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Advanced Data Analytics: An Easy-to-use DermGPT for Rural Dermatologic Care

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September 2024

Dr. Donath



Larner College of Medicine

Dermatology in Rutland

- In 2022 there were 57 Dermatologists in Rutland
- Rutland currently only has 2 dermatologists¹
- By December 2024 there will only be 1 dermatologist serving all of Rutland County
- 67.7% of Rutland County's population lives in a rural area²

Public health impact – Rutland's dermatologic need

- 24% of Vermont adults have had 2 or more sunburns in the past year
- Rutland middle school students have the second high sunburn rate in the state
- Female students in Vermont are more likely to get sunburns
- 63% of high school students at 2 or more sunburns³
- The UV associated cancer rate in Vermont is 36.6 – compared to 22.4% of the US
- 9% of cancers in Males are melanomas
- 7% of cancers in Females are melanomas⁴

Community Perspective – Key takeaways

Interview A

Physician

- Rutland has a paucity of dermatologists – and most live far from healthcare resources
- Waitlists for those who are accepting are very long
- Patient education can improve
- Tele-dermatology and AI tools can help bridge resource gaps and transportation issues

Interview B

Community leader

- Wait times are long – primary care ends up seeing more Dermatology cases
- A high density of outdoor activity related skin pathology
- AI can allow physicians to spend more time with patients
- Vermont is losing physicians to higher paying locations
- Can incentivize young doctors to come to Vermont with loan relief

The Project

- Develop a GPT to help aid in treatment formation for common dermatologic cases
- Demonstrate convenience and usability of Advanced Data Analytics to create rapidly accessible and customizable dermatologic resources
- Query the GPT on deidentified, real clinic cases
- Create a case series as a proof of concept

- Scrape UpToDate pages for dermatologic information
- Feed “training” data to ChatGPT’s GPT4o advanced data analytics – create a GPT
- Retrospective cases are used to query the custom GPT to provide to a treatment plan
- Compare with Physician created plans

The Method

Case Series

Psoriasis

Query:

Patient presents with few large psoriasis plaques on their wrist and arms, with some inflammatory pains in her hand joints. She has intermittently used betamethasone. Please provide a treatment plan.

Prescribed treatment: tacrolimus, calcipotriene

Eczema

Query:

Patient presents with chronic itchy red rash on arms and hands. Patient has not tried any treatments. Please provide a treatment plan.

Prescribed treatment:

betamethasone cream

Plantar Wart

Query:

Patient presents with multiple warts on the plantar surface of their right foot. Today is the 5th treatment with liquid nitrogen. Please provide a treatment plan.

Prescribed/performed treatment:

Debridement, Liquid Nitrogen, Salicylic acid paste

Case Series – DermGPT treatment recommendations

Psoriasis

Treatment Suggestions:

- High potency corticosteroid
- Calcipotriene
- NSAIDs
- DMARDS
- Biologics
- Emollients
- Salicylic Acid

Eczema

Treatment Suggestions:

- Low to mid topical corticosteroid
- Tacrolimus
- Antihistamine
- Ceramide cream
- Petrolatum
- Avoid triggers
- Patch testing

Plantar Wart

Treatment Suggestions:

- Cryotherapy
- Salicylic acid
- Duct tape
- Cantharidin
- Imiquimod
- Bleomycin injection
- Laser therapy

Efficacy and Limitations of Custom GPT Model



Advanced data analytics is an easy-to-use feature allowing document analysis and reading



DermGPT effectively provided many treatment options, which suggest customizable AI tools can be easily implemented in medicine



Cannot be sole resource - must verify due to potential for errors

Future directions

- Compare to LLAMA3 which is open-source and trainable
- Use RAG as opposed to GPT4o advanced data analysis feature
- Test on multiple retrospective cases in potential research project, using physician or UTD treatment algorithms to measure accuracy

References

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