



DOCTOR
HAZEL AI

Real time AI for skin cancer detection

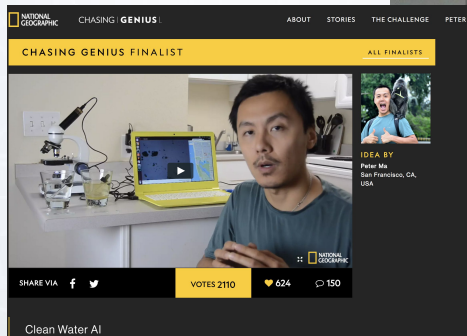
Peter Ma

Hackathon

Intel Software Innovator

5 startups

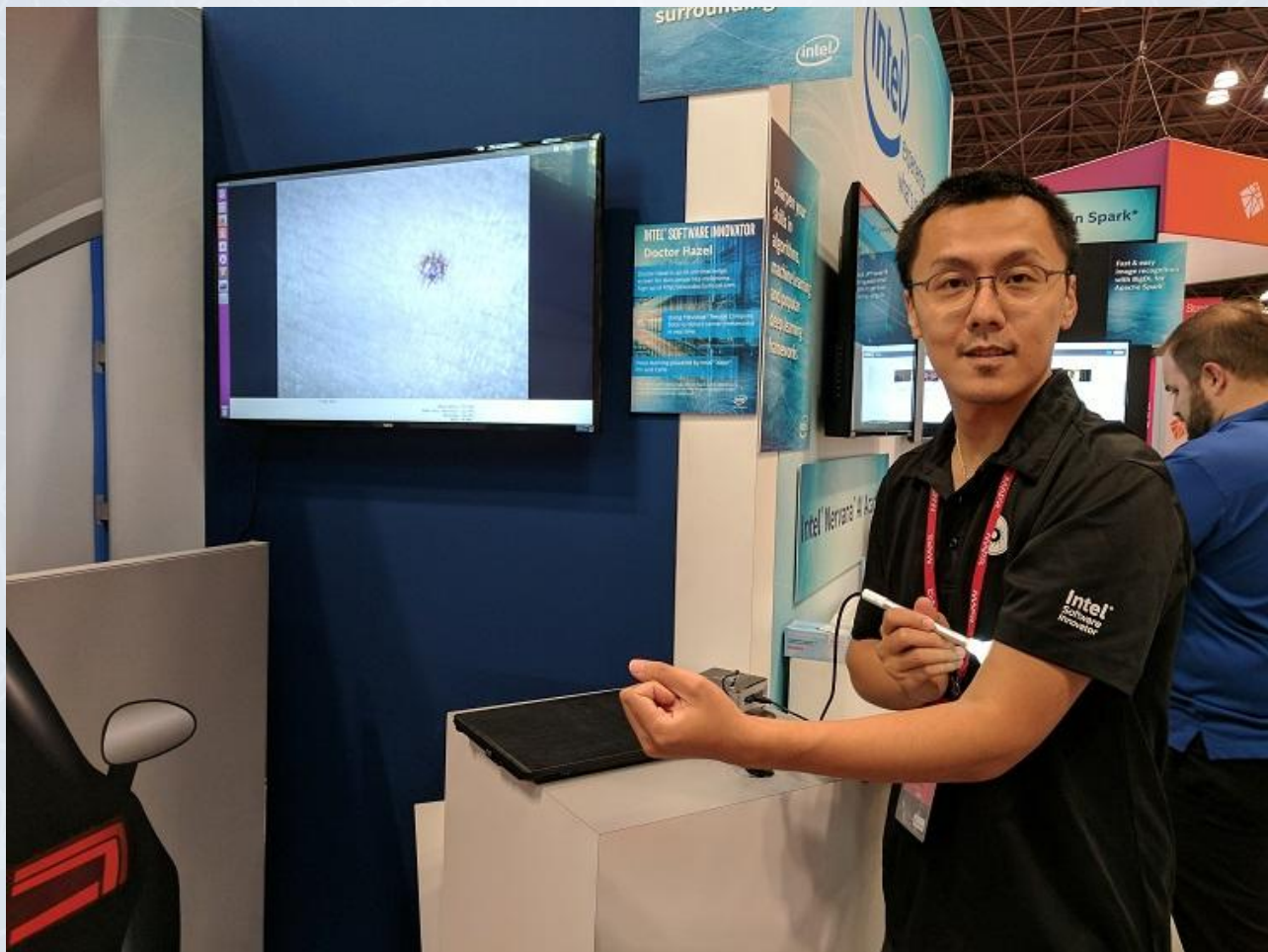
Built AI, IoT, BlockChain, Mobile



Problem

- Between 40 and 50 percent of Americans who live to age 65 will have either basal cell carcinoma or squamous cell carcinoma at least once.
- The annual cost of treating skin cancers in the U.S. is estimated at \$8.1 billion: about \$4.8 billion for nonmelanoma skin cancers and \$3.3 billion for melanoma.
- The estimated 5-year survival rate for patients whose melanoma is detected early is about 98 percent in the U.S.
- The survival rate falls to 62 percent when the disease reaches the lymph nodes, and 18 percent when the disease metastasizes to distant organs







Intel

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After losing a friend to cancer, two engineers created a revolutionary way to detect the deadly disease.



Skin Cancer Detection App

Detecting skin cancer AI: Pamphlet explaining skin cancer

IQ.INTEL.COM

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Artificial Intelligence (AI) Helps with Skin Cancer Screening

Published on March 26, 2018 [Translate](#)

CONTENTS

- [Challenge](#)
- [Solution](#)
- [Background and History](#)
- [Enabling Technologies](#)
- [Resources](#)
- [References](#)



"The long-term goal and true potential of AI is to replicate the complexity of human thinking at the macro level, and then surpass it to solve complex problems—problems both well-documented and currently unimaginable in nature."¹

Challenge

Skin cancer has reached epidemic proportions in much of the world. A simple test is needed to perform initial screening on a wide scale to encourage individuals to seek treatment when necessary.

Solution

Doctor Hazel, a skin cancer screening service powered by artificial intelligence (AI) that operates in real time, relies on an extensive library of images to distinguish between skin cancer and benign lesions, making it easier for people to seek professional medical advice.

Press Coverage



The Vision

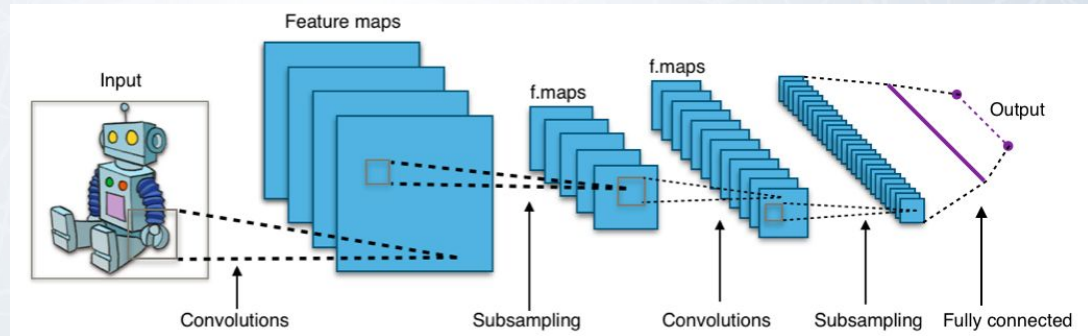
Everyone in the world gets a free AI powered cancer screening. Patients can engage a real dermatologist for biopsy and get a real treatment.

Every patient and every diagnosis trains the Artificial Intelligence delivering better care to more people and saving more lives.



Solution

A cloud AI service that classifies skin conditions and recommending the right treatment and follow up. The service would be available through special high definition camera equipment, embedded in insurance and provider mobile apps and available on the web.





0.8126 b'melanoma'
0.1874 b'nevus(mole)'



0.8848 b'nevus(mole)'
0.1152 b'melanoma'



Sources of Data

1. Stanford - already supported one study
2. University of Washington - Mike's alma mater
3. Fred Hutch
4. UCSF



Power Vision AI

My Workspace

My Data Sets

My DL Tasks

My Trained Models

My Web APIs

My Data Sets / Skin Cancer

Update Data Set - Others / Skin Cancer

Export As Zip File

Add Category

Rename Selected Category

Remove Selected Category

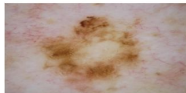

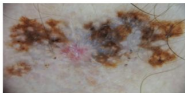


melanoma

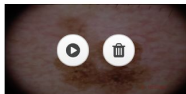




seborrheic keratosis


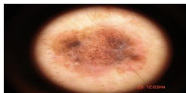



nevus

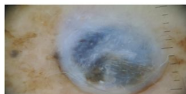



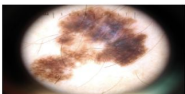
Upload pictures (jpg / png) by dropping them here Or

Select some









Total: 2169 Page Count: 109

Power Vision AI



Select Dataset
Select or create dataset



Build Model
Build model based on selected dataset



Deploy And Test
Deploy trained model and run test

Latest Status: deployed

Total Iteration: 1500

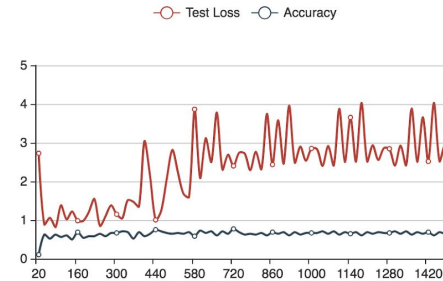
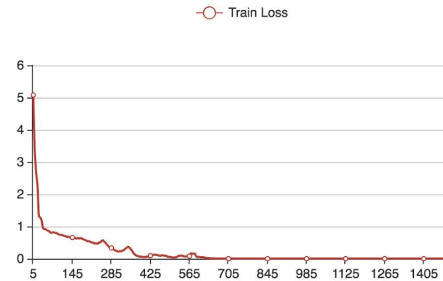
Train Iteration: 1500

Train Loss: 0.00024

Test Iteration: 1500

Test Loss: 2.55776

Accuracy: 0.68750



Estimated time left: 0 seconds

Who cares and why?

Insurance Companies

- Detecting cancer early lowers the costs of treatment.
- Getting people more engaged in their software helps them with population analysis and risk planning.

HMOs:

- Their goal is to have healthier population
- Cost of care of a person dying of cancer is way more than early detection.

And obviously patients because having cancer is devastating!

Events and Demos

1. TechCrunch San Francisco 2017, *San Francisco, CA*
2. STRATA Big Data NY 2017, *New York City, NY*
3. NIPS 2017 - *Long Beach, CA*
4. AI Academy Workshop 12/2017, *Long Beach, CA*
5. ACM SIGSCE 2018 - *Baltimore, MD*
6. SOLVE: Healthcare #IntelSolve 2018, *San Francisco, CA*
7. O'Reilly AI Conference NY 2018



Target Customers and Partners

1. Kaiser - they perceive the total cost of ownership
2. UCSF
3. Blue Shield
4. Teladoc
5. Walgreens

Go To Market in the Order of Priority

1. **HMOs and Insurance companies:**
 - a. A lot of customers at once.
 - b. Monetization on the entire population of insured.
2. **Walgreens and other drug stores:**
 - a. There is already a precedent with blood pressure monitoring in the stores.
 - b. Might be tied to Walgreens rewards.
3. **Direct to consumer:**
 - a. Freemium model on the web.
 - b. Allow hospital and doctor advertisement.

Team

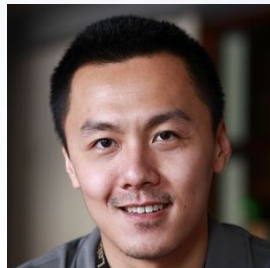
Mike Borozdin
*Co-Founder
Engineering*

- 20 years in software.
- 9 years at DocuSign
- 3 years at Microsoft
- Exec at multiple startups.



Peter Ma
*Co-Founder
Engineering*

- Software (15 years)
- 5 Startups (1 in EMR)
- Intel Software Innovator
- Samsung Championship
- Verizon (4 years)



Sarah Han
UX & Design

- Design (4 years)
- Software (3 years)
- China-US Young Maker Semifinalist 2016, 2017
- SAP Esri Hackathon Grand Winner, 2018



Johnny Madrid
Biz Dev

- Truman Scholar, Stanford
- Goldman Sachs
- Lombardia Capital Partners



Wesley Ryan
Marketing

- Published Writer
- 2 years in Copywriting
- Speaker at the Two-Year College English Association, 2015



Christine L. Brady
Marketing

- Marketing (2 years)
- Western States Communication Association (WSCA) Scholarly Conference Presenter, 2017



Advisors



Dr. Harold Milstein, MD

Dermatologist



Dr. Eric Wong, MD

Primary care

Roadmap

| | |
|---------|---|
| H2 2018 | Raise seed round (\$2MM). Get into accelerator. Build the AI engine. |
| H1 2019 | Start the FDA process. |
| H2 2019 | Finish building product. Clinical trial. |
| H1 2020 | Launch with Major partners. Raise Series A (\$10-\$12MM). |



INCEPTION PROGRAM

FDA

The Food and Drug Administration's (FDA, the Agency, or we) Center for Devices and Radiological Health (CDRH or Center) is announcing its Software Precertification Pilot Program. The program aims to evaluate a new approach toward software products, including a precertification program for the assessment of companies that perform high-quality software design and testing. This voluntary pilot program is part of FDA's ongoing efforts to develop pragmatic approaches to balance benefits and risks of digital health products. **FDA intends to develop a precertification program that could replace the need for a premarket submission in some cases and allow for decreased submission content and/or faster review of marketing applications for software products in other cases.** During the pilot program, FDA customers, including pilot participants, will have the opportunity to provide input on the development of the precertification program.

Major Risks

| | | |
|--------------------------------|---|---|
| FDA | FDA doesn't know how to deal with AI yet | This could be a great way to get in given that we have a good cause and are willing to work with them |
| Insurance Companies and Kaiser | Medical field is risk averse | We are involving them early |
| Data Sources | UW, Stanford, UCSF might not want to share the images | |

Business Model

Primary Care EMR Integration (per API call)

Reference Materials

Nature.com paper on Stanford findings:

<http://www.nature.com/nature/journal/v542/n7639/full/nature21056.html>, <http://sci-hub.cc/10.1038/nature21056>

Stanford Study on using AI for skin cancer:

<https://www.youtube.com/watch?v=toK1OSLep3s&feature=youtu.be>

Teladoc IPO - disrupting health delivery:

<https://rockhealth.com/deconstructing-teladoc-ipo-s-1/>

FDA software certification process:

<https://www.federalregister.gov/documents/2017/07/28/2017-15891/fostering-medical-innovation-a-plan-for-digital-health-devices-software-precertification-pilot>



www.doctorhazel.com