

1. Introduction

Indonesia is one of the archipelagic countries with approximately 17,508 islands based on Law Number 6 of 1996 concerning Indonesian Waters. With a population exceeding 280 million, Indonesia is the fourth most populous country in the world [1]. This population is spread across various regions, each with its own distinct customs and traditions. In addition to its diverse population, Indonesia also has a rich cultural heritage, including traditional scripts. As digital technology advances, the preservation of these scripts has declined, leading to reduced understanding and use. Some regional languages that have scripts for writing include Balinese, Javanese, and Sundanese.

Balinese and Javanese scripts are among the traditional scripts in Indonesia that are difficult to learn due to their forms. Balinese and Javanese scripts are also well-known traditional scripts in Indonesia and are often used in written forms for tourist attractions [2]. As one of the ancient Southeast Asian scripts, the Sundanese script has seen a decline in daily use among native speakers. Therefore, recent research efforts have focused on digitizing and recognizing the script through document image analysis to help preserve and study it [3].

Image processing efforts for traditional scripts in Indonesia are an initiative to preserve the nation's cultural heritage. Handwriting Recognition (HWR) is an advancement of Optical Character Recognition (OCR) that allows the system to recognize handwritten text by converting it into machine-readable format [4]. Deep Learning has become one of the most prominent research trends in Machine Learning. It has demonstrated remarkable effectiveness in applications such as image classification and natural language processing [5]. Convolutional Neural Network (CNN) is a type of neural network in Deep Learning that is widely used in image classification and character recognition. Neurons in CNN have activation functions and consist of several layers, including Fully Connected Layer, Pooling Layer, ReLU Activation Layer, and Convolution Layer [6].