



FG-AI4H Meeting: 28-30, Sep, 2021

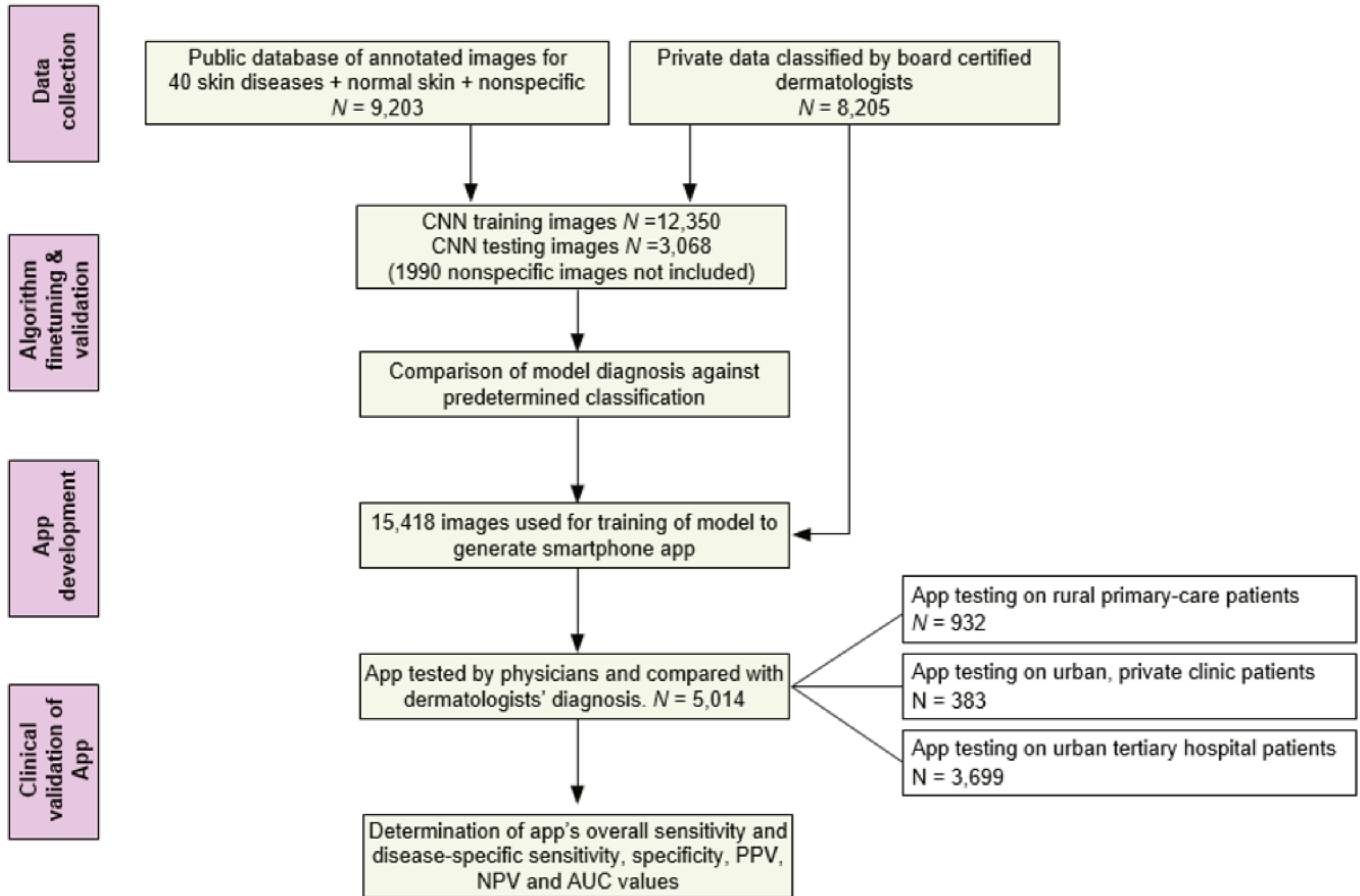
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- ▶ A total of 5014 patients were evaluated by the m-health app and the results compared against dermatologist diagnosis.
- ▶ The app demonstrated an overall top-1 accuracy of 76.93 +/- 0.88% and a mean area-under-curve of 0.95 +/- 0.02.
- ▶ The study underscores the utility of the AI-driven smartphone applications as a point-of-care, clinical decision support tool for dermatological diagnosis of skin diseases in patients of colour.

METHODOLOGY




RESULTS

S.no.	Disease class	Number of patients	AUC-clinic	Top-1 sensitivity % (CI)	Top-3 sensitivity %	Top-1 specificity %	Top-1 PPV	Top-1 NPV
1	Acne	592	0.98	89.86 (87.15-92.18)	97.97	98.19	86.92	98.64
2	Alopecia	184	0.97	88.11 (82.55-92.36)	96.22	99.28	82.32	99.54
3	Anogenital warts	34	0.85	57.14 (39.35-73.68)	71.43	99.70	57.14	99.70
4	Basal cell carcinoma	123	0.98	93.55 (87.68-97.17)	97.58	98.51	61.38	99.83
5	Bowen's disease	11	0.77	45.45 (16.75-76.62)	54.54	99.90	50.00	99.88
6	Bullous pemphigoid	16	0.73	35.29 (14.21-61.67)	47.06	100.00	100.00	99.78
7	Candidiasis	16	0.81	41.18 (18.44-67.10)	64.71	99.80	41.18	99.80
8	Discoid lupus erythematosus	47	0.90	60.42 (45.27-74.23)	83.33	99.20	42.03	99.61
9	Eczema	432	0.87	54.29 (49.46-59.10)	81.90	97.58	67.83	95.78
10	Fixed drug eruption	12	0.87	41.67 (15.16-72.33)	75.00	99.70	25.00	99.86
11	Herpes zoster	38	0.89	66.67 (49.78-80.91)	79.49	99.60	56.52	99.74
12	Hidradenitis suppurativa	32	0.97	93.94(79.78-99.26)	93.94	99.62	62.00	99.96
13	Ichthyosis	21	0.93	81.81 (59.72-94.81)	86.36	99.78	62.07	99.92
14	Impetigo and Pyodermas	109	0.89	57.27 (47.48-66.66)	82.72	99.04	57.27	99.04
15	Keloids/Hypertrophic scar	128	0.91	73.64 (65.16-81.00)	84.50	99.44	77.87	99.30
16	Lichen planus	170	0.88	69.59 (62.10-76.38)	84.80	95.66	36.17	98.89
17	Lichen sclerosus et atrophicus	17	0.86	44.44 (21.53-69.24)	72.22	99.90	61.54	99.80
18	Melanocytic nevi/Mole	138	0.83	43.17 (34.80-51.83)	67.63	99.79	85.71	98.40
19	Melasma	277	0.96	83.80 (80.00-87.89)	94.36	98.48	76.77	99.02
20	Milia	36	0.94	59.46 (43.00-75.25)	89.20	99.82	70.97	99.70
21	Molluscum contagiosum	51	0.98	84.62 (71.92-93.11)	96.15	98.93	45.36	99.84
22	Pemphigus	102	0.92	67.96 (58.04-76.81)	85.44	99.00	58.82	99.32
23	Pityriasis rosea	20	0.90	52.38 (29.78-74.29)	80.95	99.84	57.90	99.80
24	Pityriasis versicolour	77	0.95	75.64 (64.60-84.65)	92.31	99.13	57.84	99.61
25	Psoriasis	394	0.93	77.67 (73.22-81.68)	93.15	96.08	62.84	98.05
26	Rosacea	11	0.91	41.67 (15.16-72.33)	83.33	99.82	35.71	99.86
27	Seborrhoeic keratosis	41	0.85	52.38 (36.42-68.00)	71.43	99.57	50.00	99.60
28	Squamous cell carcinoma	13	0.96	78.57 (49.20-95.34)	92.86	99.64	37.93	99.94
29	Tinea capitis	32	0.87	54.55 (36.35-71.89)	75.76	99.90	78.26	99.70
30	Tinea cruris, corporis or faciei	545	0.95	81.69 (78.18-84.84)	96.22	96.75	75.47	97.73
31	Tinea pedis	10	0.75	40.00 (12.16-73.76)	50.00	99.90	44.44	99.88
32	Tinea unguium	64	0.96	76.92 (64.1-86.47)	92.31	99.70	76.92	99.70
33	Urticaria	60	0.91	55.74 42.46-68.45)	81.97	99.78	75.56	99.46
34	Viral warts	147	0.93	70.94 (62.92-78.11)	89.87	98.11	53.30	99.11
35	Vitiligo/ Leucoderma	254	0.98	92.94 (89.07-95.76)	97.65	98.76	80.07	99.62
36	Overall/Mean S.D./ 95% C.I.	4254	0.90	0.07 75.07 (73.75-76.36)	89.62 (88.67-90.52)	99.11 (99.06-99.15)	61.46 (55.77-67.14)	99.35 (99.07-99.62)

RESULTS

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Diagnoses details




History Body Map

Disagree with Assessment?

Refer to Dermatologist

PREDICTED CLASS : SQUAMOUS CELL CARCINOMA

Home Diagnose Patients



History Body Map

Disagree with Assessment?

Refer to Dermatologist

PREDICTED CLASS : HERPES ZOSTER

Disease Class	Probability
Herpes zoster	0.74
Know more from WebMD...	
Lichen planus	0.18
Know more from WebMD...	
Acne	0.06

Home Diagnose Patients

OBSERVATIONS

← Diagnoses details

History Body Map

Disagree with Assessment?

Refer to Dermatologist

PREDICTED CLASS : NO DIAGNOSIS

Disease Class	Probability
Melasma	0.29
Vitiligo	0.16
Acne vulgaris	0.08

Home Chart Profile

← Diagnoses details

History Body Map

Disagree with Assessment?

Refer to Dermatologist

PREDICTED CLASS : MELASMA

Disease Class	Probability
Melasma	0.54
Non specific	0.12
Actinic keratosis	0.06

Home Chart Profile

- ▶ High dependence on images
- ▶ High dependence on user (physician) training
- ▶ Patient history, etc. are typical in clinical settings
- ▶ **Much needs to be done for widespread clinical consistency. But, what?**

OBSERVATIONS

- ▶ Here are some of the Needs we identified. There are probably others that this WG should brainstorm on.
 - ▶ Image quality checks for appropriateness for diagnosis
 - ▶ Standardise additional patient clinical symptomatic information and patient history to supplement diagnosis.
 - ▶ Support algorithms for disease progression analysis
 - ▶ Support for prescription, treatment
 - ▶ Patient Privacy, Region wise Regulatory aspects
 - ▶ Etcetera
- ▶ Can we come up with:
 - ▶ An interoperable definition for medical diagnosis from images captured on mobile devices
 - ▶ Leverage existing, on-going work by FHIR etc.