IdentCan: The App That Detects Breast, Lung, and Skin Cancer

Methods

- We researched the different types of symptoms experienced, risk factors, treatments, previous studies and results such as HPP-TGFM (high-pressure photon ionization time-of-flight mass spectrometry).
- We have run various trials, which all account for patients of various backgrounds, different medical histories, and complications that may arise.
- We planned the app digitally and on paper to gain an understanding of exactly what we wanted.
- We have built a simple digital prototype in Figma and a second prototype was developed in Xcode, where we have used coding languages such as JavaScript, Kotlin, and Python.
- The third version of our app is in Android Studio, and this is the prototype that we are looking to release in the future.

Design Evolution: Prototypes 1.1 - 1.3

Procedures

Machine Learning Procedure Example:
1. Train the machine using approximately a minimum of 500 pictures in each class (different types of each cancer) and approximately 8,000 pictures each for breast, skin, and lung cancer
2. Experiment with numbers of iterations and augmentations to ensure highest accuracy in both image and sound classifications and record data for each trial
3. Cross validate machine learning model using images with varying types, stages, and progression of cancer
4. Run simulations combining the machine learning process with the survey in the view of IdentCan users to generate examples of cancer diagnosis, treatment plans, etc.
5. Repeat using rare cancer cases, patients who are minorities, different types of cancer scans, etc.

Treatment Plan Success Rate Procedure Example:
1. Analyze inputted data from the survey, images, sound clips (if applicable), generated diagnosis, etc.
2. Apply fractal geometry and FFT to predict growth and rate of growth of tumor, nodule, mole, etc., in the future
3. Identify best treatment plan based on predicted growth and aggression, diagnosis, and other factors
4. Run series of simulations to identify the success rate of various treatment plans generated by IdentCan on different patients examples

Results

• Log and conduct at least 6,000 trials per each type of cancer to develop a high accuracy
• Incorporate at least 5 different global languages to maximize user accessibility
• Incorporate more advanced fractal geometry
• Increase the number of features available in IdentCan
• An overall accuracy of at least 90 percent in cancer detection and diagnosis for IdentCan
• Improve the accuracy of sound classification by inputting at least 500 more sound clips
• Develop a prototype of IdentCan on Android Studio

Engineering Goals

Conclusions

- IdentCan is successfully able to diagnose breast, lung, or skin cancer and provide a specialized treatment plan with an overall accuracy of 94.3%
- Our app helps advance and prove research that has been done on the correlation between machine learning and cancer, in both cancer detection and diagnosis, as well as successful treatment plans.
- Our projected users are doctors and patients who wish to screen themselves for cancer using an accessible and reliable platform.
- From feedback received from experts and professionals in the field, we have noted that our app fits legal guidelines and have included a page for terms of service.