Cash Recognition for Visually Impaired

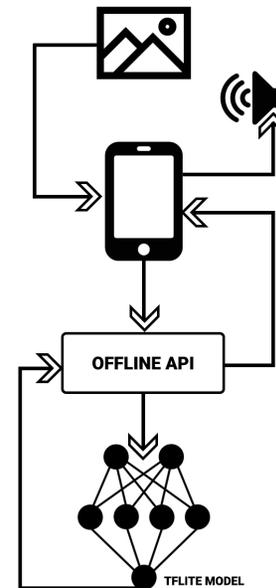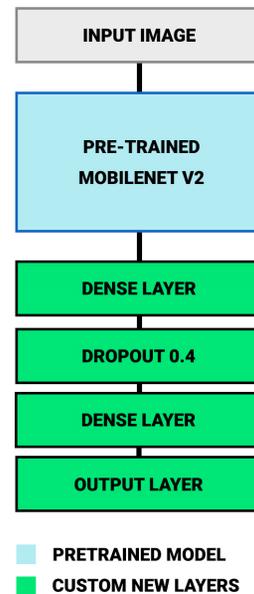Kshitiz Rimal, Artificial Intelligence for Development (AID)

Nepalese monetary notes doesn't have special markings for visually impaired people to easily recognize them. This makes visually impaired individuals dependent on others for their daily monetary tasks.

Thanks to new advancements in technology and wide adoption of modern touch screen smart phones, more and more visually impaired individuals are using such devices for their daily communication tasks. They do so by utilizing the accessibility features present in those devices. Using a smart phone app and a deep learning model, I propose a solution to this cash recognition problem.

When an individual captures the image of the note he/she is carrying using the app I designed, the deep learning model connected to this app will then classifies the image and play the sound signifying the value of the note the individual is carrying.

- Intel® Optimization for TensorFlow*
- Intel® AI DevCloud
- Intel® Neural Compute Stick (Intel® NCS)
- Intel® NUC

1. Images of all 7 types of Nepalese cash notes are captured using smartphone.
2. Each categories has 2,000 (Train/Val) images.
3. Using Transfer Learning & Fine Tuning the classifier model was re-trained on those data.
4. Trained model was embedded in a custom app. When image is captures using that app, classification will be done on that image and according to predicted class, audio will be played for visually impaired individual to recognize the value of the captured image.

INPUT IMAGE

PRE-TRAINED MOBILENET V2

DENSE LAYER

DROPOUT 0.4

DENSE LAYER

OUTPUT LAYER

PRETRAINED MODEL
CUSTOM NEW LAYERS

OFFLINE API

TFLITE MODEL

With this solution Visually Impaired Individuals will be able to conduct their day to day monetary activities independently and with much confidence than before. Benefit and Importance of using Deep Learning over traditional image processing approach on this one is, our model needs to be very accurate on image classification, regardless of time, place, orientation and lighting conditions of the environment, for which Deep Learning approach is much preferable than traditional techniques.

Final Model was developed using pre-trained MobileNetv2 model, which was trained on ImageNet images. Smartphone app was developed natively for both Android* and iOS* devices.