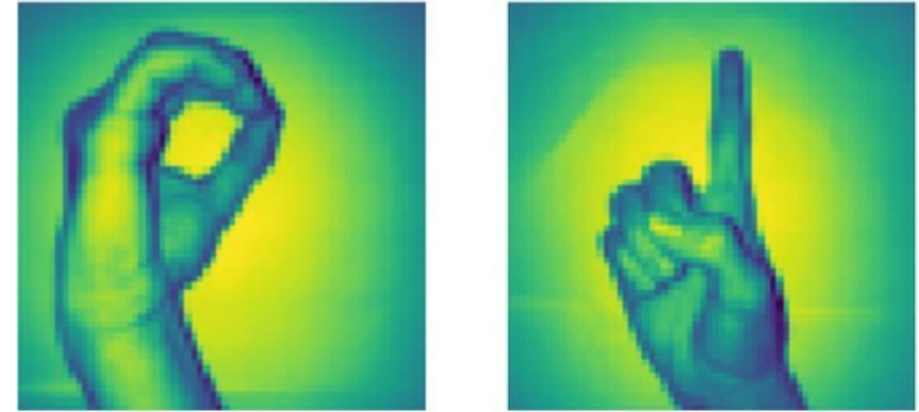


Sign Language Digits Recognition

Problem Overview

- Hand gestures are a skill that, though useful, is not very well known
- Our system, as such, will look to identify and recognize hand signals

Data set Overview

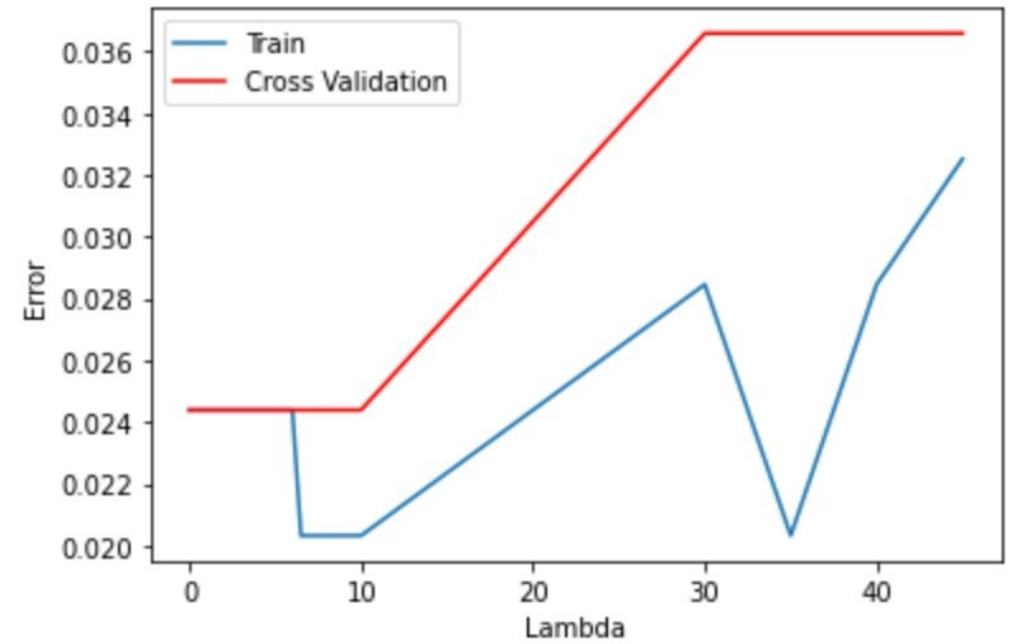
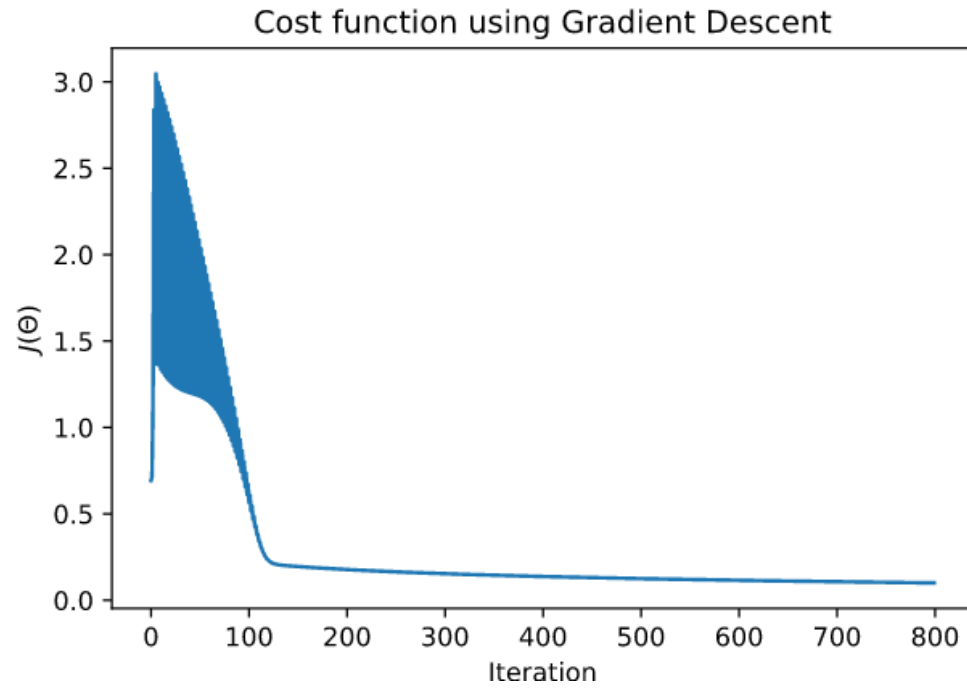


- The data set contains 2062 sign language digits images.
- Digits range from 0 to 9, so, there are 10 unique signs.

Logistic Regression - Initial Configuration

Train Data	60%
Cross-Validation Data	20%
Test Data	20%
Lambda	0.1
Theta	[0, 0, ...]

Logistic Regression



Logistic Regression - Error and Accuracy

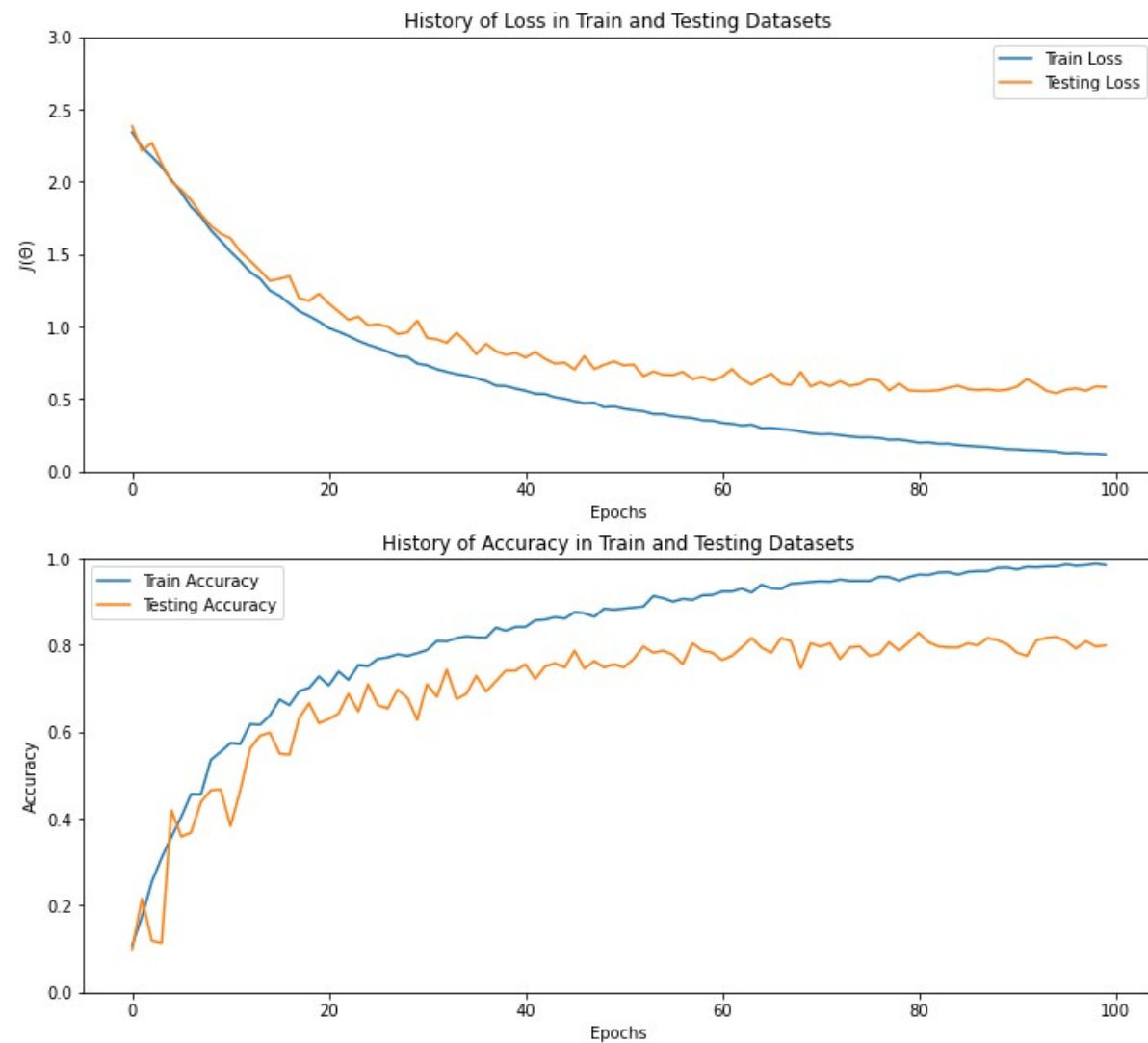
Train Error	0.02743902
Test Error	0.03658536
Train Accuracy	97.30%
Test Accuracy	96.30%

Convolution Neural Network (CNN) - Definition

- Takes in an input image, assigns importance (learnable weights and biases) to various aspects/objects in the image and differentiates one from the other.
- Pre-processing required much lower as than other classification algorithms.

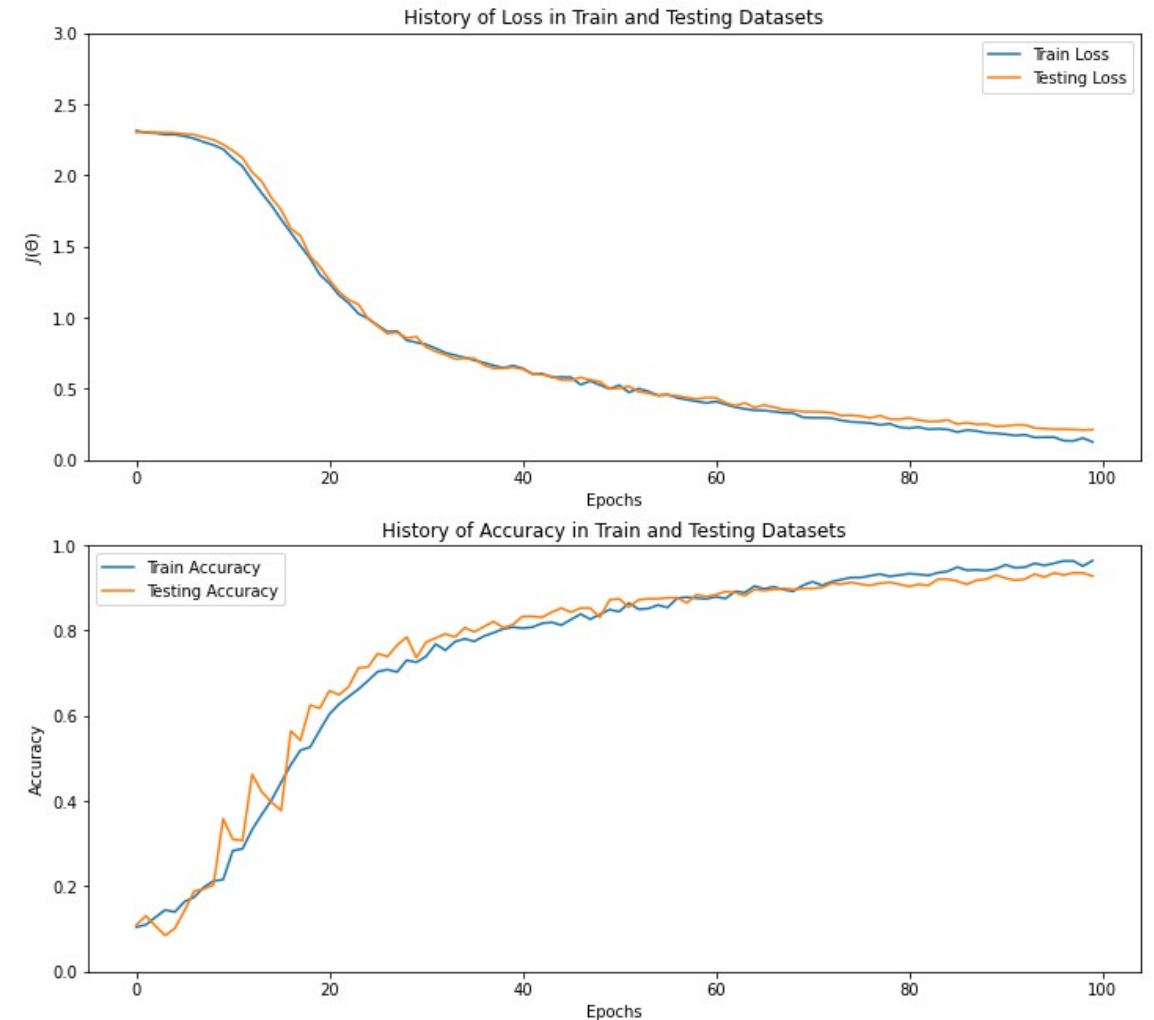
Convolution Neural Network (CNN) - Model 1

Train Error	0.248
Validation Error	0.354
Train Accuracy	75.182%
Validation Accuracy	64.649%



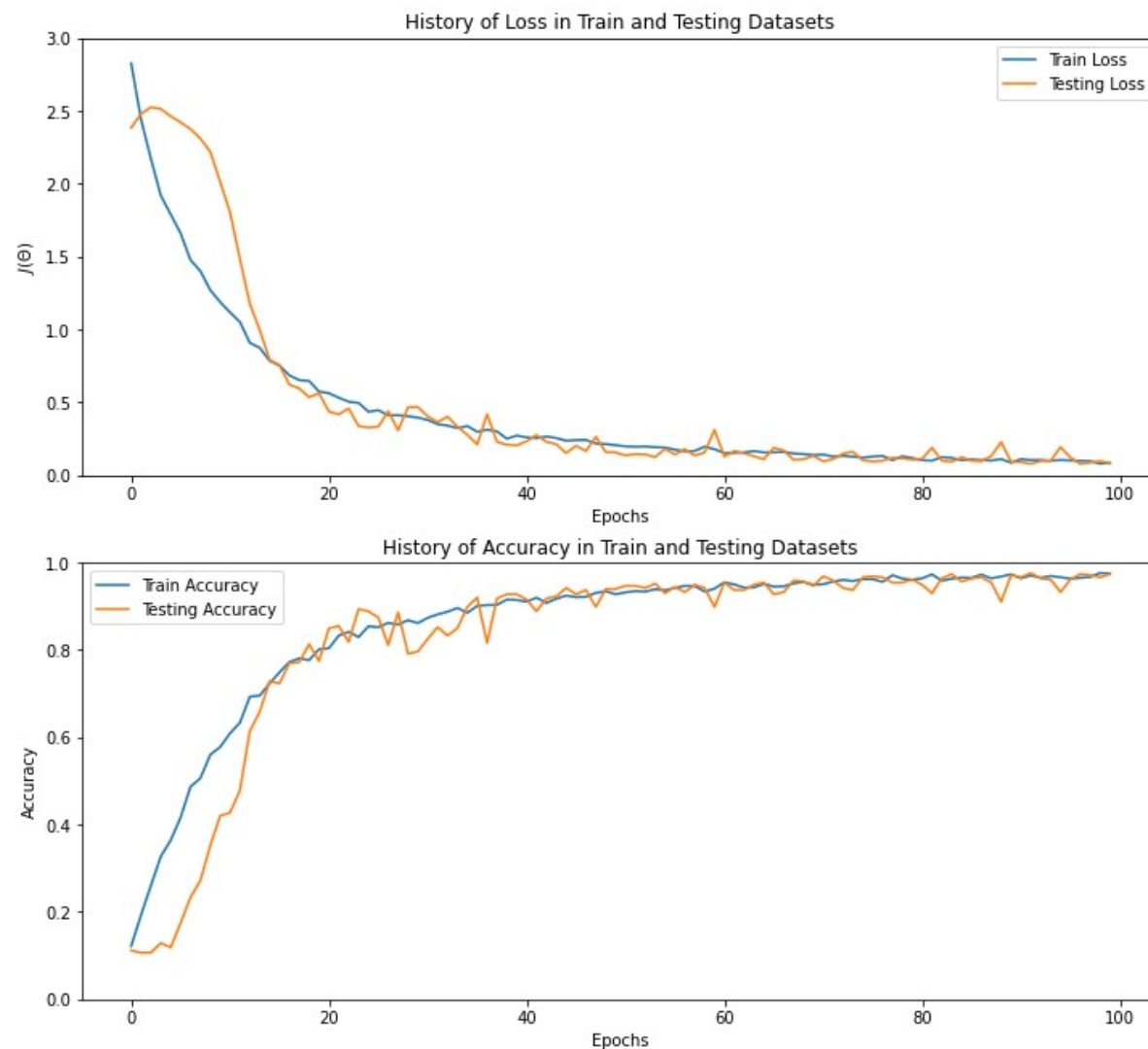
Convolution Neural Network (CNN) - Model 4

Train Error	0.010
Validation Error	0.068
Train Accuracy	99.030%
Validation Accuracy	93.220%

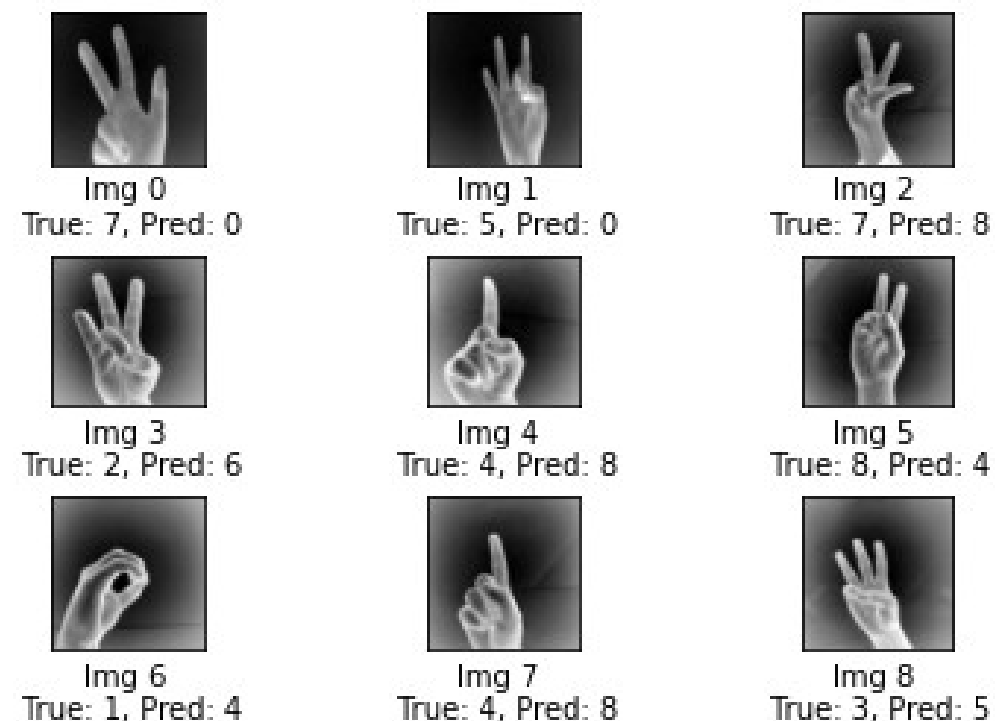
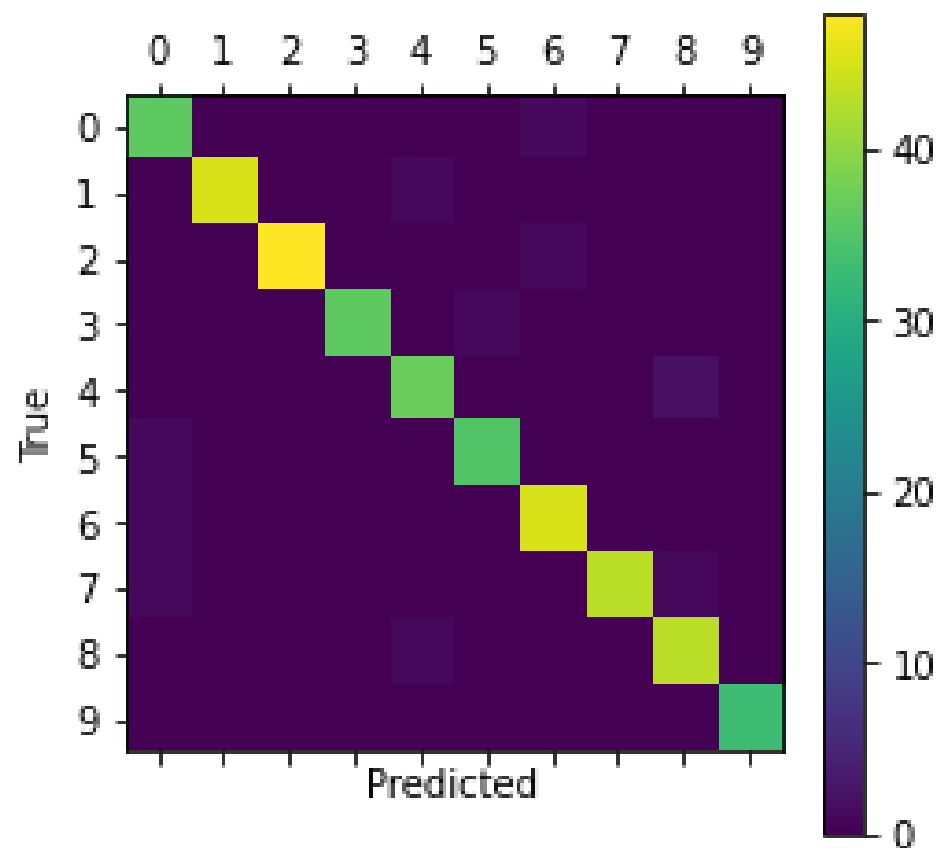


Convolution Neural Network (CNN) - Final Model

Train Error	0.004
Test Error	0.029
Train Accuracy	99.636%
Test Accuracy	97.087%



Result analysis



Conclusion

	Training Error	Testing Error
Logistic Regression Model	0.027	0.036
CNN Model	0.004	0.029