

Skin Cancer Diagnosis using Artificial Intelligence on the Cloud

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Advisor/Client: Ashraf Gaffar

Team: Megan Eberle, Breann Grant, Bariture Ibaakee, Alexander Lafontaine, Evan Nim, Abigail Thompson

Problem: Current implementations of AI skin cancer detection models are not widely available and accessible worldwide.

Solution:

This project is meant to aid in the process of detecting skin cancer using just an image of the area of skin in question. Powered by Artificial Intelligence (AI), it aids doctors in their visual analysis of an affected area. As an Android application with the AI model hosted on the cloud, it is easily accessed from anywhere in the world.

Intended Users:

Doctors and medical professionals.

Design Requirements:

Functional Requirements:

- The product shall have an Android application to access the AI model.
- The product shall be accessible from around the world.
- It will have the ability to obtain results from an image.

Resource Requirements:

- It should run on a device that has an Android operating system and camera.
- The model will run on a cloud platform.

Nonfunctional Requirements:

- The images that are obtained through the application will not be saved to a database.

Design Approach:

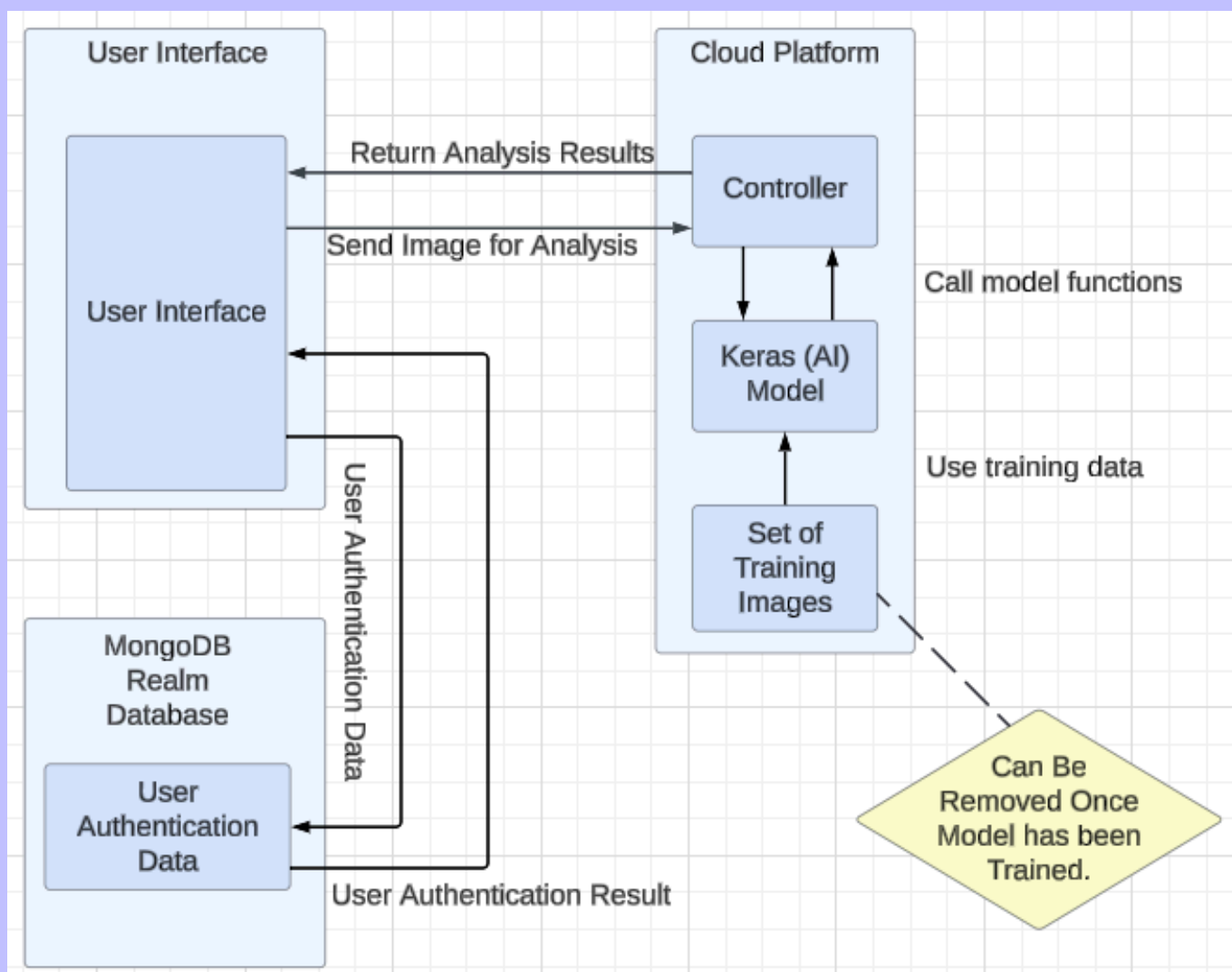


Figure 1: Block Diagram

Technologies Used:

Cloud Providers: Google Cloud Provider, Amazon Web Service

Model Training: Python, Keras, Tensor Flow

User Authentication Database: MongoDB Realm

Operating System: Android

Frontend: Andorid Studio -Java, XML

Version Control: Git

Cloud Provider Analysis:

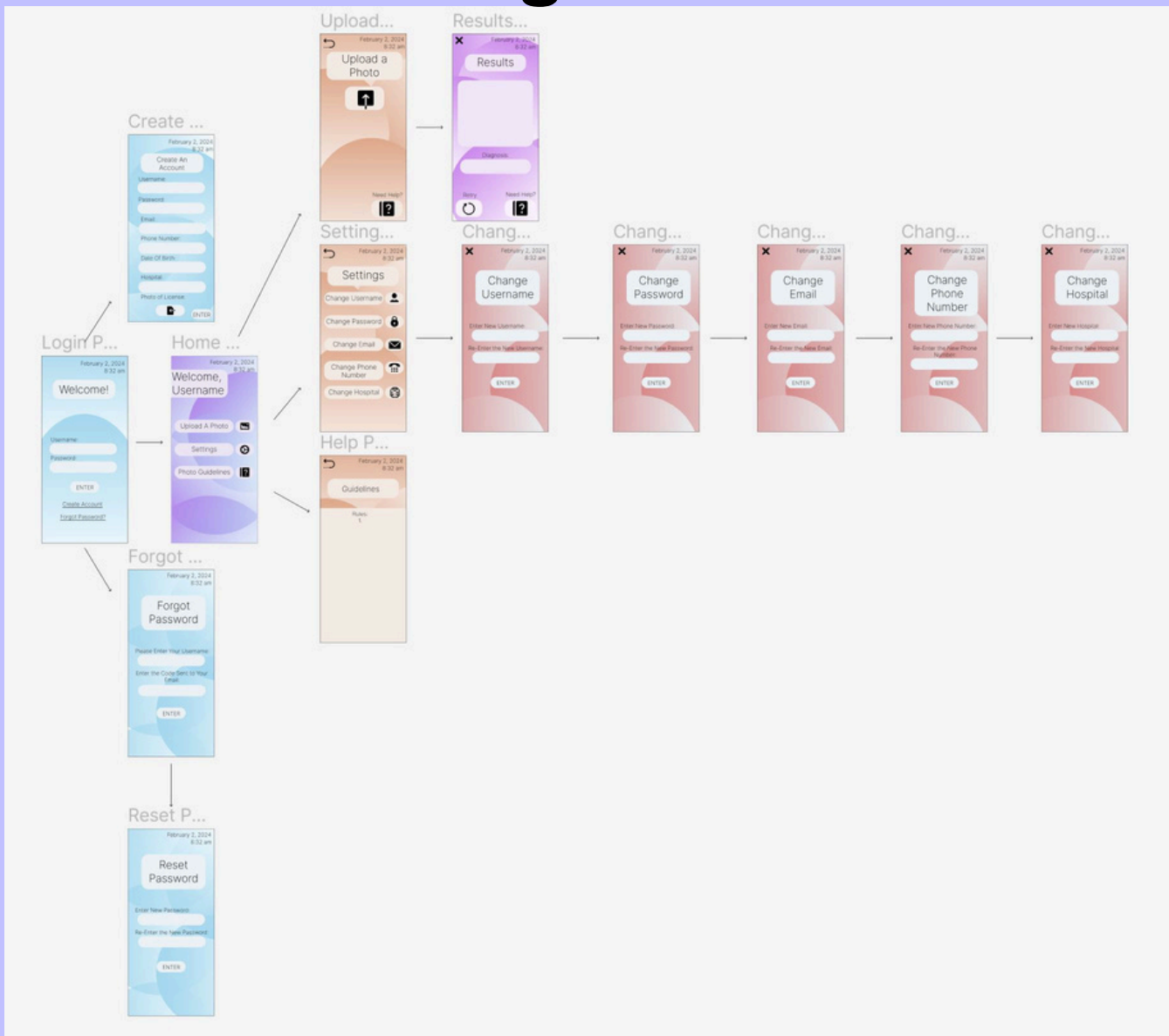
Time	Activity	AWS Time	GCP Time
	Dataset Generation	4.6235 Seconds	0.991 Seconds
	Dataset PreProcessing	0.5168	0.4031
	Model Building	2.0074 Seconds	1.1855 Seconds
	Model Training	60.044 Hours	50.850 Hours
	Model Saving	0.9682 Seconds	0.8918 Seconds
	Hours per Iteration	12.0088 Hours	10.1701 Hours

Cost	AWS	GCP
Total Cost (US Dollar)	\$49.80	\$57.50

Validation

	AWS (Preliminary)	GCP (Preliminary)	Local
Training Accuracy	98.28%	98.28%	98.28%
Validation Accuracy	49.10%	77.19%	98.0%
Training Loss	0.984	0.0991	0.0854
Validation Loss	1692.4597	6.5616	0.6469

User Interface Design:

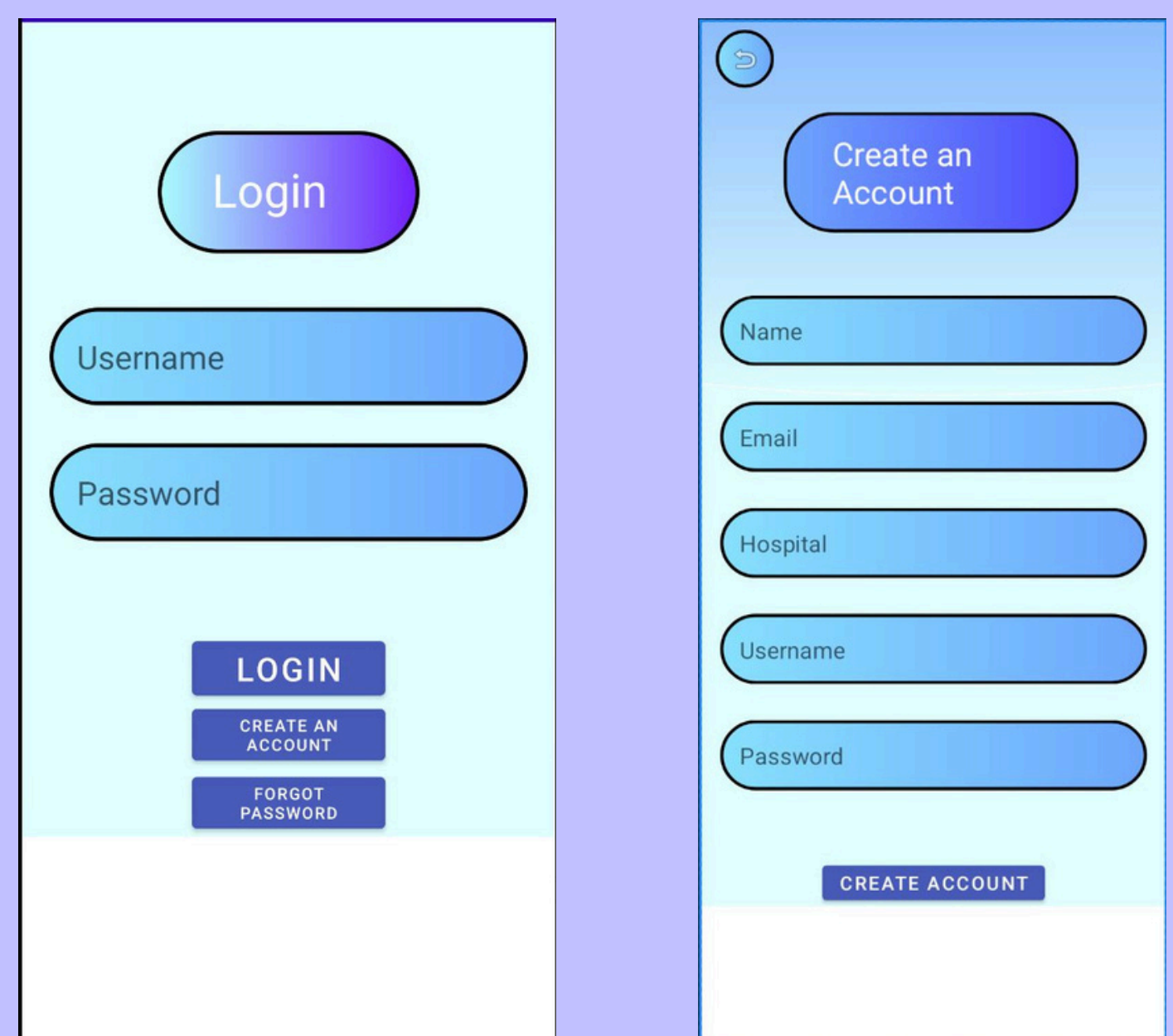


Testing

Model Testing: We tested the AI model using a small Xception Model. We started with smaller sets of images and increased as we improved the accuracy of the model. After we increased the model accuracy to 80% and image dataset to 20k images, we started using a more complete version of the Xpection Model.

Standards: HIPAA (Health Insurance Portability and Accountability Act)

User Interface:



These are a couple images of our user interface