Women Rock-IT

IT is a world of possibilities.

Register now

Addressing Real World Problems with Artificial Intelligence

Annie O'Rourke
Founder and Executive Director
Digital Workforce Australia

Dr. Geetha Manjunath
Founder, CEO & CTO
NIRAMAI

#Tech4Good

Putting community at the heart of Artificial Intelligence

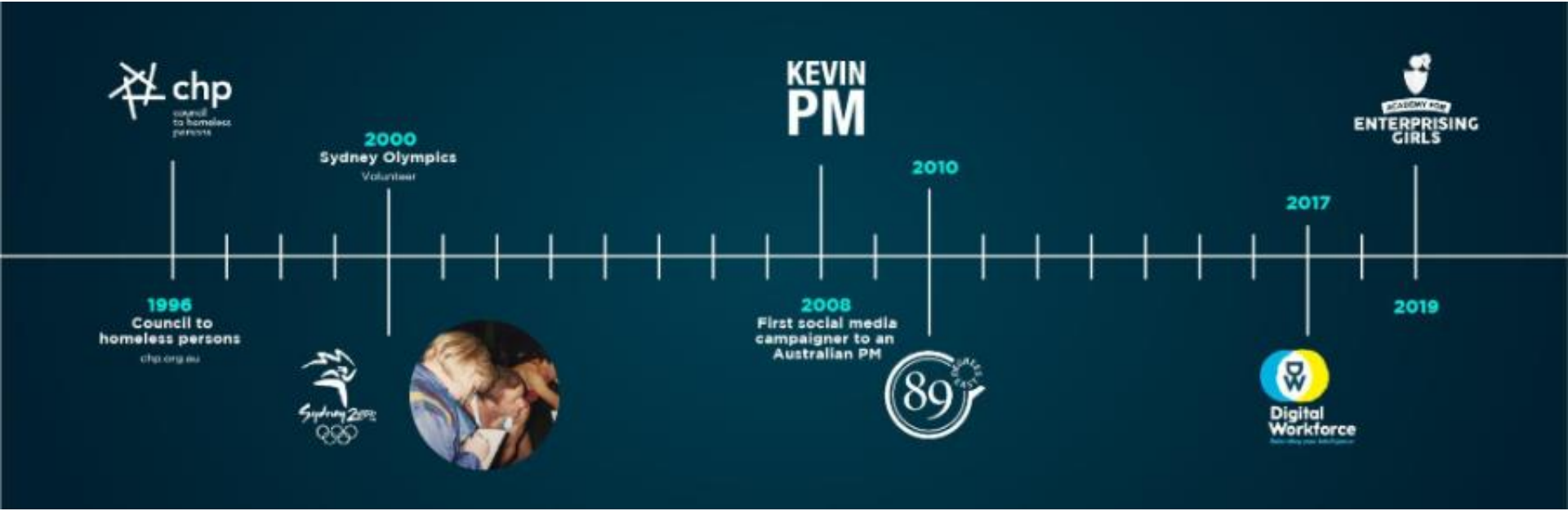
Addressing real world problems with Artificial Intelligence

Annie O'Rourke
Digital Workforce Australia CEO

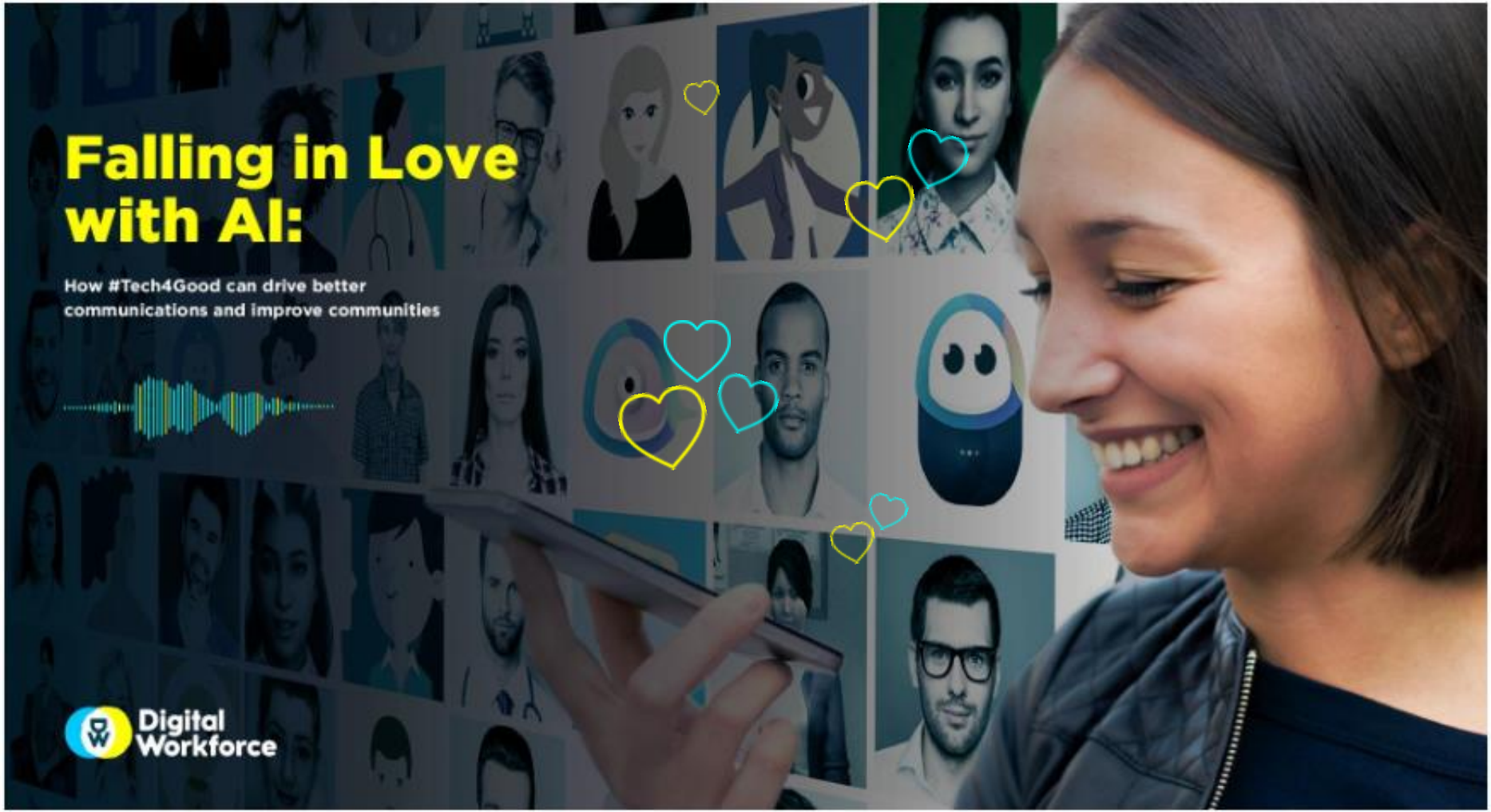
Digital Workforce

Serial #GirlFounder

My pathway to passion & purpose lead tech



Career pathway: Community, connections, creating good


Falling in Love with AI:
How #Tech4Good can drive better communications and improve communities
Digital Workforce

The Conversational Economy

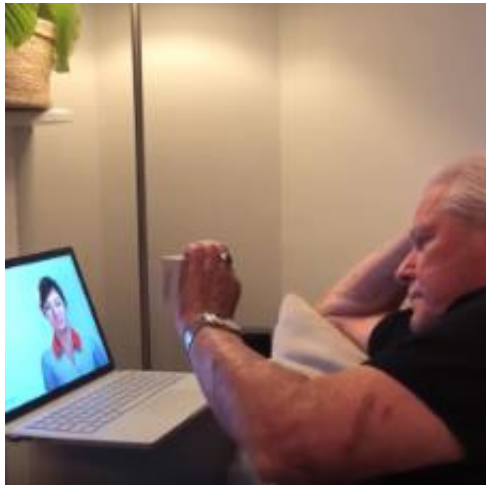
The future is voice

GET YOUR COPY

Download the ‘Conversational Economy Whitepaper’ at **heridea.co/Annie**

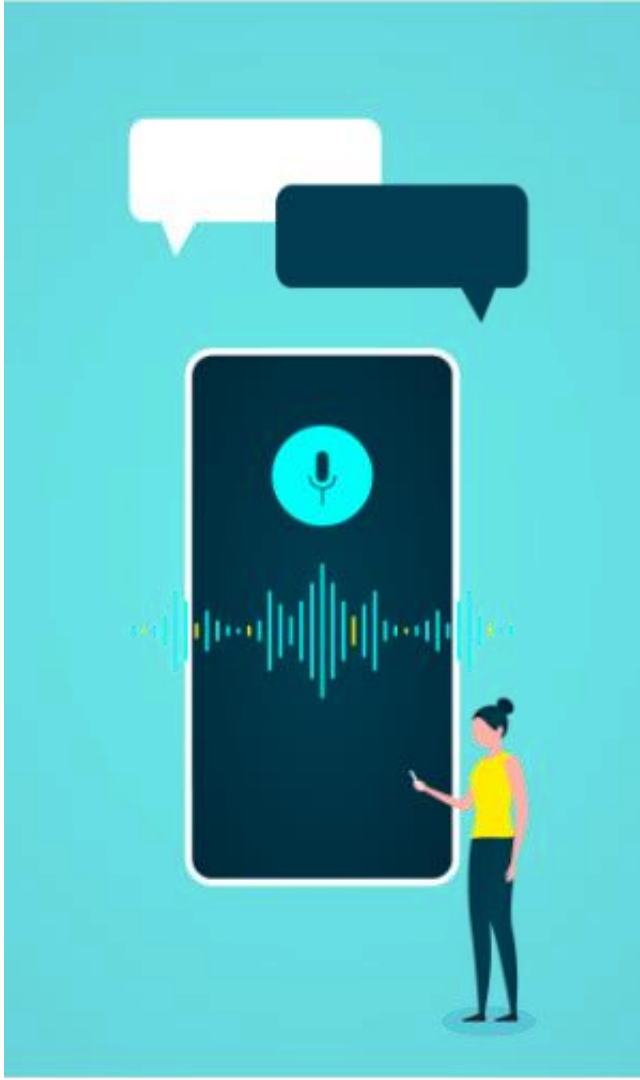
“Efficient Technology” which disconnect citizens and consumers

Community driven Artificial Intelligence and #Tech4Good



Artificial intelligence is only as GOOD as the humans who create it.

What you program, and how you program matters.



Digital Workforce

Creating Community Good with Artificial Intelligence

Lucy,
Hospital Smart Speakers

Cardiac Coach

Nadia, NDIS

Ellie, US Army
Therapist AI

Career Coach


HAVE YOU
TRIED
TURNING
IT OFF
AND ON
AIM?
Digital
Workforce

Getting more women in STEM! Passion &

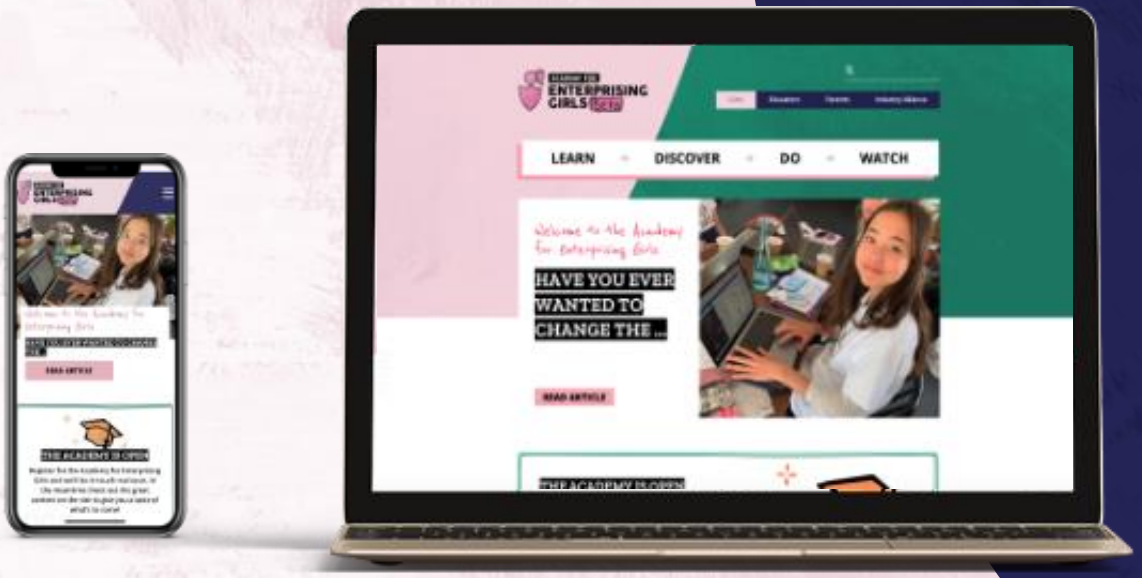
You can’t be what you can’t see.

STEM-based jobs make up 75% of the fastest growing occupations and higher paying jobs in Australia.

But **only 17%** of the STEM workforce in Australia is women!

Demand for workers with skills in STEM is growing exponentially.

ACADEMY FOR
ENTERPRISING GIRLS



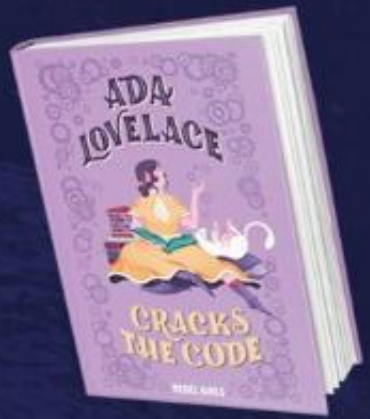
EnterprisingGirls.com.au

ENTERPRISING GIRLS
COURAGEOUS KIDS

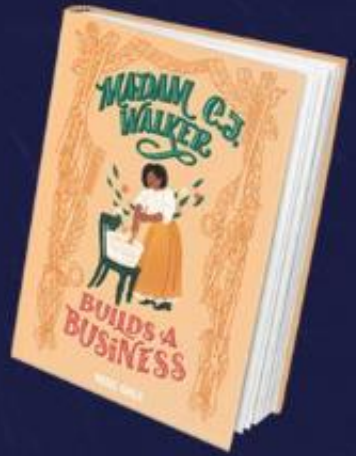
"I just turned 13 and I own my own business."

Téa Devow

BOOK GIVEAWAY



Are you the next
Ada Lovelace?



be in it to win it

ENTER NOW

ACADEMY FOR ENTERPRISING GIRLS

REBEL GIRLS®

My tips for Women who want to Rock-IT

Find the passion that will give your tech purpose

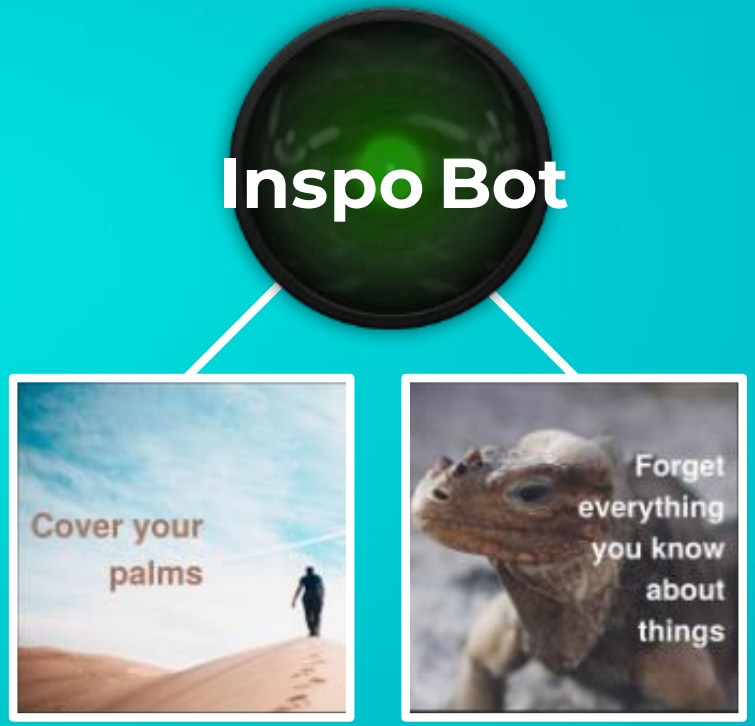
Create, code and develop with community good at the heart of what you build #Tech4good

Understand STEM to contribute - It’s essential that everyone helps create value from tech

Remember

AI can do many things to **help** people, but it cannot **replace** people.

AI cannot do everything, but people - including people like you and I - **can do anything**.



Thank you

Find out more about the
Academy for Enterprising Girls
enterprisinggirls.com.au

Annie O'Rourke
m: +61 488 557 166
e: annie@digitalworkforce.com.au

Digital Workforce

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Non-Contact, Non-invasive Early -Stage Breast Cancer Screening

Dr Geetha Manjunath
Founder and CEO
NIRAMAI Health Analytix

Breast cancer - leading cause of cancer deaths in women

1 in 17

Women develop a breast abnormality in their lifetime

500,000

Deaths per year

Survival rates in India and many developing countries is just 50%

Early Detection is key to survival!

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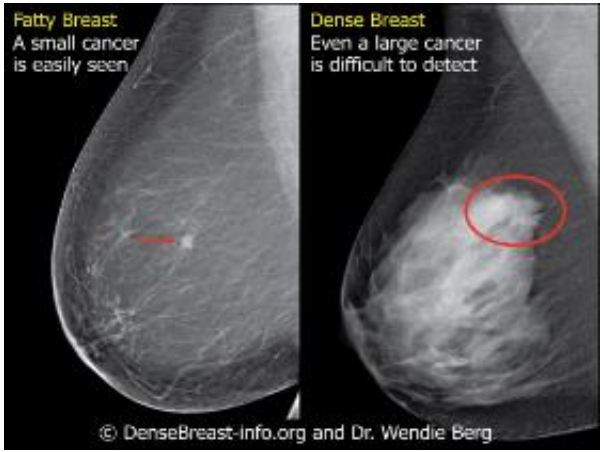
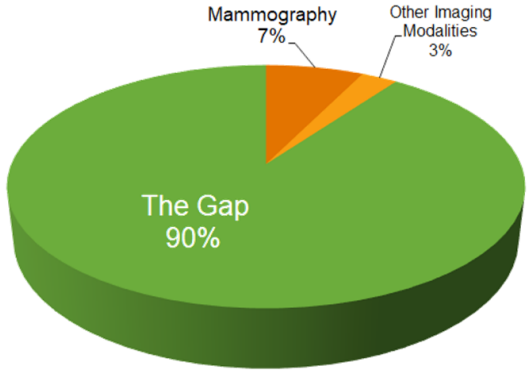
Gaps in current screening methods



- No good test for women < 45 years

  and women with dense breasts
- Affordability
- Accessibility
- Radiation Exposure and Pain



Most people detect cancer by hand examination

2 Billion women need to be screened every year

Less than 200 Million breast imaging tests done per year

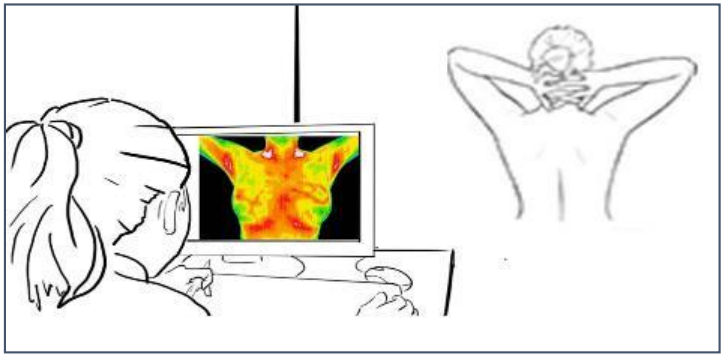
Niramai

NIRAMAI Solution

Privacy-Aware, Early Stage Breast Cancer Detection

- Can detect cancer long before a lump is felt
- Non-contact, Non-invasive, Privacy Aware
- No Radiation
- Works for women of all ages, and men too!
- Affordable
- Portable, light, small screening device

Powered by Machine Learning



22


30+ Hospitals and
Diagnostic Centres

Corporate Camps

Rural Outreach

300+ Outreach Camps

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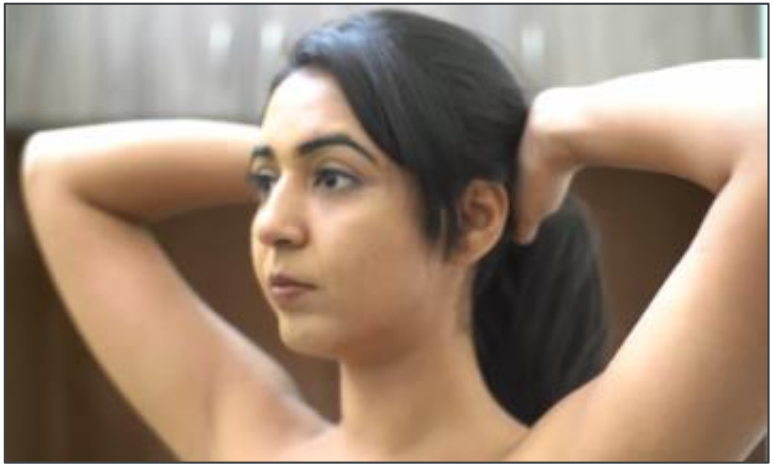
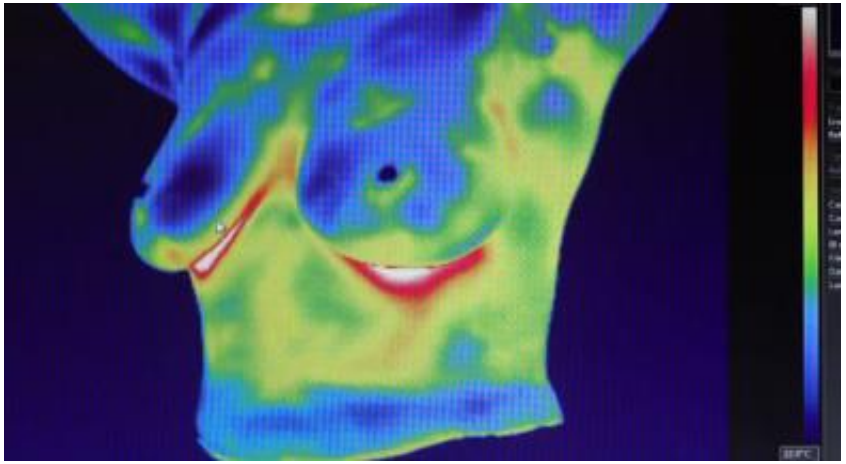
Patient Experience Video





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How does it work?

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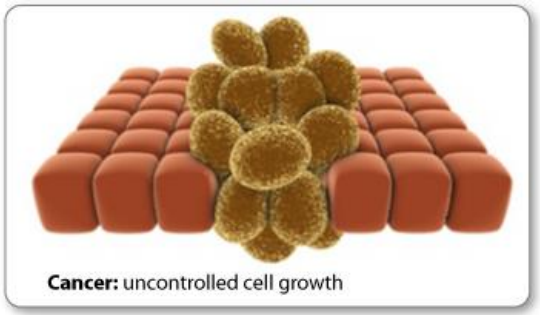
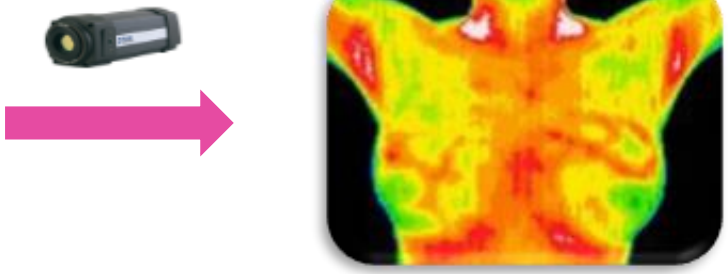
Thermography can detect cancer much earlier than any other modality

Thermography measures infra-red radiation from the body generated due to heat





FDA Approved Adjunct modality for cancer screening

>500

Thermography clinics in US

Limitation of Manual Thermography:

- **Interpretation errors**
- **Subjective Analysis**
- **Cognitive Overload**

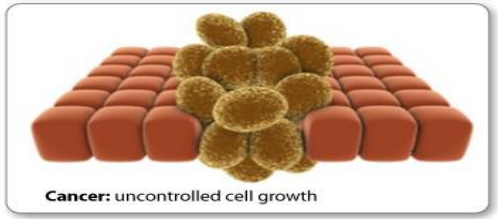
(400,000 color pixels of 2000 shades)

Thermalytix© by Niramai

Thermalytix® by NIRAMAI

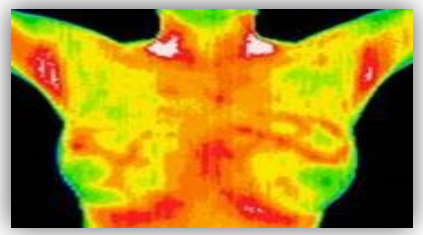
A Novel Fusion of Machine Intelligence + Thermography

9 US patents granted
More patents pending



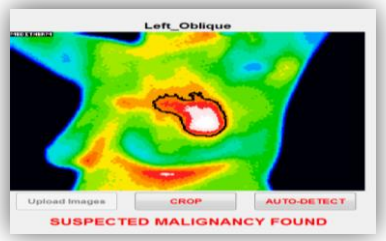
- ✓ Highly Sensitive
- ✓ Early Detection

Thermal Sensor



- ✓ Portable
- ✓ Safe
- ✓ Non-invasive

Machine Intelligence



NIRAMAI Software

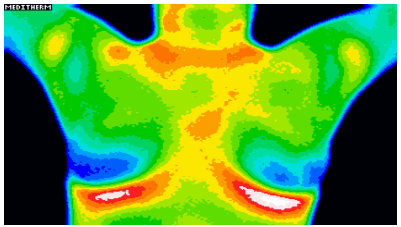
- ✓ Automated
- ✓ Real time
- ✓ Affordable
- ✓ Accurate

Instead of looking for lumps, we look for cancer.

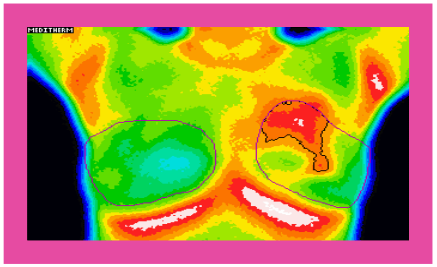
The Core Innovation

Ability to differentiate malignancy from benign conditions

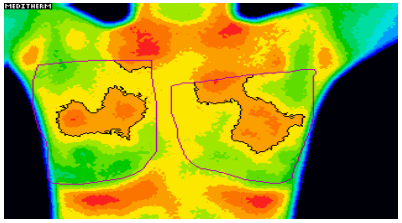
9 US patents granted, more pending



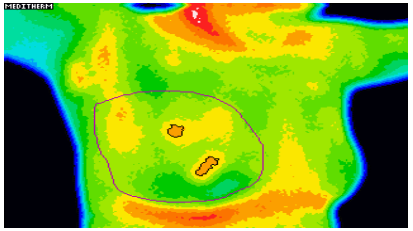
Normal Lady



A Lady with Breast Cancer



A Lady with Hormonal Activity



A Lady with a Cyst

Machine Learning and Computer Vision Algorithms to detect early stage cancer

- Demography Data
- Asymmetric Patterns
- Thermal Distribution
- Vascularity Analysis
- Hotspot Boundary
- Hotspot Shape Characteristics

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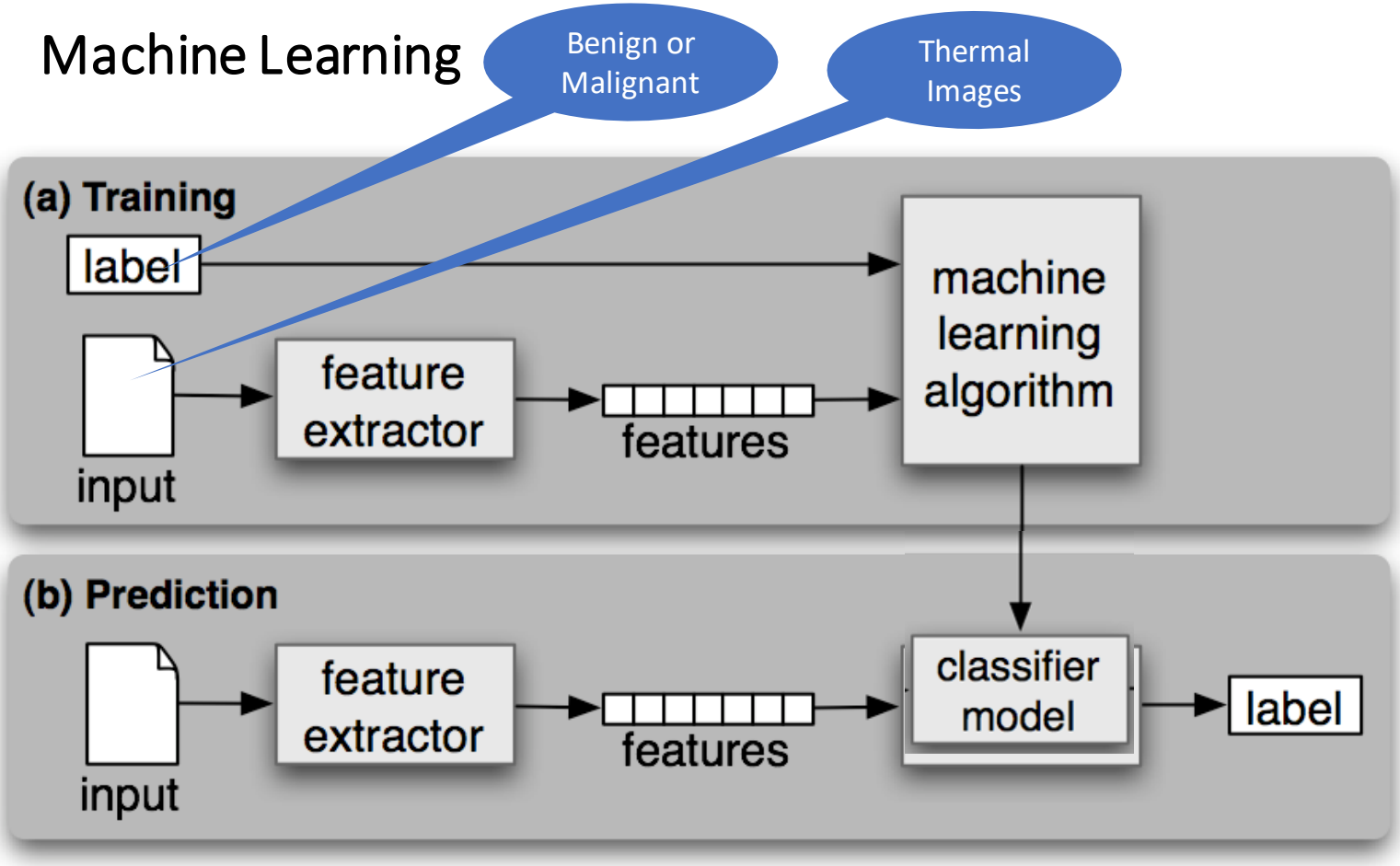
Machine Learning



NIRAMAI team trained ML classifier models using thermal images labelled with Malignant/Benign

This ML classifier model is used to predict probability of malignancy on new thermal images.

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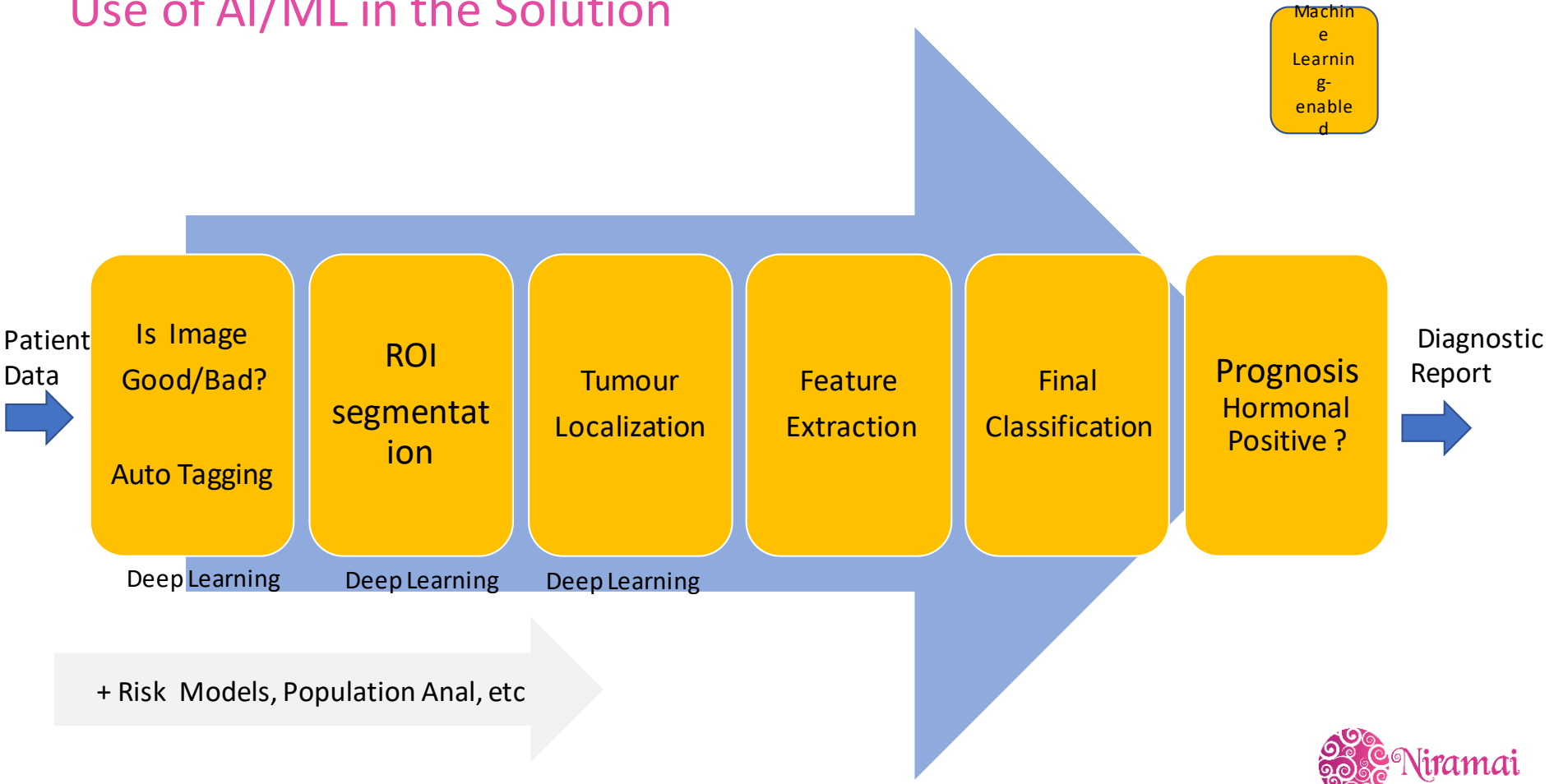
Use of AI/ML in the Solution



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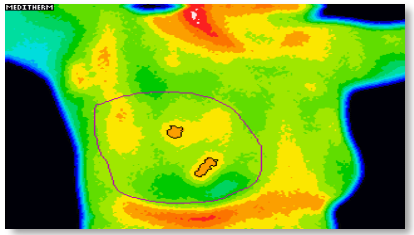
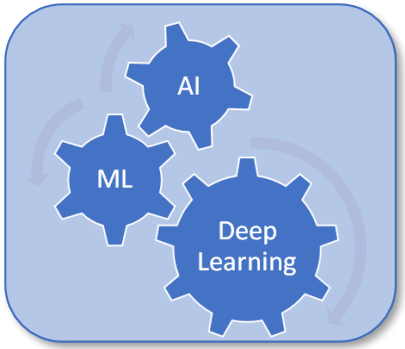
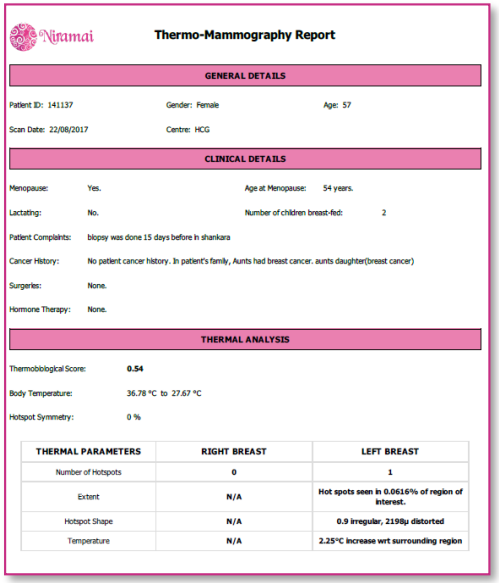
Computer Aided Diagnostics using AI/ML







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Thermo-Mammography Report

GENERAL DETAILS

Patient ID: 141137 Gender: Female Age: 57

Scan Date: 22/08/2017 Centre: HCG

CLINICAL DETAILS

Menopause: Yes. Age at Menopause: 54 years.

Lactating: No. Number of children breast-fed: 2

Patient Complaints: biopsy was done 15 days before in shankara

Cancer History: No patient cancer history. In patient's family, Aunts had breast cancer. aunts daughter(breast cancer)

Surgeries: None.

Hormone Therapy: None.

THERMAL ANALYSIS

Thermobiological Score: **0.54**

Body Temperature: 36.78 °C to 27.67 °C

Hotspot Symmetry: 0 %

THERMAL PARAMETERS	RIGHT BREAST	LEFT BREAST
Number of Hotspots	0	1
Extent	N/A	Hot spots seen in 0.0616% of region of interest.
Hotspot Shape	N/A	0.9 irregular, 2198µ distorted
Temperature	N/A	2.25°C increase wrt surrounding region

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Granted US Patent and Applications

	Patent ID	Title	Grant Date
1	US-9486146-B2	Detecting tumorous breast tissue in a thermal image	08-11-2016
2	US-9622698-B2	System and method for detecting cancerous tissue from a thermal image	18-04-2017
3	US-9865052-B2	Contour-based determination of malignant tissue in a thermal image	09-01-2018
4	US-9898817-B2	Software tool for breast cancer screening	20-02-2018
5	US-10055542-B2	Software interface tool for breast cancer screening	21-08-2018
6	US-10068330-B2	Automatic segmentation of breast tissue in a thermographic image	04-09-2018
7	US-10198670-B2	Blood vessel extraction in two-dimensional thermography	05-02-2019
8	US-10307141-B2	Thermography-based breast cancer screening using a measure of symmetry	04-06-2019
9	US-10368846-B2	Classifying hormone receptor status of malignant tumorous tissue from breast thermographic images	06-08-2019
10	US-2017245762-A1	Privacy booth for breast cancer screening	Pending Grant in US
11	New Application	System and Method for Adaptive Positioning of a subject for capturing thermal image	Applied
12	New Application	System and Method for Identifying errors in Positioning of a subject for capturing thermal image	Applied

Also applied in India, Germany, Canada, Europe, Singapore, China, Japan

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Our Research Published in International Computer Science Journals / Conferences

1. Cascaded CNN for View Independent Breast Segmentation in Thermal Images, Siva Teja Kakileti*, Geetha MANJUNATH, Himanshu Madhu, 2019 41st Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC). Berlin , June 2019
2. Exploring Deep Learning Networks for Tumour Segmentation in Infrared Images, A Dalmia, ST Kakileti, G Manjunath, 14th Quantitative InfraRed Thermography Conference (QIRT)
3. Invited Chapter on “Advances in Breast Thermography” in Open Access Book titled “New perspectives in Breast Imaging”.
4. An Accurate Polygon-based Breast Segmentation for Multiview Thermography, ST Kakileti, AK Parthasarathy, M Himanshu, V Krithika, G Manjunath, EMBC 2017 (Accepted)
5. “Automatic Determination of Hormone Receptor Status in Breast Cancer using Thermography”. 19th International Conference on Medical Image Computing & Computer Assisted Intervention October 17-21, 2016, Athens, Greece.
6. “Extraction of Medically Interpretable Features for Classification of Malignancy in Breast Thermography”. 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, Orlando, USA, on August 17 – 20, 2016.
7. “Automated Blood Vessel Extraction in Two-Dimensional Breast Thermography”. 23rd IEEE The International Conference on Image Processing, Phoenix, Arizona, USA, on September 25 – 28, 2016.
8. “Semi-automated breast cancer tumor detection with thermographic video imaging,” IEEE Int. Conf. Engineering, Medicine and Biology Society, August 2015, Milan, Italy
9. “Initial evaluation of human supervised automated breast cancer screening using thermography,” Quantitative InfraRed Thermography Asia Conference, July 6-10, 2015, Mamallapuram.
10. “Method for classifying cancerous and normal regions in breast thermography for small size tumors,” Quantitative InfraRed Thermography Asia Conference, July 6-10, 2015, Mamallapuram.

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International Clinical Publications

(1) International Conference on Breast Cancer Management, Amsterdam, February, 12-13, 2018 (pdf)

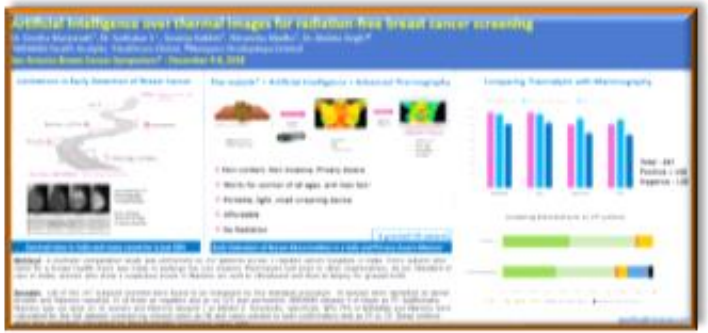
(2) International Conference on Advances in Breast Cancer Treatments, Kyoto, Japan, April 26-27, 2018 (pdf)

(3) San Antonio Breast Cancer Symposium International Conference on Breast Cancer Research, Dec 2018 (pdf)

(4) AACR Cancer Research Journal, Feb 2019 (pdf)

(5) ASCO Breakthrough Summit to be held in Thailand in Oct 2019 (pdf). Also Among top 50 abstracts Grant

(6) SABCS 2019, to be held in Texas in Dec 2019 (selected for presentation)



ASCO Breakthrough

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Awards and Media Mentions

BNP Best Preventive Insurance Idea

Amazon AI Conclave

Winner of AI Award Healthcare

Graham Bell Award in Data Science

2nd INDIAN CANCER CONGRESS
AROI ISO IASO ISMPO
ICC 2017 08-12 Nov Bengaluru

Top Cancer Startup

PHILIPS HealthWorks

HackOsaka 2019

Gold Prize Winner

birac
Ignite Innovate Incubate

WinER 2017

Google Developers Launchpad Accelerator

These Four Indian Startups Are Revolutionizing How To Detect Cancer

Forbes

YOURSTORY

STARTUP

Healthtech startup Niramai makes breast cancer screening safe and low-cost

Philips HealthWorks bets on 4 Indian startups for its accelerator programme

Amazon AI Awards 2017: Recognising the future of AI

HEALTH TECH

Fighting breast cancer with AI & ML

Niramai's Thermalytix screens patients for breast cancer, overcoming the limitations posed by mammography or ultrasound

SANDHYA MICHU

BENGALURU-BASED NIRAMAI'S break-

expert radiologists rollout. "The first big was the funds neede tual property since th oped by us when we w previous organisatic seed round within th to ensure that Niram Manjunath recalls.
Dr. Sudhakar, brea HCG, a leading cance chain which uses Ni diagnosis of breast patients, sees immer

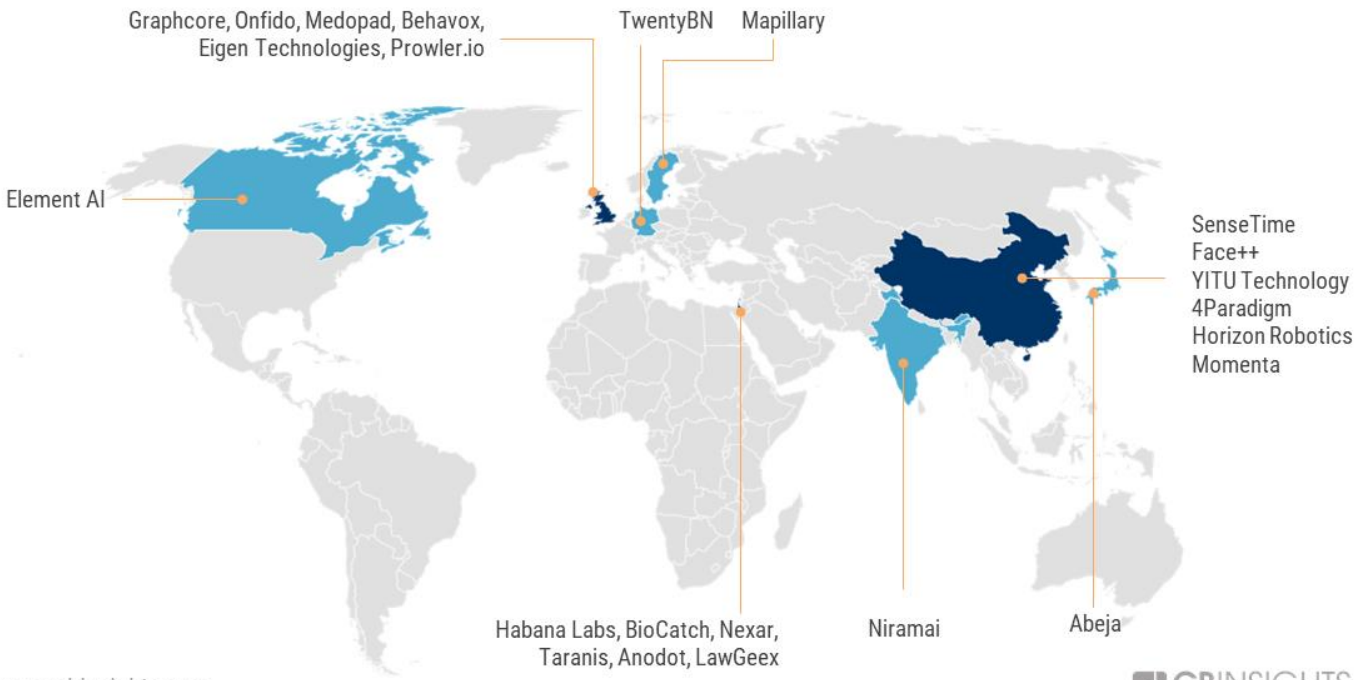
Analytics India MAGAZINE

10 Leading AI Startups India 2018

10/22/2018 'Our breast cancer solution addresses cultural issues' - The Times Of India - Delhi, 10/21/2018

'Our breast cancer solution addresses cultural issues'

2019 AI 100: Startups outside the United States



Source: cbinsights.com

CBINSIGHTS

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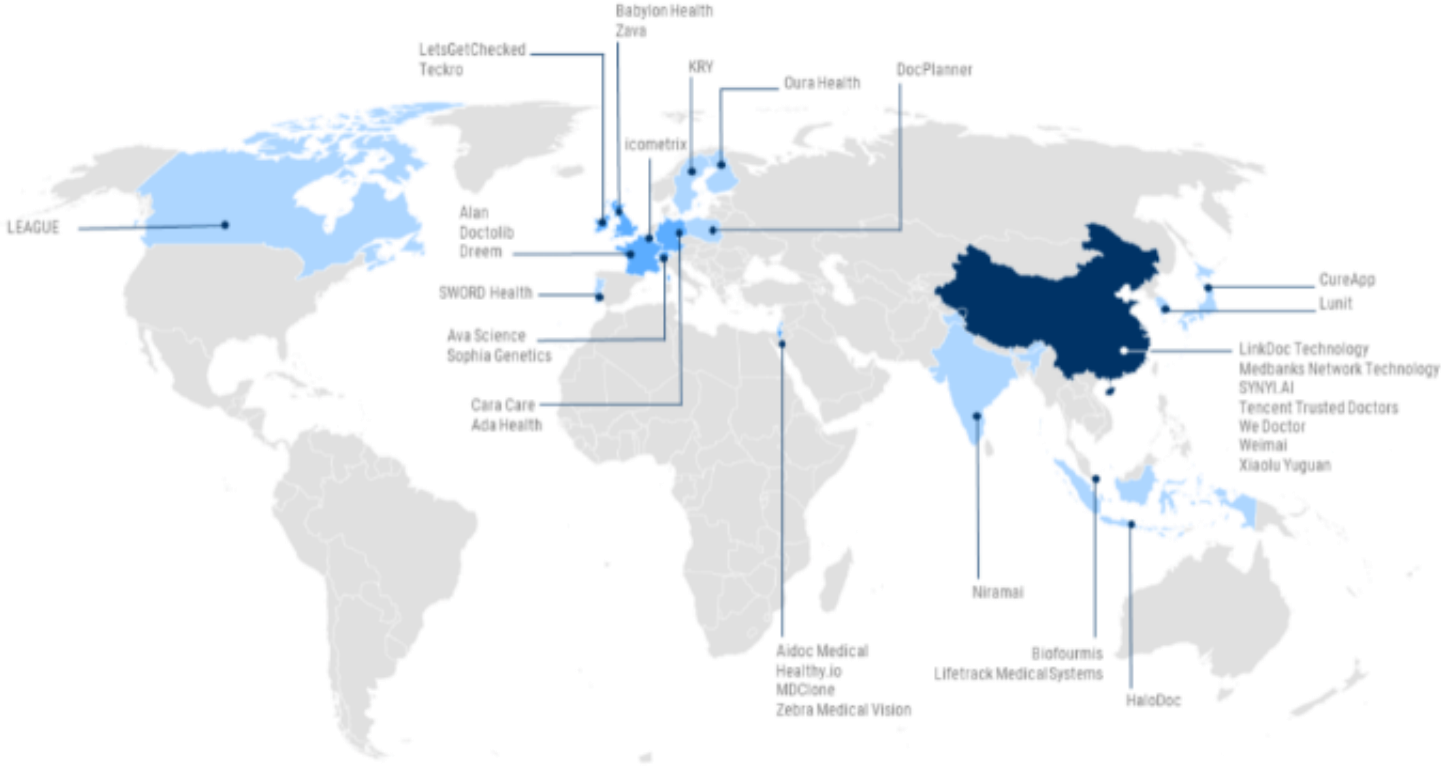
2019 Digital Health 150: Startups outside the United States



Source: cbinsights.com

CBINSIGHTS

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NIRAMAI Team

Geetha Manjunath

Founder and CEO

Nidhi Mathur

Co-founder

Bindu Ananth

Head- Screening Solutions

Himanshu Madhu

Senior Research Engineer

Surajit Mukherjee

Chief Business Officer

Siva Teja Kakileti

Data Scientist

Thara S

Senior Solution Architect

Revathi M M

Customer Success Manager

Shailesh B G

Research Associate

Ratna Kumari

Clinical Research Associate

Kanchana Gopinath

Senior Manager Special Projects

Manjula P G

Lead App Developer

Asha Rajendra

Certified Thermographer

Minerva Panda

Research Associate

Consulting Partners

Dr. Ram Prakash
Senior Thermologist

Dr Sudhakar
Head Radiology, HCG

Raveendran Gandhi
GTM Advisor

Niramai

Universal Screening Solution to detect Early Stage Malignancy

Saving Many Lives ...

Niramai

THANK YOU

http://www.niramai.com

Contact email:

Geetha Manjunath: geetha@niramai.com

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