

# TG-DERMATOLOGY

AI for Dermatology

Focus Group on Artificial Intelligence for Health| April 2019

# TG-Derm

## Motivation

- One in every three cancers diagnosed is a skin cancer, and every year approximately 3 million new cases of skin cancer is detected worldwide
  - According to Skin Cancer Foundation Statistics, one in every five Americans will develop skin cancer in their lifetime
- Although Malignant Melanoma (MM) accounts only for a small percentage of this type of cancer, it is responsible for the most skin cancer related deaths.
  - However if detected early, the success rates of recovery are extremely high
- Growing interest in ICT
- High management concordance of 81% between in-person and teledermatology evaluations have been previously reported
- Significant advances in the automatic risk assessment of skin lesions through computer vision have been recently reported

# TG-Derm

FhP AICOS

- Performing research in the field of Mobile Dermatology since 2011 (Derma [portfolio](#))
- Scientific and technical competences
  - Image Processing and Computer vision
  - Machine learning
  - Mobile health
- [SMARTSKINS](#) Public dataset
  - 106 melanocytic lesions
  - Acquired with a smartphone with and without dermatoscope
  - Medical annotation according ABCD rule and Overall Risk (benign, moderate, high atypia)
- [DERM.AI](#) project
  - Usage of Artificial Intelligence to power Teledermatological Screening

# TG-Derm

FhP AICOS – SMARTSKINS Dataset

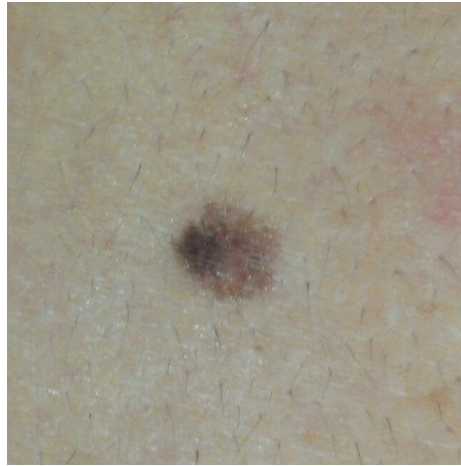
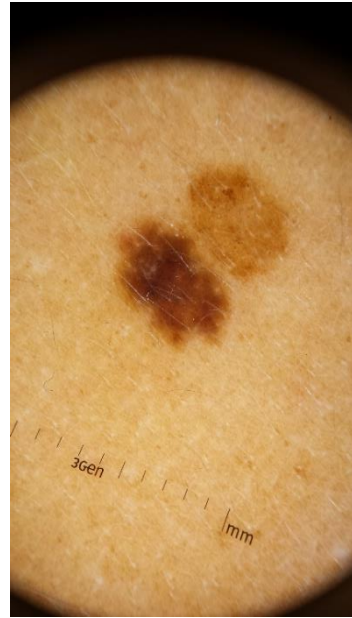


Image ID	HTC Mobile	S4 Mobile	S4 Dermoscopic	Asymmetry		Border	Color					Overall Risk	
				Major	Minor		White	Red	Light Brown	Dark Brown	Black		Blue Grey
17	1		1	1	1	0	0	0	1	1	1	0	3
103	1	1	1	0	1	0	0	0	1	1	0	1	3

# TG-Derm

## FhP AICOS – SMARTSKINS Dataset

Summary	
Number of Moles	106
HTC images	103
S4 images	81
Dermoscopic S4	106
From all three devices	78
Scoring description	
Asymmetry	
	0 symmetric axis
	1 asymmetric axis
Border	
	0 – 8 number of abrupt borders
Color	
	0 color absent
	1 color present
Overall risk	
	1 low risk
	2 medium risk
	3 high risk

Doctor classification	0	1	2	3	4	5	6	7	8
A score	7	44	55						
B score	90	13	2	1	0	0	0	0	0
C score		59	41	6	0	0			
Risk 1-3		47	43	16					
Risk 0-1	47	59							

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## Other datasets

- The Interactive Atlas of Dermoscopy ([EDRA](#))
- [ISIC](#) Archive
- [Dermofit](#)

## Benchmarking task

- Participants should be able to submit an AI model capable of classifying macroscopic images of skin lesions obtained via smartphones in terms of level of risk (benign lesion vs moderate/high atypia)
- Possible metrics applied to a binary classification problem (benign lesion vs moderate/high atypia)
  - Sensitivity
  - Specificity
  - F1-score

# TG-Derm

## Members

- Maria Vasconcelos, Fraunhofer Portugal

## Next steps

- Disseminate group
- Schedule meeting with Weihong Huang