Hackathon Research for Team #24

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Challenge Name

Dermatological Diagnostic Tools (Vision AI based)

"The main idea is to improve remote diagnosis of dermatological diseases and lesions. We want to make an AI based app / platform that could either give the user immediate corrections on photo taking before sending it to the doctor for diagnosis, or that could hopefully give direct diagnosis of lesions by comparison to known databases"

Research Inquiries

1. A technological and medical review of existing solutions and products in the field of ai based, diagnosis tools for dermatologic diseases/skin lesions.

Findings

Current technologies and solutions:

1) [DermaDetect](#)

AI driven technology utilizing big data and deep learning to create automated decision support in diagnostics and therapeutics of dermatology. DermaDetect is a developer of algorithm-based digital image analyzing solutions for the diagnosis of skin disorders. The company is developing a non-intrusive detecting and monitoring solution for medical and healthcare applications for the detection of skin disorders. It is also developing a solution for consumer and non-medical professionals to self-detect and track skin disorders.

2) [AI Dermatologist](#)

AI Dermatologist uses a deep machine learning algorithm (AI-algorithm) which was trained by confirmed diagnosed (by dermatologists) dermoscopic imaging database. The AI is able to distinguish between benign and malignant tumors, find risks of human papillomavirus, and classify different types of acne.

3) [Scanoma - mole check](#)

This mobile app gives a diagnosis solely on moles using a trained AI algorithm but combines it with a dermatologist second opinion.

[Additional Information:](#)

Non-diagnostic apps using AI on skin photos, giving a quick **analysis**:

1) **[DermAssist](#)** (by Google Health)
2) **[Aysa](#)** - helps in "correction before sending to doctors"
3) **[MIISKIN](#)** - has an automatic skin imaging and image modifications.
4) **[Rash ID - Rash Identifier](#)**

Data collector for Teledermatology (Telehealth in dermatology):

[TytoHome](#)

Mobile App and clinician dashboard for conducting remote physical exams, reviewing exam data, and communicating with patients. AI-powered guidance technology ensures anyone can capture exam data safely and accurately. It also takes skin pictures for later adivasatory meeting with your dermatologist.

[DermEngine](#)

Collect picturs to dermatologists, like tyto but focused on skin and have a Mole spector AddOn device.

Database of pictures after guiding questions:

[Dermatology Database](#), **[The Cunliffe (TP) General Dermatology Diagnostic Tool](#)**, **[DermaDiag by Dermnet](#)**.

Literature review of technologies, approaches and solutions:

A **medical** comprehensive Review (November 2022) of **AI trends in Dermatology Image Analysis** show, among an abundance of information, on **market** aid-dermatology AI **system and apps**:

Table 5.

Name	Manufact urer	Coun try	On Mark et Year	Platf orm	Application	Refere nce
Moleanaly zer pro	Fotofinder	Germ any	2018	Windo ws	Analyzes melanocytic as well as non-melanocytic skin lesions and calculates an AI score for mole risk assessment	[97,13 7]
Vectra WBS 360	Canfiield	USA	2017	Windo ws	Capturing the entire skin surface in macro quality resolution with a single capture, to identify and monitors pigment lesions automatically or mannually	[102,1 03,138]
Visia skin	Canfiield	USA	2007	Windo ws	Capturing key visual information for eight areas affecting complexion health and appearance and to provide an informative comparison of patient's complexion's characteristics to others of same age and skin type	[173,17 4,175]

Antera 3D	Miravex	Ireland	2011	Windows	Analysis and measurement of wrinkles, texture, pigmentation, redness and other lesions	[176]
Dermoscan X2	Dermoscan	Germany	2017	Windows	Identification of the new or modified lesions with digital photo documentations and makes automatic comparison of pigmentation marks	[177]
AIDERMA	Dingxiangyuan	China	2018	Online	Automatic identification of skin disorders and stores patient's medical record in the cloud safely	[178,179]
DermEngine	MetaOptima Technology Inc.	Canada	2015	Android and iOS	Imaging, documentation and analysis of skin conditions including skin cancer; offers business intelligence features designed for practice management	[71]
Skin-App	Swiss4ward	Switzerland	2017	Android and iOS	Detection of hand eczema automatically	[71]
Neurodermitis Helferin|Nia	Nia Health	Germany	2019	Android and iOS	Marks affected areas on the clear body diagram, takes photos and documents of the current severity of the neurodermatitis and gives personalized suggestions after further analysis	[157]
DermoScanner	Neat Technology Inc.	N/A	2019	Android	Analysis of skin moles and detects skin cancers at an early stage when it is most treatable.	[159]

Dermaco mpass	Swiss4war d	Switz erlan d	2017	Andro id and iOS	It contains skin diseases, pictures and algorithms for treatment and provides individual case diagnosis and image comparison for dermatologists	[180]

Moreover in the same article you'll find the "behind the scenes" of the AI dermatology field including: The algorithm model (**key technologies** like GAN, CNN, DNN and ANN), its purpose, the dataset used and its **sensitivity** and **specificity**,

Latest Review (December 2022) of Dermatology AI, discusses the **gap** between breakthroughs in vision AI and the **applicability** of it in everyday clinical practice. It covers **regulation**, **challenges**, and possible **solutions** for overcoming limitations in future studies.

A Recent scientific Review (2020) of "Use of Artificial Intelligence in Dermatology" introduces us new developments of AI relevant to dermatology, and exams its current and future implementation.

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