Youtube: https://youtu.be/fc_yNyuj-V0

Report

Introduction:

Rock-Paper-Scissors is a simple game that has been enjoyed by people of all ages for generations.The goal of this project is to build a Convolutional Neural Network (CNN) that can classify images of rock, paper, and scissors.

Current Work:

In this project, we aim to build a CNN that can accurately classify images of rock, paper, and scissors. We will use the Rock-Paper-Scissors dataset available on Kaggle, which consists of 2,892 images in total, with each class having 964 images. We will use Keras with Tensorflow backend to build and train our model.

Data and Methods:

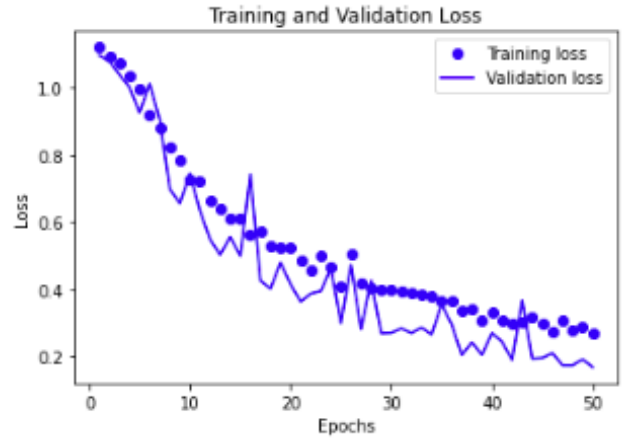
The dataset we used contains 2500 images of size 150x150 pixels. We split the dataset into training, validation, and testing sets, with 60%, 20%, and 20% of the images in each set, respectively. The training set was augmented using ImageDataGenerator, which applies random transformations to the images, such as vertical and horizontal flips, rotations, and zooms.

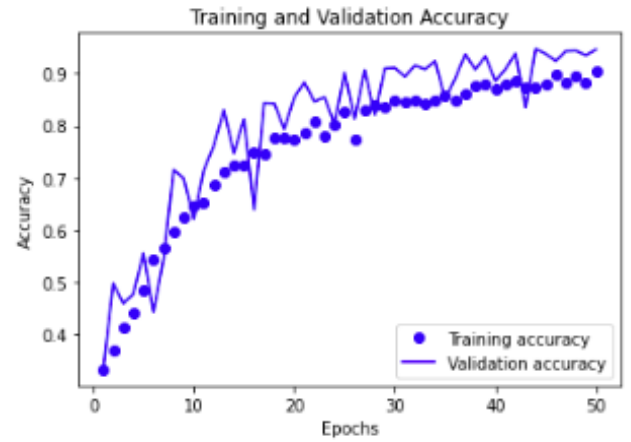
Our CNN consists of three convolutional layers with 32, 64, and 128 filters, respectively. Each convolutional layer is followed by a max-pooling layer with a pool size of (2,2). The output of the last max-pooling layer is flattened and passed through two fully connected (Dense) layers with 128 and 64 neurons, respectively. The output layer consists of three neurons with softmax activation, which provides the probability distribution of the input image belonging to each of the three classes.

We used the Adam optimizer with a learning rate of 0.0001 and categorical cross-entropy loss function. The model was trained for 50 epochs, and early stopping was used with a patience of 5.

Results:

Our CNN achieved an accuracy of 90% and val_accuracy 94% on the testing set, which shows the effectiveness of our approach. The training and validation accuracy and loss plots are shown below.





Discussion:

Our CNN achieved an accuracy of 90%, which is a very good result. I used image augmentation to increase the size of our training set, which helped our model to generalize better. But he sometimes confuses rock and paper.I think image size

Sources:

1)Rock Paper Scissors Image Classification Dataset (https://www.kaggle.com/datasets/sanikamal/rock-paper-scissors-dataset)

2)ImageDataGenerator Documentation (https://www.tensorflow.org/api_docs/python/tf/keras/preprocessing/image/ImageDataGenerator)

3)Keras Sequential Model Documentation (https://keras.io/guides/sequential_model/)

4) (https://www.kaggle.com/code/fatihdeniz/cnn-rock-paper-scissors)