

A healthcare professional, likely a nurse or doctor, is shown in profile, wearing light blue scrubs and a name tag. She is pointing her right index finger at a large digital screen that displays a microscopic image of skin tissue, showing various cellular structures and patterns. The background is a dimly lit room with horizontal blinds. The overall tone is professional and clinical.

# POC SKIN DISEASE DETECTION

*Matthew Agard*

# PROJECT SUMMARY

## Addressing the Problem

- U.S. healthcare system's patient population is becoming increasingly racially diverse
- Research confirms the healthcare system's struggles to provide quality dermatologic care to people of color (POC) relative to their White counterparts
- Problem necessitates the development of a tool for use by medical providers to assist them in their understanding and detection of cutaneous (skin) diseases in POC
- Developed a research notebook used for implementing a computer vision model to address the problem

# PROJECT IMPLEMENTATION

## Task Statuses

- *Completed*
  - Finalize data source(s), upload to AWS S3
  - Develop AWS Glue jobs (metadata only)
  - Build neural network model in AWS SageMaker
  - Conduct model analysis in AWS SageMaker
- *Outstanding*
  - Configure AWS Redshift data warehouse
  - Construct MWAA data workflow for previous tasks
  - Create AWS Lambda function to dynamically execute MWAA workflow

# RESEARCH

- Academic
  - Identified research papers highlighting discrepancy in dermatologic outcomes for POC
- Technical
  - Read Tensorflow & Keras documentation
    - Building neural network architectures
    - Decision-making for hyperparameter tuning

# PROJECT DEMONSTRATION

- To AWS we go!

# FUTURE WORK

- True project success is predicated upon regularly achieving performance superior to the baseline accuracy
  - Model performance currently falls short of the baseline more often than not
- Improve understanding of neural network architectures
  - Knowledge gaps likely prevented me from optimally tuning all of the hyperparameters on the training set
- Perform more data augmentation
  - Neural networks perform best with large amounts of data

A healthcare professional, likely a nurse or doctor, is shown in profile, pointing at a large medical monitor. The monitor displays a blue-toned scan, possibly an ultrasound or X-ray, showing internal structures. The professional is wearing light blue scrubs and has an identification badge hanging from their neck. The background is dimly lit, showing window blinds and some office furniture. The text "THANK YOU!" is overlaid in large, white, bold capital letters across the center of the image.

**THANK YOU!**

# PROJECT FINAL SUBMISSION – SPRING 2024

- **Section I – Project Overview**

- Project Title: *POC Skin Disease Detection*
- Team Members and Roles/Responsibilities
  - *Matthew Agard (magard3) – Lead Developer, Project Manager*
- TA Mentor: *Tanmay Shah*
- Project Task Status
  - Refer to 'Project Implementation' PowerPoint slide

- **Section II – Project Artifacts**

- Deployed Application URL: *N/A (per Sprint 2 project planning document)*
- GitHub Repository Link: *<https://github.gatech.edu/magard3/POC-Skin-Disease-Detection>*

- **Section III – Project Presentation**

- Presentation Link: *<https://www.youtube.com/watch?v=n7p6GFsignw>*

- **Section IV – Project Documentation**

- Refer to 'documentation' directory in GitHub repository