COVID-19 PneumoCheck - Mobile Chest X-Rays Classifier App
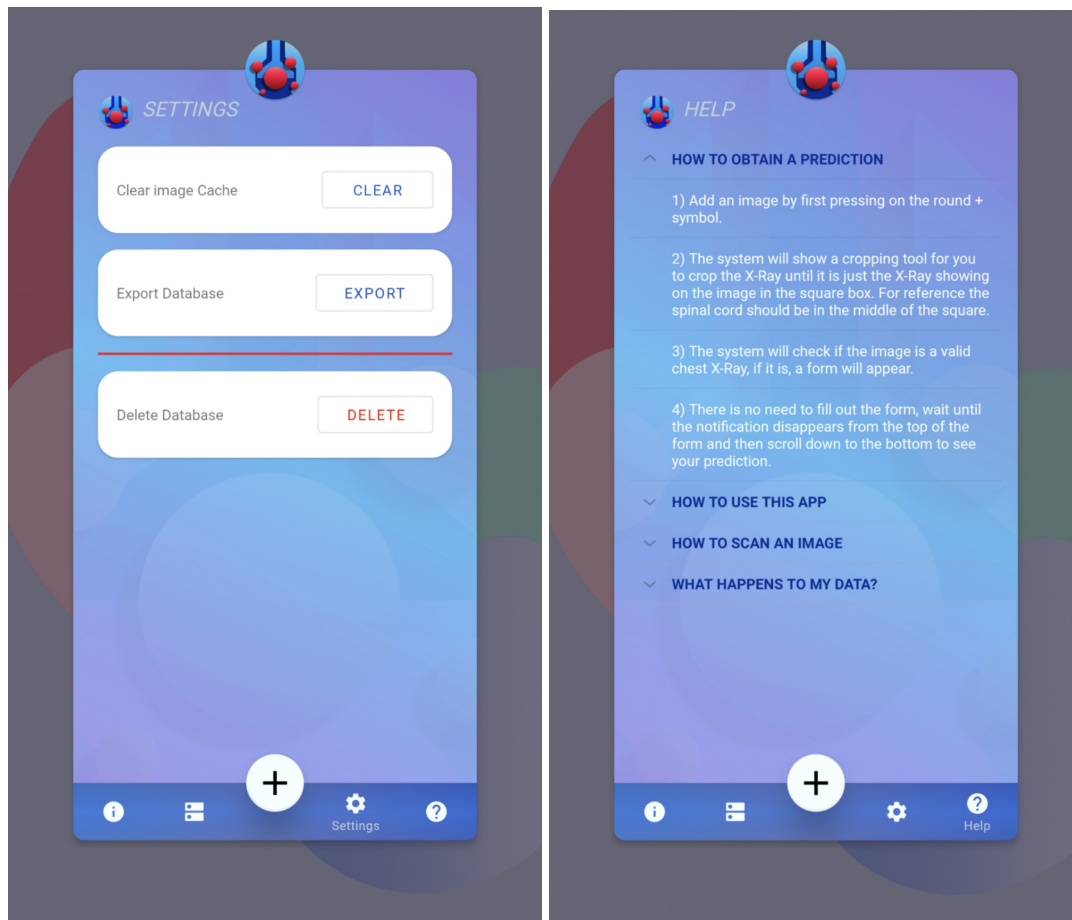
CovidNet TFLite Model Android Mobile Classifier Implementation

A (poc) android application to track and classify COVID-19, Pneumonia or Normal chest X-Rays.

WARNING: Regardless of accuracy, do not use this application as a method of self-diagnosis. Please visit a doctor for an official diagnosis.

Recommended android version : Android Marshmellow (6)

Download

If you would like to test and try out the pre-release demo application you may download it from here: https://github.com/DannyFGitHub/COVID-19PneumoCheckApp/releases

(Remember to allow installation from unknown sources in order for your android system to allow the installation of the app)

Permissions requested by the app at the time of writing include:

- Read and Write Storage - for Chest X-Ray saving and retreiving (to and from app database))
- Camera - for taking pictures of X-Rays.

FAQ

How to use this app

This app is intended to help a user track, collect and obtain a pre-diagnostic prediction on the given chest X-Ray. You may return to the app once obtaining an official diagnosis and either confirm or correct the prediction. You may choose to export your database and provide it for research purposes to further teach the machine learning model with your corrections or confirmations.

To get started using this app, go to the + symbol and choose a method of uploading your Chest X-Ray photo. We recommend scanning the X-Ray with a scanner and using the Gallery to prevent any foreign material (glare, sunlight, light anomalies) from impacting the prediction. Capture or select a photo from gallery, then use the copping tool to crop the image so only the Chest X-Ray is showing entirely within the cropping square tool. Tap on the checkmark on the top right of the cropping tool screen to confirm the crop. Once you arrive at the Chest X-Ray submission form, scroll to the bottom and you will see an AI Prediction on the X-Ray you provided.

How to scan an image

To scan an image, choose the + symbol and tap on Camera. The PneumoCheck X-Ray identification model will check if the X-Ray provided is a valid Chest X-Ray and begin the Chest X-Ray submission process. If using the camera, we recommend having your phone in portrait mode aligned to the orientation of your chest x-ray. Both your phone and the chest X-Ray should be as parallel to each other as possible. For best results we recommend scanning the X-Ray with a flatbed scanner and using the Gallery to prevent any foreign material (glare, sunlight, light anomalies) from impacting the prediction.

How to obtain a prediction

1. Add an image by first pressing on the round + symbol.

2. The system will show a cropping tool for you to crop the X-Ray until it is just the X-Ray showing on the image in the square box. For reference the spinal cord should be in the middle of the square.

3. The system will check if the image is a valid chest X-Ray, if it is, a form will appear.

4. There is no need to fill out the form, wait until the notification disappears from the top of the form and then scroll down to the bottom to see your prediction.

What happens to my data

X-Ray Image:

When you submit an X-Ray image and you obtain a prediction, the photo you took is stored in cache (your phones storage) until you either cancel the form or complete it. After that the image is converted into code and stored in a database specific to the PneumoCheck App. If you would like to force the cache to be cleared, go to Settings on the PneumoCheck app and tap clear next to Cache.

Submission:

Your submission (along with all the identifiable data) is stored in the app specific local database on your device. The database is not uploaded or given to any party without your consent. Exporting is only useful for research purposes at the time of writing.

Database:

The database only exists while you have the application installed, as soon as you uninstall the application, all the database entries will be removed and the database erased.

Keeps saying invalid X-ray provided

The application is pretty good at discriminating between Valid and Invalid X-Rays. If the application continues to say that the Chest X-Ray provided is not a valid X-Ray, you can try the following:

- Make sure to only take a picture of the Chest X-Ray on a flat surface.
- Make sure that area around the X-Ray is not in the image. (Such as the table the X-Ray may be on or the wall it is mounted on if the X-Ray is in a medical X-ray film viewer)
- Make sure that the X-Ray is not severely dirty, damaged or warped.
- Make sure the X-Ray is FLAT on the surface where it rests.

Models used in Chest X-Ray Classification

The models used in this application can be found at my other repo: https://github.com/DannyFGitHub/pneumoCheck-Models-TFLite-COVID-Net

Next Steps

- Integrating Location and optional location tracking.