is designed to provide greater information and accuracy than traditional tissue diagnostics.

### Challenges

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The client was looking to enhance the functionality of their tissue image analysis tool which loads images from fluorescence scanner and detects tissue fragments on the slide, with a view to make it commercially ready for use in a CLIA/CAP-certified lab.

Client was looking for a competent organization with capabilities & experience in imaging technologies, scanning devices and diagnostics domain to undertake their bespoke requirements. It was also challenge to understand the original design architecture of the tool.

Optra was found to be a perfect partner with requisite experience and capabilities to deliver client expectations.

### Solution (Tissue Image Analysis tool for cancer diagnostics)

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Optra team started with an in-depth analysis of client's requirement to define an iterative strategy for enhancements including tool's overall performance.

## **Tool Features:**

- Image loading from FL scanner, performing segmentation on images and detecting tissue fragments on the slide.



- Ability to segment the nuclei for each tissue fragment.
- Feature measurements the objects i.e. cell, cytoplasm etc. could be analyzed from nuclei.
- The feature data is then summarized into different features sets. These include basic summary statistics:
  - ✓ With 5<sup>th</sup>-97<sup>th</sup> percentile measures but also includes more complex intensity based features including co-expression and morphology based features.
- Threshold features (which were similar to the basic summary statistics but with thresholds applied) and tile based features (where images are tiled into equal sized squares and measurements are recorded by tile).
- **Enhancements Delivered:**
  - ✓ Improving tool to process all required slide blobs flawlessly in default and manual mode.
  - ✓ Amendment of code after slide analysis to record all missing slide/blob/feature data.
  - ✓ Improving functionalities for accurate comparison of 2 image analysis summary statistics data sets.

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- ✓ Amendment to allow proper annotation and processing of include, exclude region in slide image.
- ✓ Generation of Heat Map Matrix for nuclei tile features.
- ✓ Resolving Co-Expression feature NaN issue and slide name substring issue for co-Expression features.
- **Improved UI:**
  - ✓ User Interface improvements for sub-tools and modification of slog headers and csv files to enhance visibility of input and output records.
- Improvement of annotation on slide, modification in feature extraction and development of feature analysis module.
- Development of classifier software which involves developing a user interface that allows a clinical lab user to load feature data, produce a risk score and risk class. Development of the reporting software involves auto-population of patient metadata fields from LIMS and classifier output fields from classifier software.
- Creation of a Barrett's Test Module calculates only the masks and features required by client.

## Technology Environment

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- MATLAB,C#,WPF, .NET 4.5 Framework
- Visual studio 2010.
- GitHub as Code repository

## Benefits

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- The enhancements delivered helped client to make the Tissue Imaging tool commercially ready with improved throughput for CLIA/CAP-certified labs.
- Client's Software development procedure was amended to follow GMP norms & guidelines.

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- Global delivery model ensured 50% costs savings with 100% assured quality and 200% enhanced production cycle.
- “Work for Hire” model facilitated Client to own code and Intellectual Property Rights without increasing their headcount.

## About Optra Systems

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Optra Systems is an ISO-certified global organization with deep domain expertise in medical devices, lab automation, life science informatics and healthcare IT solutions. The company provides a fully-scalable, cost-effective OptiShore™ delivery model. This enables customers to choose the optimal balance between on-site, on-shore, and off-shore development that will best address their budget and collaboration requirements. With Optra Systems, customers are able to shrink their time-to-market by leveraging practical, building-block based solutions. Committed to clear communication and total transparency, the company consistently meets or exceeds its clients’ expectations. Offering a full complement of expert engineering and consulting services, Optra Systems is aligned to real business needs applied over the entire product development lifecycle. The robust, scalable and efficient IT infrastructure of the company, together with its outstanding project management team, consistently ensures superior results. Optra Systems ’s global delivery model helps its customers cut costs by about 50% without compromising on quality and realize a 200% improved production cycle.

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### **Contact Optra Systems Today**

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