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YourScan.org

DEFEATING BREAST CANCER THROUGH CROWDSOURCING
Please Donate Your Mammograms to Help Defeat Breast Cancer

August 17, 2015 -- A California software company has put out a call to women who have had to face the difficult diagnosis of breast cancer: Donate your mammogram images to a crowdsourcing campaign and help confirm that a new visual recognition software presents a breakthrough in early detection and distinguishing benign from malignant tumors through the use of "Lesion Tissue Profiling."

In a pilot test conducted over the last three years, the company has shown that its Lesion Tissue Profiling technology is capable of accurately detecting the shapes of malignant tumors (lesions) otherwise not visible to the human eye. The study further indicated that these lesions have a limited number of basic shapes that can be rendered as distinct tissue profiles common to all malignancy. The implication is that these profiles may be used as a tool in routine screening of *all* mammography. This could present an important breakthrough – the first automated digital search of the more than 30 million mammograms done in the US each year, a search that would offer valuable diagnostic insight.

The company, YourScan.org, has built a proprietary database specifically designed to store mammographic images in a format allowing for rapid and precise comparison of billions of tissue profiles. The data is highlighted using a visual-based color illustrator and the technology catalogues each shape – assembling a "tissue profile" that can be matched with other tissue profiles. Searching "healthy" mammograms using those tissue profiles has revealed that the technology can detect "precursor" tissue profiles in digital mammograms, both two-dimensional and newer 3-D images produced by tomosynthesis technology. The Company is asking women diagnosed with breast cancer to provide their entire series of mammograms to compare earlier mammograms to the later one that resulted in a definitive diagnosis; identifying and cataloging precursor and lesion tissue profiles found in their mammograms. These newly identified tissue profiles will be added to the tissue profile library, and used to search other mammograms for breast cancer precursors and lesions.

The, YourScan.org, research to date offers a tantalizing possibility. There appears to be a finite number of distinct tissue profiles to be assembled into a large library. Once assembled, mammograms can be rapidly searched against this library, looking for matching precursor and lesion tissue profiles. In pilot tests, such matches proved to be 99.9 percent accurate, conclusively detecting cancer or eliminating false positives. The hope is that the technology could become an invaluable routine tool for radiologists. It could be used as a universal "double-check" based on the growing national library of identified tissue profiles, resulting in early detection of not-readily-visible precursors as well as distinguishing benign from malignant lesions.

Crowdsourcing – Big Data is Critical

This potential can only be reached, however, if the library is comprehensive. Conventional clinical trials and medical research studies typically analyze data from a couple hundred to a few thousand patients. Larger

studies that compare findings of multiple studies do not assemble large collections of individual images. That is why the Company has turned to crowdsourcing. If some of the millions of women across America stricken with this disease were to donate their mammograms, a complete library of tissue profiles could be quickly assembled. As the database grew, its utility and accuracy would increase geometrically. The Company's technology resides in the Amazon Cloud and is scalable for millions of concurrent searches and mammograms.

Accordingly, *www.YourScan.org* seeks donated mammograms with physician-diagnosed lesion(s) of any type. To donate a mammogram, please go to the website and fill out a release form for your mammogram sets and they will formally request a copy of them from your doctor. If you already have copies, you can directly upload them from the website *www.YourScan.org*.

The crowd-sourcing approach seeks to accelerate the data collection and assemble the comprehensive library. The universal application of the scanning technology for diagnostic purposes will require collaboration with medical institutional partners and ultimately federal regulatory review and approval.

How Does it Work? – The Leaves of a Maple Tree

Compared with existing image recognition software, the YourScan.com website uses an entirely different technology: Ldb3 technology. The standard approach is to mechanically count pixels and make numerical comparisons that are often useful but sometimes misleading, especially when dealing with organic shapes such as lesions.

By contrast, Ldb3 technology mimics the process of human vision. Like the leaves of a maple tree, no two lesions are identical. Yet when shown a maple leaf, we can identify it as belonging to a maple tree because it "looks like a maple leaf." We do this by visually generalizing a leaf's specific features and engaging in what digital recognition technologists call "visual rounding." It is a kind of pattern or shape recognition based on previous identifications. This is the same process used by Ldb3 technology and is remarkably fast and accurate. Using the tissue profile library it identifies tissue patterns missed by the human eye or not recognized by other technologies.

Below are actual lesion images that illustrate the technology, using both 2-D and 3-D mammograms. The technnology detects and highlights the tissue patterns isolating them in green, against the gray and white background of the mammogram. Seen this way, lesions clearly have distinct shapes that, while not identical, share distinct characteristic features.

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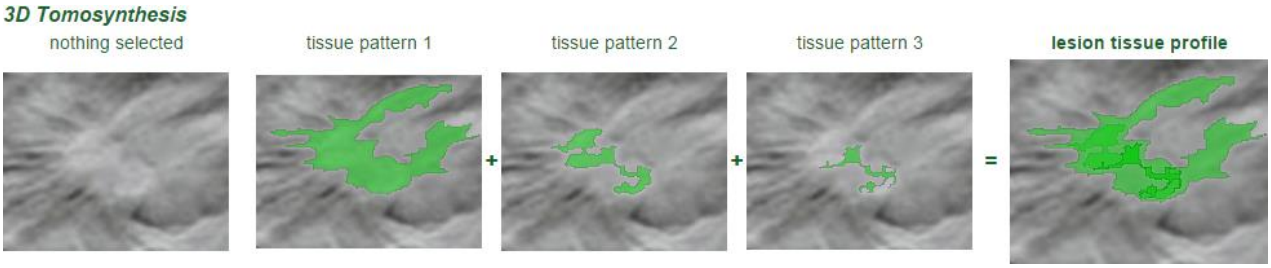
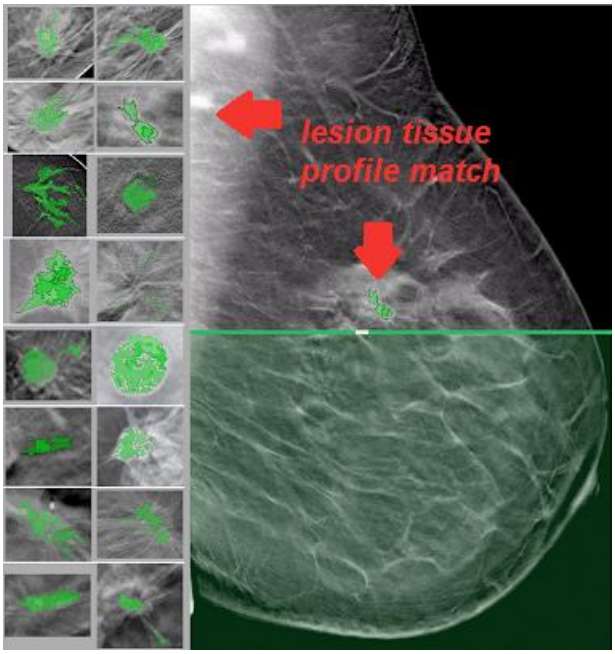


Mammograms can be scanned against the library of known precursor and lesion tissue profiles. Below is a screen shot of the technology doing such a scan. The small boxes on the left are lesion tissue profiles compiled from the lesion tissue profile library. The larger image on the right is an uploaded mammogram as it is scanned (indicated by the green line and shading). The small green image in the middle of the larger image on the right denotes a lesion tissue match in the lesion tissue profile set on the left.



As the tissue profile library expands with additional donated mammograms, the statistical significance of its analysis will sharpen even further. The tissue profiling of a first 2,000 lesions has yielded some tantalizing preliminary results. In the example below the Ldb3 technology appears to distinguish a benign lesion from a malignant lesion. It does this by revealing the existence of a central core in the malignant lesion. Recognizing this

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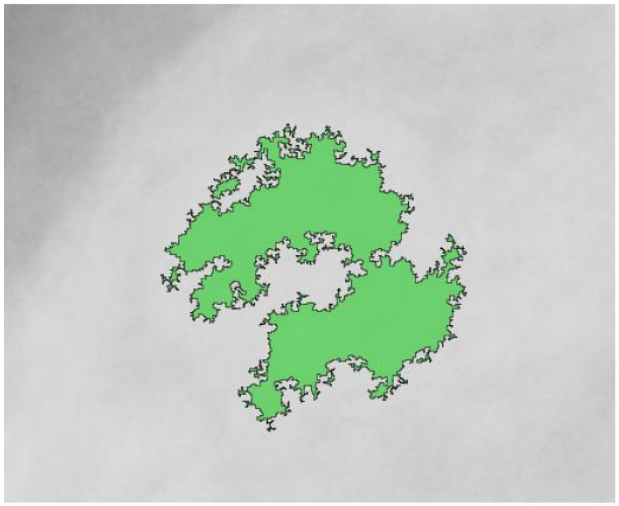
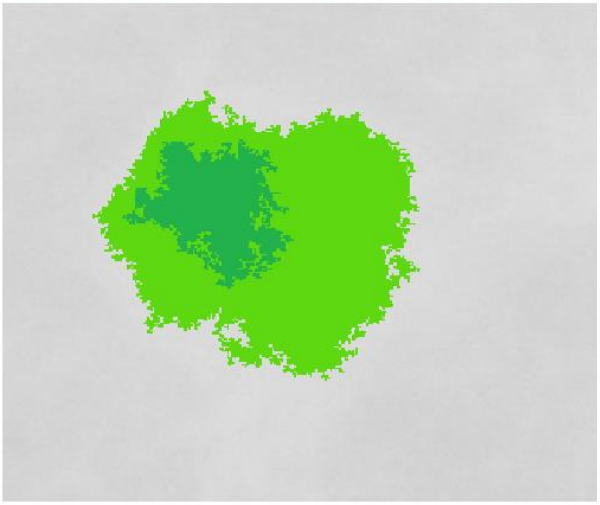
tissue pattern has proven to be a reliable method to distinguish between benign and malignant lesions. That is, malignant lesions appear to have a centralized core that the mass grows outward from, whereas benign lesions appear to lack such a core.

Benign no core tissue



Malignant has core tissue (dark green)



Benign no core tissue
Not highlighted by Ldb3

Malignant has core tissue
Not highlighted by Ldb3