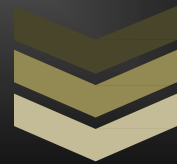


# CARDS™ (COMPUTER AIDED REGION DETECTION SYSTEM)



A WEB BASED APPLICATION FOR REGION OF INTEREST DETECTION

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## A White Paper

Jan 2013

### **Introduction:**

Digital Pathology refers to an integrated process of converting glass microscope slides into high-resolution, whole-slide digital images that can be viewed, managed, analysed, shared and interpreted by the Pathologist with a computer instead of a microscope.

It refers to a dynamic image based environment which provides fertile soil to various computer aided detection and analysis solutions that help generate objective and meaningful information from the digital images.

### **The Problem:**

Histopathology slides are a veritable goldmine of information and knowledge that act as a cornerstone in tissue diagnosis of disease. Diagnosis in histopathology is based on detection of morphological features and recognition of patterns that help differentiate between normal and diseased tissue.

Conventionally this process is carried out manually by the human eye, using a microscope. When a large number of specimens are to be analyzed, the manual method results in loss of speed and loss of accuracy due to human fatigue.

Moreover several grading systems for malignancies are based on pattern recognition (e.g.: breast and prostate) and manual reporting introduces subjectivity and inter-observer variability in these scenarios.

## **The Solution:**

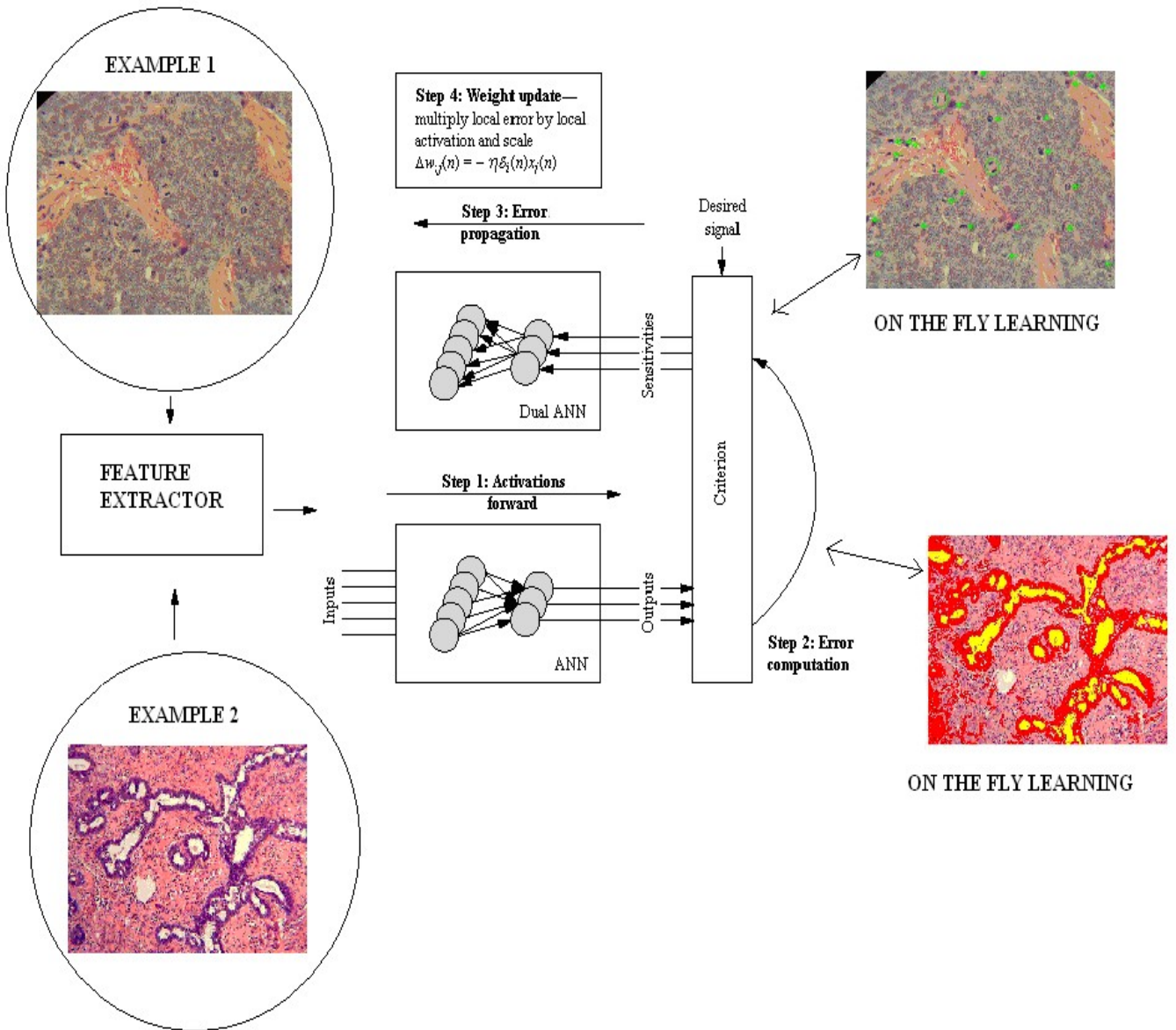
CARDS (Computer aided region detection system) is a solution which makes use of Artificial Neural Networks (ANNs) to aid the Pathologist in automated pattern recognition and detection of a region of interest in histopathology tissue sections, to generate speedy, objective, accurate and reproducible results. This solution can be applied for recognition of patterns in various tissues like breast, prostate, kidney glomeruli, pancreatic islet cells, blood vessels etc.

## **Benefits:**

The CARDS (Computer aided region detection system) offers multiple benefits like:

- 1) Single case as well as batch processing for a high throughput laboratory
- 2) Being an user interactive solution, the Regions of interest (ROIs) can be selected and rejected by the user with a single click of mouse
- 3) Manual modifications of auto detected regions are used as inputs to help the system learn on the fly
- 4) An intelligent image analysis system is used in tandem with CARDS for further analysis of the ROIs.
- 5) The analyzed images are managed, integrated with case details and stored for future reference with an image management system
- 6) Integration with the image analysis and image management systems results in generation of complete reports which are accurate and reproducible
- 7) The information can be accessed anytime anywhere because of the web based architecture
- 8) Being a plug in solution supporting HL-7, it can be easily integrated with existing LIS and HIS
- 9) The solution is compliant with 21CFR part 11 to ensure security and confidentiality of data

# Technology Framework:



## Ready Workflow:

Acquire microscopy images (breast, prostate, kidney, colon)

Knowledge transfer to improve performance of ANN

**JEEV™** (Image management system)

Automated ROI detection by artificial neural networks

**CARDS™** User interactive acceptance of detected regions

Store processed images and results into JEEV

**JEEV.Reports**  
(Report generation)

**Optra Assays™**  
Region quantification assays

## Summary:

The CARDS (Computer aided region detection system) is a solution that aids the Pathologist in speedy and accurate region of interest detection and pattern recognition with the help of artificial neural networks, which can be integrated with an image analysis and image management system, to generate an objective, complete and reproducible report.

## Getting started:

Please write to us at [info@optrasystems.com](mailto:info@optrasystems.com) for a live demo of the solution