

# 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 Generalization test**

## **6 Conclusions**

## **References**

## **Declaration**

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