

## Hand Symbol Recognition Using Canny Edge Algorithm and Convolutional Neural Network

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**Abstract :** Hand symbol recognition is a pivotal component in the domain of computer vision, with far-reaching applications spanning sign language interpretation, human-computer interaction, and accessibility. This research paper discusses the approach with the integration of the Canny Edge algorithm and convolutional neural network. The significance of this study lies in its potential to enhance communication and accessibility for individuals with hearing impairments or those engaged in gesture-based interactions with technology. In the experiment mentioned, the data is manually collected by the authors from the webcam using Python codes, to increase the dataset augmentation, is applied to original images, which makes the model more compatible and advanced. Further, the dataset of about 6000 coloured images distributed equally in 5 classes (i.e., 1, 2, 3, 4, 5) are pre-processed first to gray images and then by the Canny Edge algorithm with threshold 1 and 2 as 150 each. After successful data building, this data is trained on the Convolutional Neural Network model, giving accuracy: 0.97834, precision: 0.97841, recall: 0.9783, and F1 score: 0.97832. For user purposes, a block of codes is built in Python to enable a window for hand symbol recognition. This research, at its core, seeks to advance the field of computer vision by providing an advanced perspective on hand sign recognition. By leveraging the capabilities of the Canny Edge algorithm and convolutional neural network, this study contributes to the ongoing efforts to create more accurate, efficient, and accessible solutions for individuals with diverse communication needs.

**Keywords :** hand symbol recognition, computer vision, Canny edge algorithm, convolutional neural network

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