Handwritten Geometric Shape Detector

Introduction:

A CNN model which detects the handwritten geometric shapes drawn by the user in the interface. The model can detect rectangle, square, circle, triangle. The model was trained with a dataset of 2000 images of size 28x28 pixels.

Methodology:

Workflow :

1. Examine and understand data
2. Build an input pipeline
3. Build the model
4. Train the model
5. Test the model
6. Improve the model and repeat the process

Tools and Libraries :

1. Tensorflow
2. Keras
3. Matplotlib
4. PIL
5. Numpy

Dataset :

The dataset was preprocessed by keras preprocessing library. The whole dataset was split into 80% 20%. For training 80% of the images were used, the rest for validation. The image height and width is 28 by 28 pixels. I prepared the whole dataset all by myself. First drew handwritten shapes and then compressed those to 28x28 size. The images were then rescalled and standardized to [0,1] for the training purposes.

Model :

The model consists of three convolution blocks with a max pool layer in each of them. There's a fully connected layer with 128 units on top of it that is activated by a relu activation function.

In order to fight over fitting I used a Dropout function during training and Data Augmentation to create more images with similar features.

GUI :

Used Python Tkinter for the user interface.

Result :

Accuracy: 0.9480. **Validation Loss**: 0.1437. **Val Accuracy**: 0.9601