Rock, Paper, Scissors: CNN for Image Classification

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Abstract

This project aims to investigate the application of Convolutional Neural Networks (CNNs) to the task of image classification using a Rock-Paper-Scissors (RPS) dataset, with the objective of designing, training, and evaluating multiple deep learning models.

The experimental pipeline is composed of dataset exploration, data preprocessing (which includes train/validation/test splitting, input normalization, and data augmentation), followed by the development of three CNN models (ordered by increasing complexity), and their supervised training and performance evaluation. Finally, a generalization part is carried out to highlight the effectiveness of using CNNs for image classification tasks.

The entire study was carried out in accordance with the official TensorFlow/Keras API documentation.

1 Introduction

2 Data exploration and preprocessing

2.1 Exploratory Data Analysis

2.2 Preprocessing

2.2.1 Train, validation and test splitting

2.2.2 Normalization

2.2.3 Data augmentation

3 CNN architecture and training

3.1 Model A: baseline CNN

3.2 Model B: intermediate CNN

3.3 Model C: complex CNN

4 Evaluation and analysis

4.1 Experimental Results

4.2 Model Comparison

4.3 Discussion

5 Optional generalization test

6 Conclusions

This project demonstrates...

References

Declaration

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