

AI Improves Breast Cancer Diagnoses by Factoring Out False Positives

February 1, 2018 by SERGE LEMONDE

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One in eight women will be diagnosed with breast cancer in their lifetime. Battling this most common form of cancer among women begins with finding it.

The majority of cases are discovered with an initial screening based on a mammogram, an X-ray of the breast tissue. However, this method has a high rate of false positives. On average, 50 percent of women over a 10-year period who have a routine mammogram receive at least one mammography interpretation that turns out to be false.

These false positives mean patients are called back for further unneeded tests, potentially including invasive biopsies, which can lead to increased anxiety, physical discomfort and medical complications.

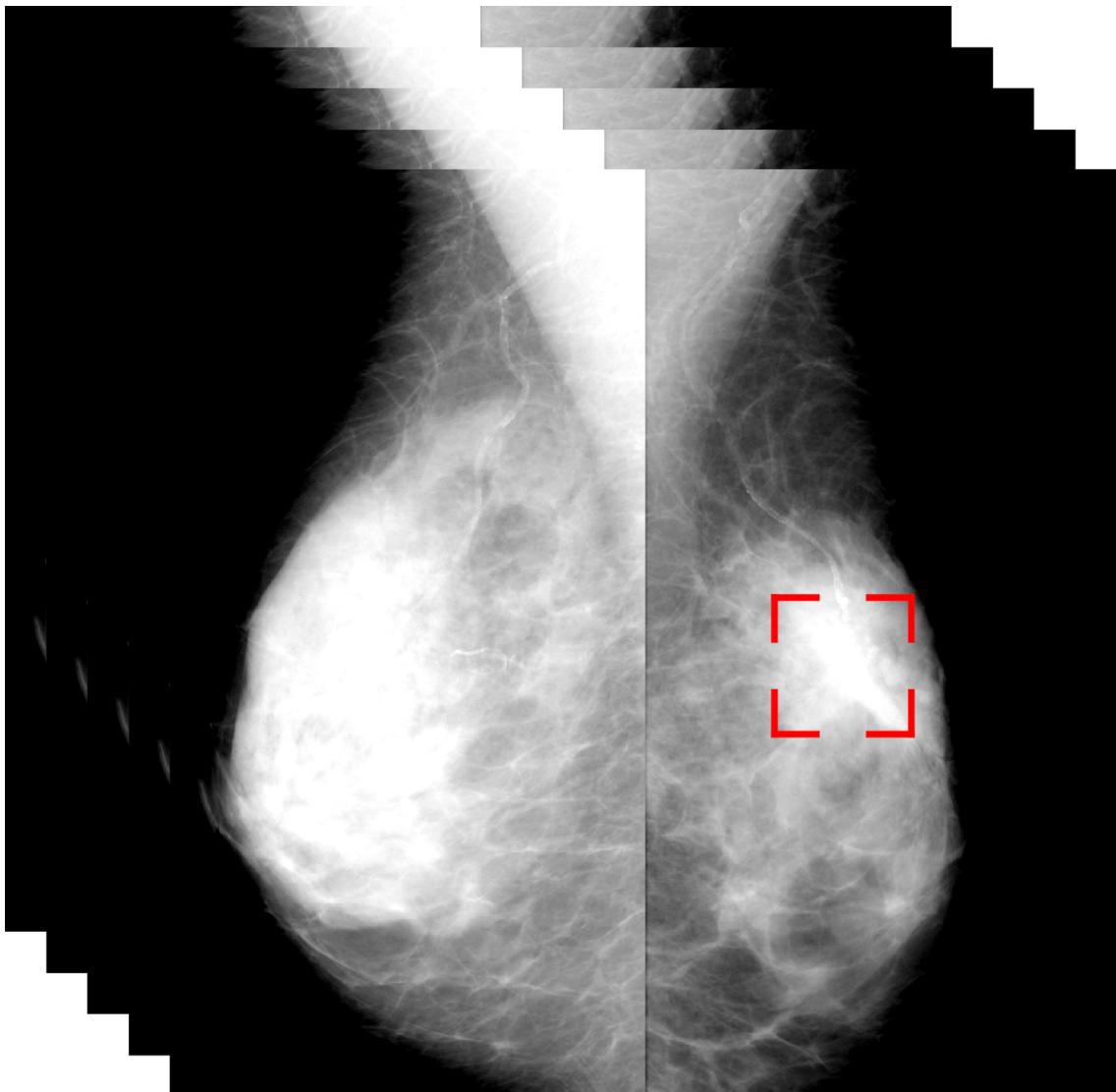
Therapixel, a French startup and member of our Inception program, is making strides in cutting down the number of false positives by improving the accuracy of initial diagnoses using AI. The company is one of more than 2,200 startups in the virtual accelerator program, which provides startups with access to NVIDIA technology, expertise and marketing support.

Making Mammography More Meaningful

To detect breast cancer development early, many countries have implemented screening programs that rely primarily on mammography. Radiologists manually review the images and check for any abnormal areas. If they detect something that appears to be unusual, they mark the image as “positive” and refer the patient for further tests.

On average 10 percent of patients who have mammograms will be marked as positive and called back for additional investigation including a biopsy, an invasive procedure that involves removing a sample of cells from the breast. Of those who undergo biopsies, 95 percent don’t have cancer.

Therapixel has developed a series of AI algorithms, accelerated by NVIDIA GPUs, to reduce the number of patients who undergo biopsies when no cancer is present. Its solution reviews the initial X-ray images and provides radiologists a first reading that indicates the likelihood of a patient developing breast cancer.



Therapixel's AI algorithms finds cancer-specific anomalies in mammograms.

mammograms, Therapixel trained one set of algorithms to find all of the cancer-specific anomalies in the images. A second **neural network**, acting on a coarser scale, was then trained based on the first network. This second network was able to return the best results when it came to calculating the likelihood of a patient developing breast cancer.

Last year, Therapixel used these AI algorithms in [The Digital Mammography Challenge](#) — a global competition focused on improving the performance of breast cancer screening through the use of AI. More than 1,200 participants competed over four rounds of the nine-month-long competition. Amidst this fierce competition, Therapixel was awarded [first place](#) for its algorithms, which reduced the number of false positives by 5 percent — considered a significant achievement — compared to current state-of-the-art methods.

Since the challenge, Therapixel has continued to develop its algorithms and can now achieve better detection rates than radiologists, on average. Soon, the company expects to receive regulatory clearance and use its solution to dramatically improve breast cancer detection worldwide.

"With the computing power of NVIDIA's GPUs behind us, we are making a real difference to the early diagnosis of breast cancer, which is a crucial factor in battling this disease," said Olivier Clatz, CEO and co-