I. INTRODUCTION

The Greek alphabet is a written language that originated in Greece around 1000 BC. It is the direct or indirect ancestor of all modern European or Latin letters that are widely used today [1]. Some of the most commonly used formula theorems—mathematical formulas such as alpha (α), beta (β), gamma (γ), and many more—can be found in the original Greek alphabet.

Each of these symbols is now more commonly used in the mathematical formula theorems that many civilians recognize from the symbols.. The many Greek alphabet symbols must be classified or identified. The challenge of symbol categorization can be handled by identifying symbol images using a deep learning approach, a machine learning improvement.

Deep learning is a type of learning that use algorithms that are inspired by mathematical laws and function similarly to the human brain. Image data is a significant implementation of deep learning. The classification of photographs seeks to group images into specified classes. To execute its tasks, the categorization process necessitates the use of machine learning [2]. Deep Learning is utilized for a wide range of activities, including forecasting opportunities or events, recognizing objects, and detecting diseases.

Image processing, or digital picture processing, is one application of deep learning. Image processing systems are designed to assist users recognize or classify objects efficiently, swiftly, precisely, and with a large amount of data at once [3].

The researchers used softmax activation functions, the Stochastic Gradient Descent (SGD) optimizer, and the ReLU activation function to classify Greek alphabet symbols, impacting the performance of the CNN algorithm using the activating function specified in the Greek Alphabet character classification that focuses on accuracy and F1-Score values.

In this study, the researchers developed a deep learning-based system that employs the Convolutional Neural Network (CNN) method algorithm, which uses three optimizer techniques—Adam, SGD, and RMSProp—and three activation functions—Softmax, Sigmoid, and ReLU. The system built by the researchers served to classify the Greek alphabet symbols and then detect the shape and name of the symbol.

The researchers used CNN in image classification because CNN was able to extract complex visual features from the image, understand spatial patterns, and maintain invariance to translation. This allows CNN to effectively capture special features that are important in an image, making it a top choice in image analysis and classification. The accuracy and performance values of the system were then measured.