

# ExtJS and Machine Learning

How to deal with cancer using JavaScript and your mobile phone

Dr. Karol Przystalski

# About



## Overview

2015 - obtained a **Ph.D.** in Computer Science @ Polish Science Academy and Jagiellonian University

2010 until now - CTO @ **Codete**

2007 - 2009 - Software Engineer @ **IBM**

## Recent research papers

Multispectral skin patterns analysis using fractal methods}, K. Przystalski and M. J.Ogorzalek. Expert Systems with Applications, 2017

<https://www.sciencedirect.com/science/article/pii/S0957417417304803>

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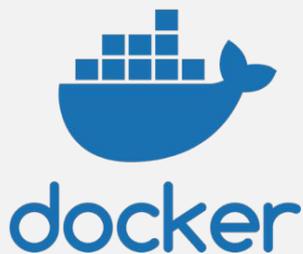
# Agenda

1. Where are we on machine learning in JavaScript?
2. Skin cancer
3. JavaScript and machine learning in production
4. Solution architecture
5. Demo
6. Where to go next?

# The idea

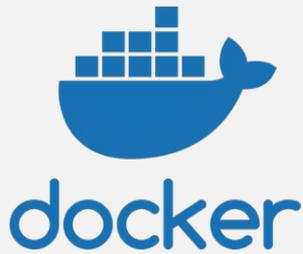
- We do it since 12 years now
- Help to fight the skin cancer
- Signed partnership contracts with dermatoscopy companies
- Open datasets - ISIC [www.isic-archive.com](http://www.isic-archive.com)

# Where are we on machine learning ...



<https://hub.docker.com/r/kprzystalski/jsml/>

# Where are we on machine learning ...



<https://hub.docker.com/r/kprzystalski/jsml/>

<https://github.com/codete/js4machinelearning>

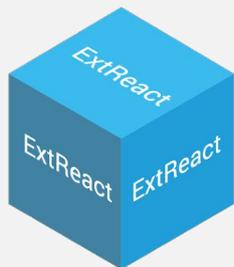


# PoC architecture overview

- ✓ ExtReact
- ✓ React is used to manage routing and data flow
- ✓ Ext is used because a lot of UI components that are very well integrated with React.js
- ✓ Phonegap and Cordova
- ✓ Tensorflow.js

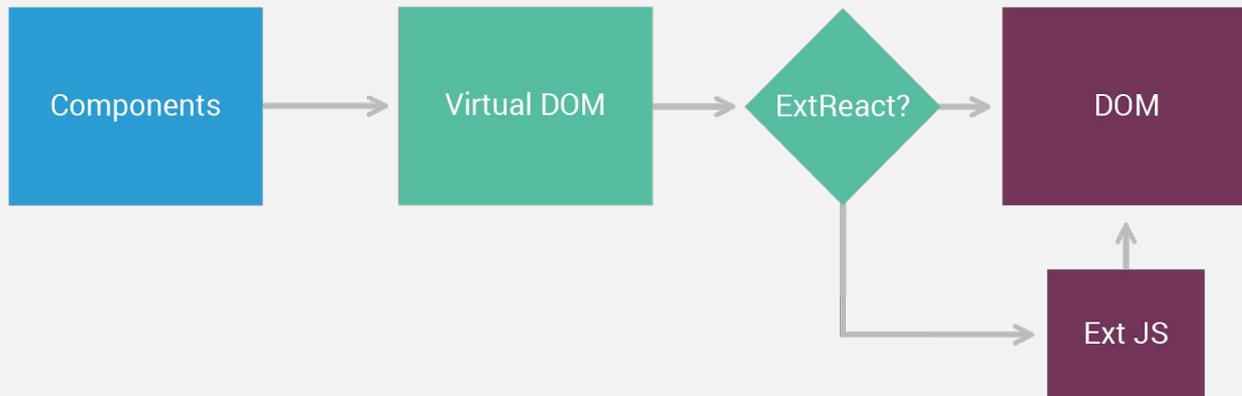
# ExtReact flow

## Application model



React.js

## ExtReact data flow

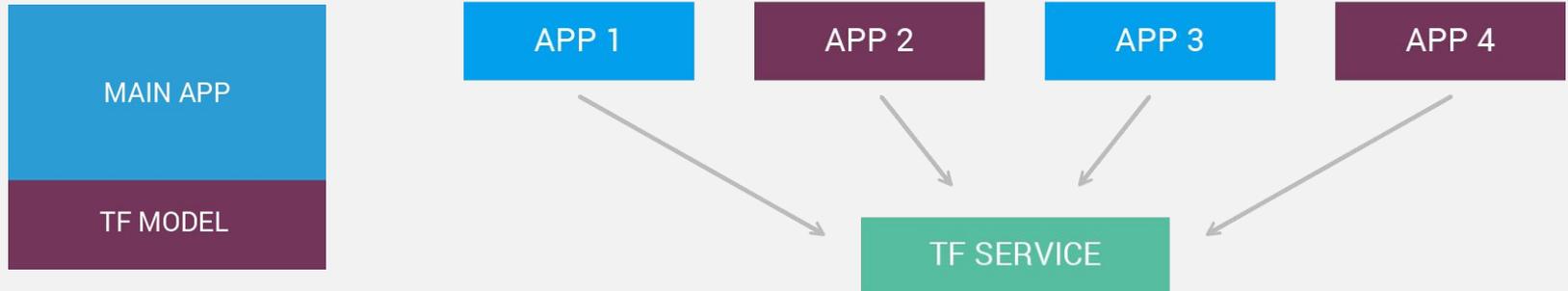


# JavaScript vs other languages

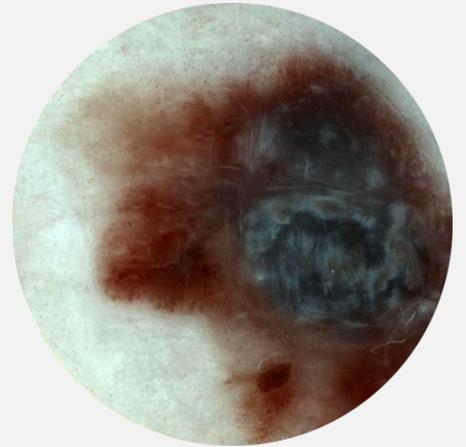
## Why and why not JavaScript for ML?

- ✓ JS is usually the second choice for model building. Data scientists prefer Python or R. In Big Data Java and Scala are used too
- ✓ In many cases JS is a good option to load and use a trained model, like a mobile or web app where the pictures or data is taken directly from the browser
- ✓ JS models on the front can be easily copied

# In production



# Skin cancer



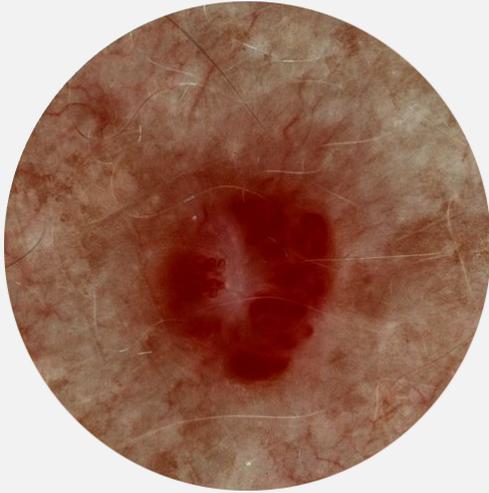
# Scoring

**There are different scoring methods used by MDs.**

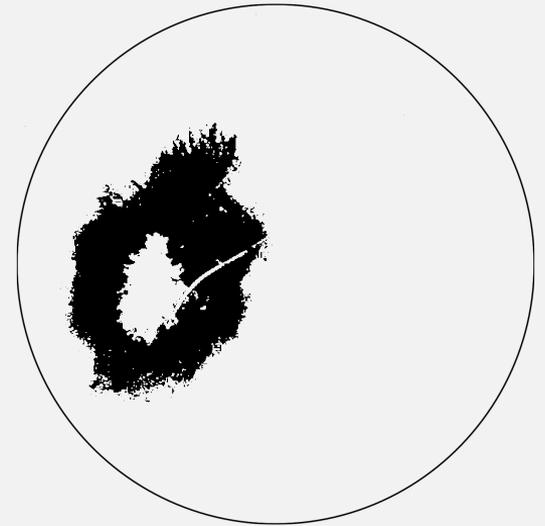
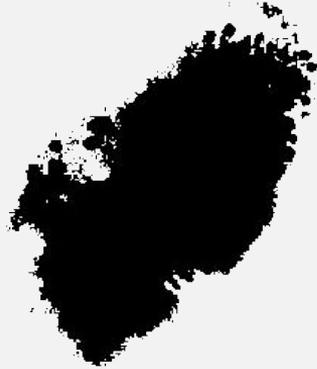
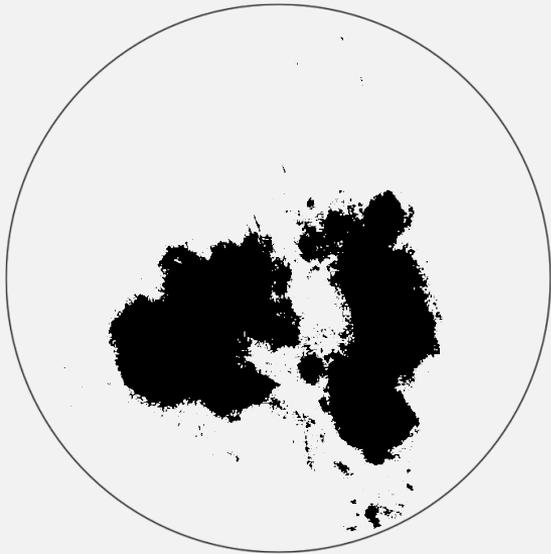
- ✓ ABCD
- ✓ 7-point score
- ✓ Hunter score
- ✓ 3-point score
- ✓ and many other scoring methods

There are about 30 different patterns that are specific for melanoma.

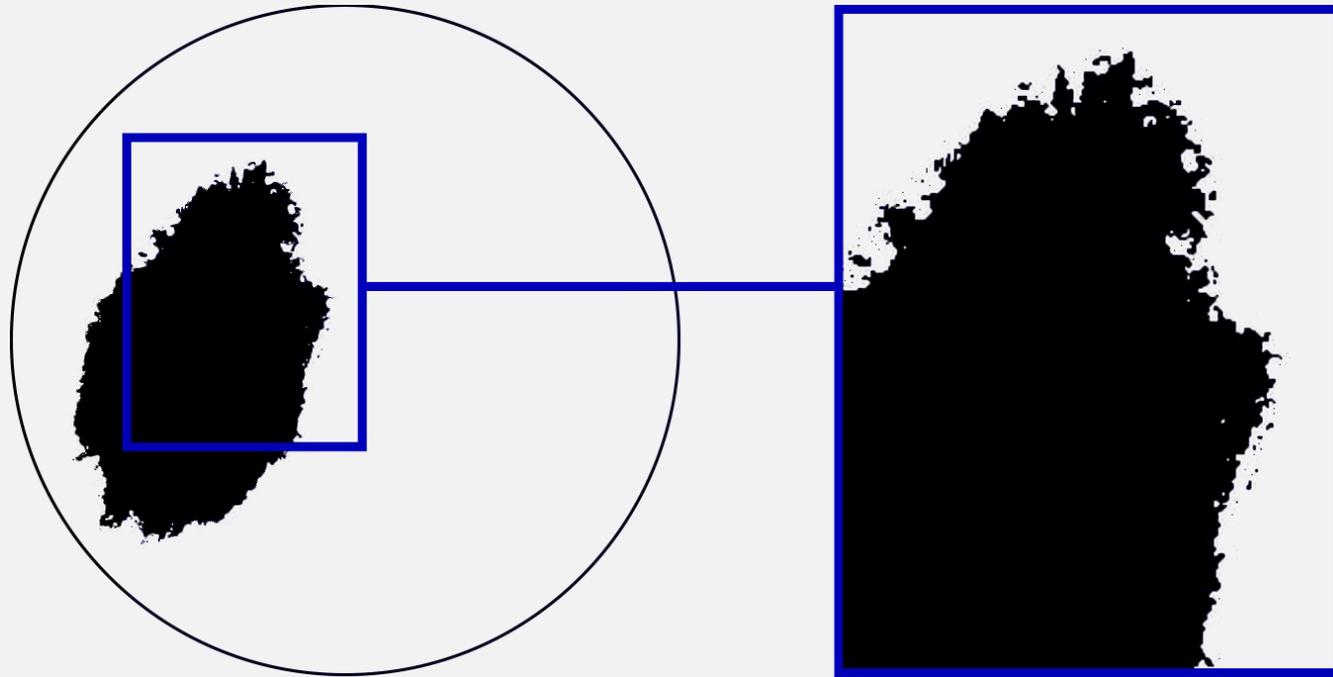
# Skin cancer



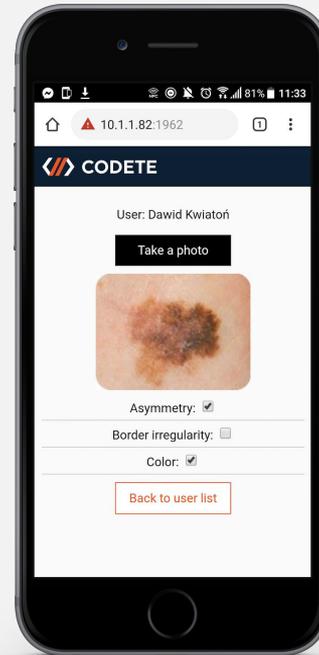
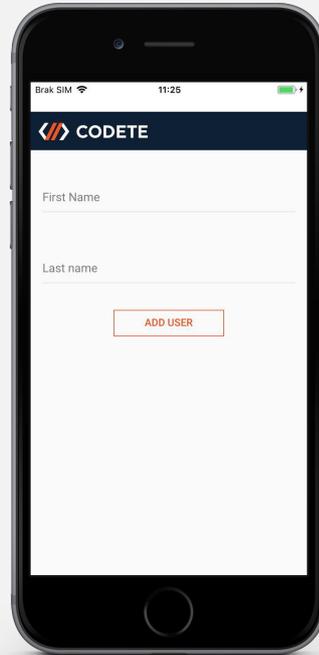
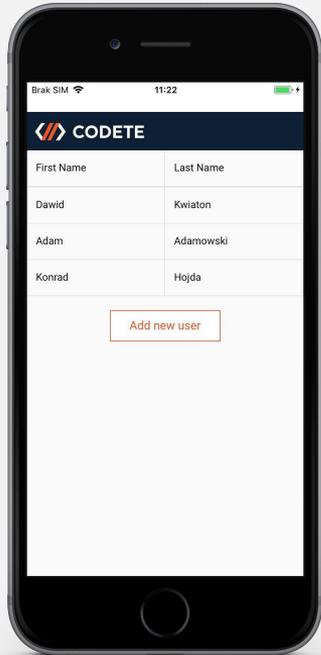
# Image processing



# Skin cancer



# Demo



# Summary

## Pros

- ✓ Can be easily used for prototyping
- ✓ Support in case something goes wrong
- ✓ Works on different mobile phones
- ✓ Can be easily moved to a web app

# Summary

## Cons

- ✓ Not so many books like Ext JS 6 By Example  
<http://shop.oreilly.com/product/9781783550494.do>
- ✓ High memory usage
- ✓ Ext architecture can be difficult to learn by developers who does not know it

# Where to go next?



**O'REILLY**  
ONLINE TRAINING

14th May  
5:00pm CEST

 Karol Przystalski  Kacper Łukawski

**Sentiment analysis for chatbots in Python**

The banner features a dark blue background with a red diagonal stripe on the left. On the right, a hand holds a white smartphone displaying a chatbot interface with a female user avatar and a blue robot avatar, each with a speech bubble. The CODETE logo is in the top right corner.

# Where to go next?



**O'REILLY**  
ONLINE TRAINING

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7th May  
5:00pm CEST



Karol Przystalski

**Building intelligent bots in Python**



# Where to go next?



**O'REILLY**  
ONLINE TRAINING

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May 9th  
4:00pm CET



Karol Przystalski

**Introduction to Distributed Ledger Technology for Enterprise**





Q&A