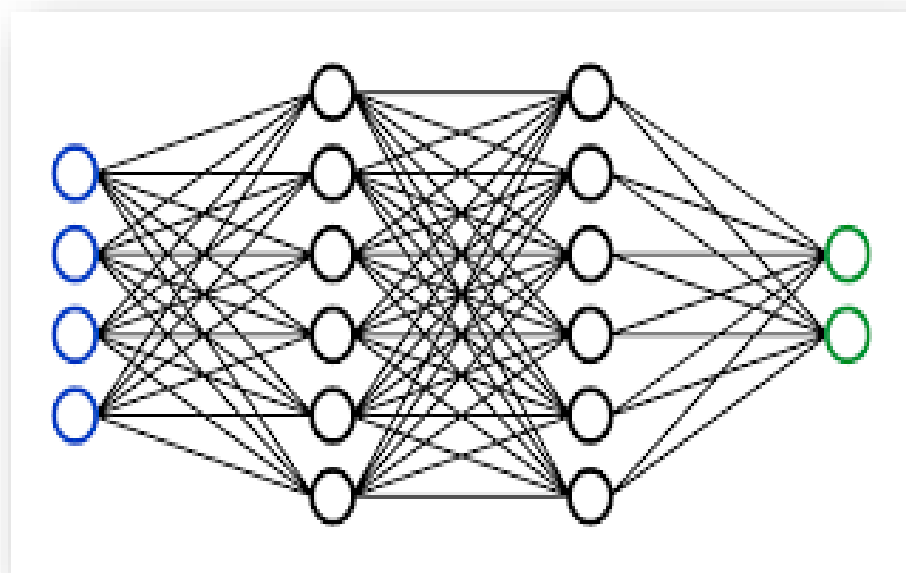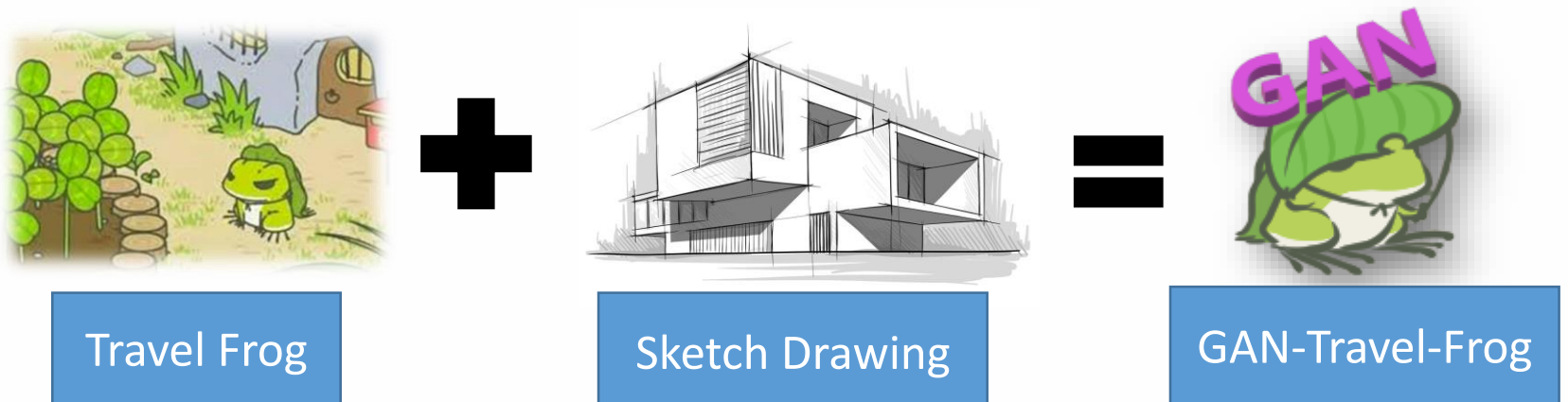# Travel Frog APP with Conditional GAN
– Send your frog to wonderlands with the power of pix2pix
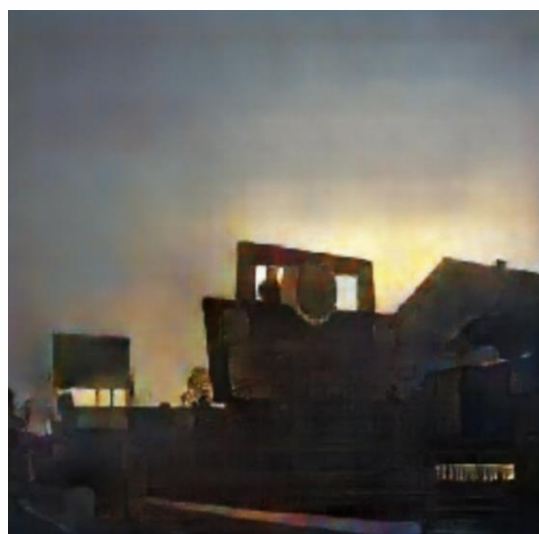
Project Introduction

Have you ever played the popular game Travel Frog?
Wouldn't it be fun if you can **draw your frog's destination**?
Do you want to create your unique beautiful wonderland?
Use **GAN-Travel-Frog** to fulfill your crazy dream!

Travel Frog **+** Sketch Drawing **=** GAN-Travel-Frog

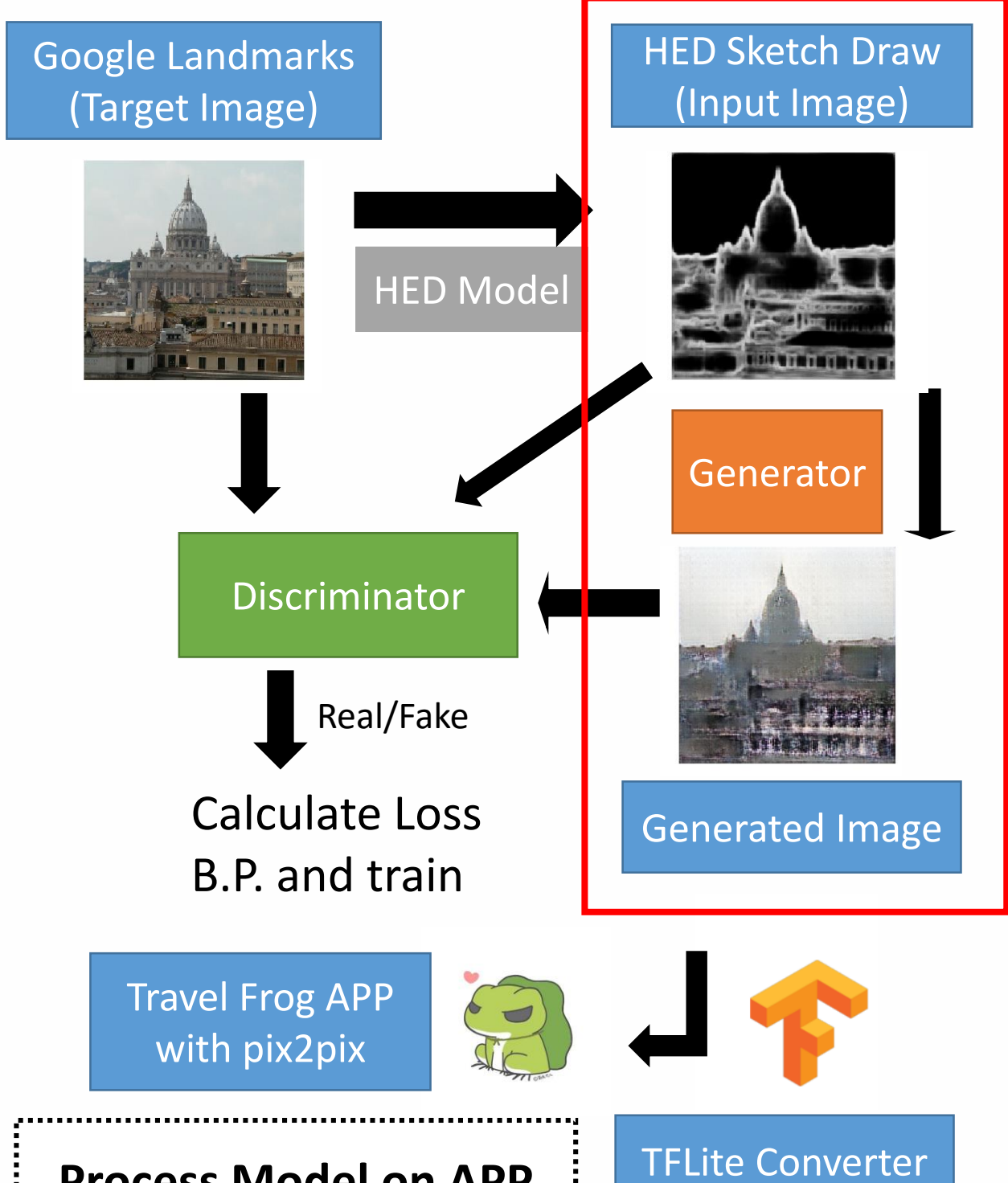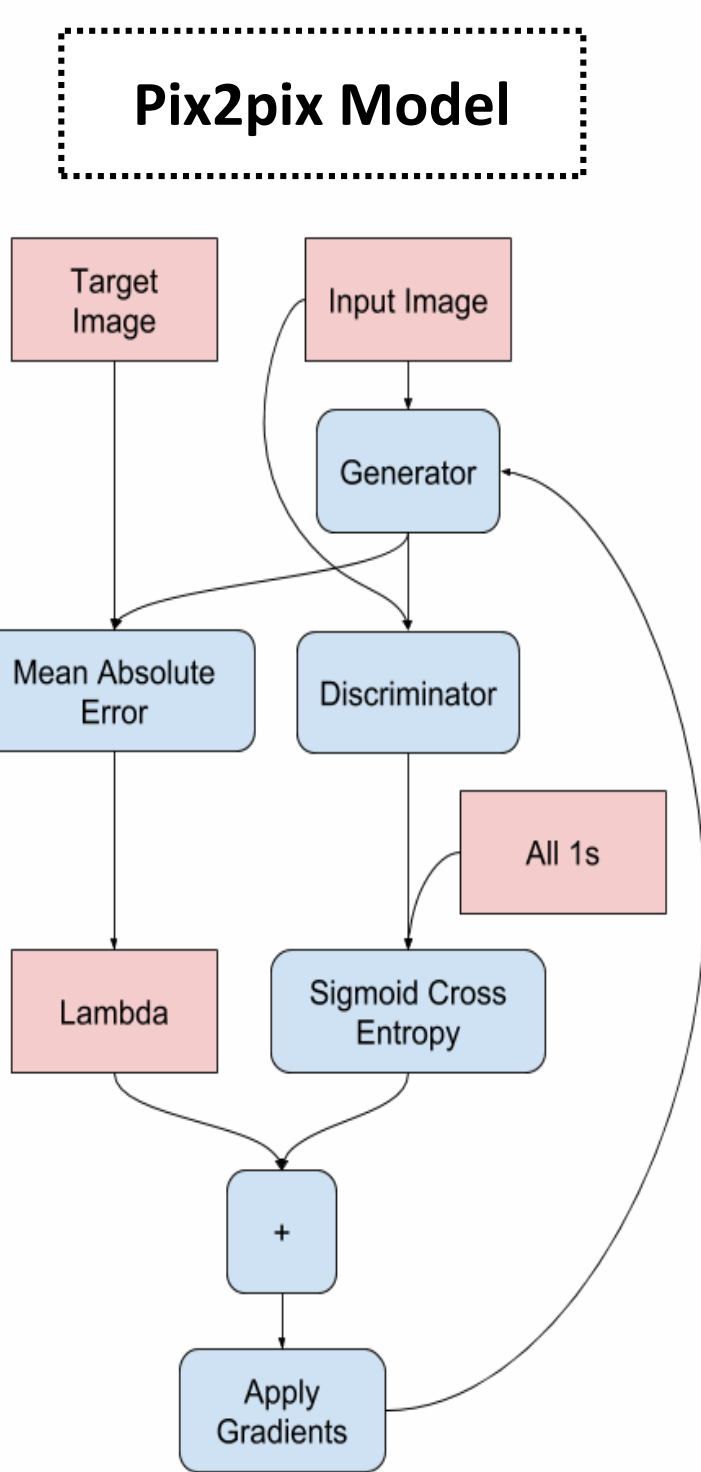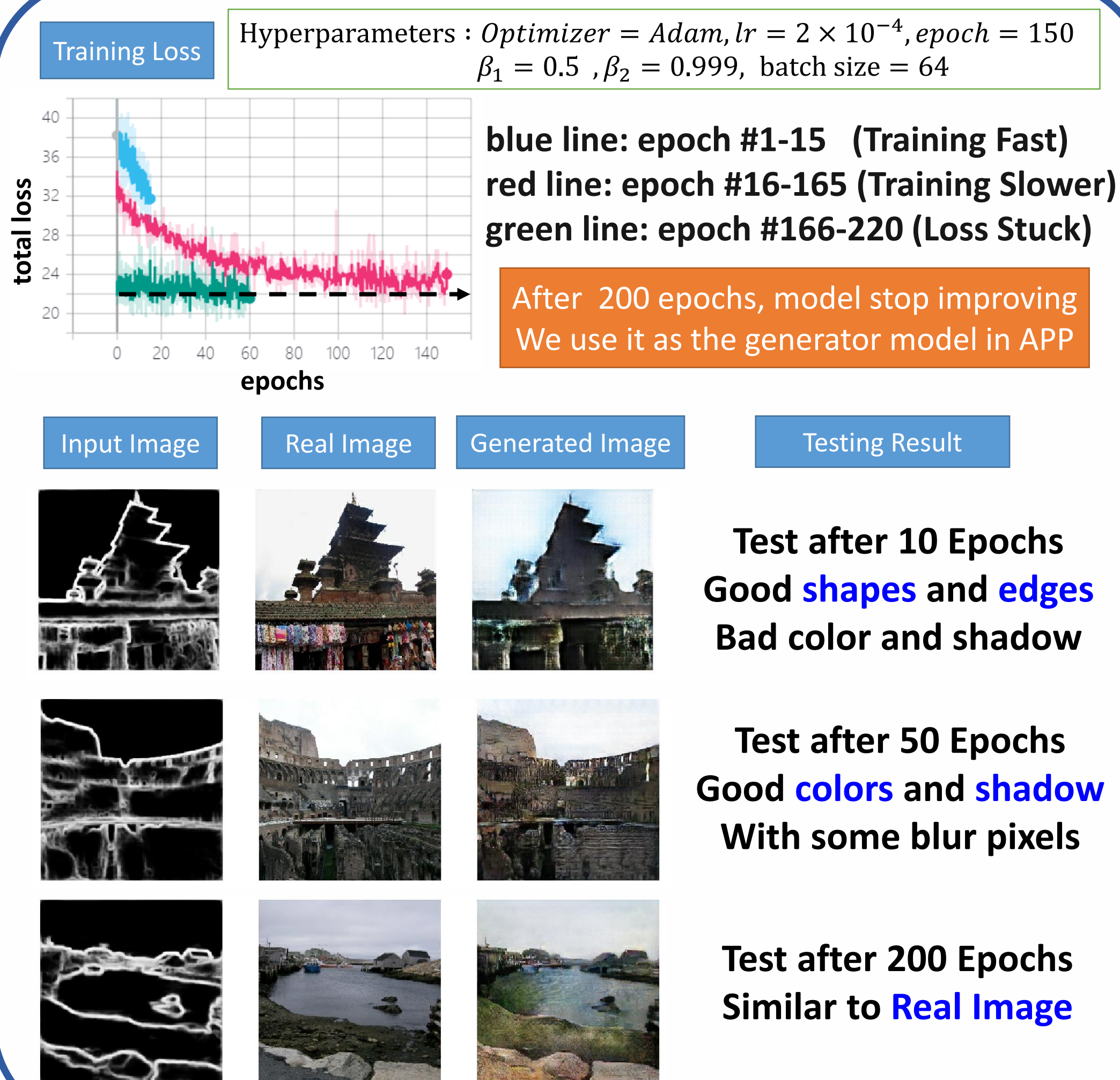| **ML-based** | **Use TensorFlow Lite** | **Generate Cool Images** | **Easy, Fun and Interactive** |

Data Processing and Model

- **Use Google Landmarks Dataset for Real Image dataset**
- **Used pre-trained HED Model to generate Input Image dataset**
- **Train a Conditional Generative Adversarial Net to generate pics**
- **Use TFLite to save and run generator model on mobile phones**
- **Randomly pick one pic to test after every epoch of training**

Pix2pix Model

Target Image → Generator
Input Image → Generator
Generator → Mean Absolute Error, Discriminator
Discriminator → All 1s
Mean Absolute Error → Lambda
Sigmoid Cross Entropy
Lambda + Sigmoid Cross Entropy → Apply Gradients

Google Landmarks (Target Image)
HED Sketch Draw (Input Image)
HED Model
Generator
Discriminator
Real/Fake
Generated Image
Calculate Loss B.P. and train

Travel Frog APP with pix2pix
Process Model on APP
TFLite Converter

Training and Testing Results

Training Loss

Hyperparameters : $Optimizer = Adam, lr = 2 \times 10^{-4}, epoch = 150$
$\beta_1 = 0.5$, $\beta_2 = 0.999$, batch size = 64

total loss vs epochs

blue line: epoch #1-15 (Training Fast)
red line: epoch #16-165 (Training Slower)
green line: epoch #166-220 (Loss Stuck)

After 200 epochs, model stop improving
We use it as the generator model in APP

| Input Image | Real Image | Generated Image | Testing Result |

Test after 10 Epochs
Good **shapes** and **edges**
Bad color and shadow

Test after 50 Epochs
Good **colors** and **shadow**
With some blur pixels

Test after 200 Epochs
Similar to **Real Image**

Examples and Android App Demo

Travel Mode : a random and unknown place

Good Performance on testing dataset.
(HED => Pic)

Creator Mode: Draw your own landmark

Bad transferability
due to the difference of doodle draw / HED
(Doodle => Pic)

Conclusion and Other Resources

- Use **HED** as condition for CGAN to **generate new landmarks** is applicable. HED can be an index of similarity of pics.

- Generate landmarks from doodles is NOT the same task as from HED, since **doodles and HED have a lot difference in detail** though sharing similar shape and features.

Download APP

Github and Ref.

投 票 区 域