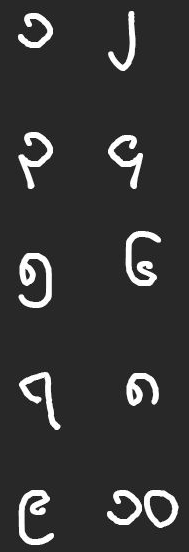


FINAL PROJECT

Burmese Handwritten Digits Recognition using Deep Learning

Team One (26.9.2021)

Table of contents

OUR TEAM

Thura Aung

KhaiKhant Minnpai

Khant Zwe Naing

Problem Statement

To make children easier recognize digits by playing Burmese Handwritten Digits Recognizer.

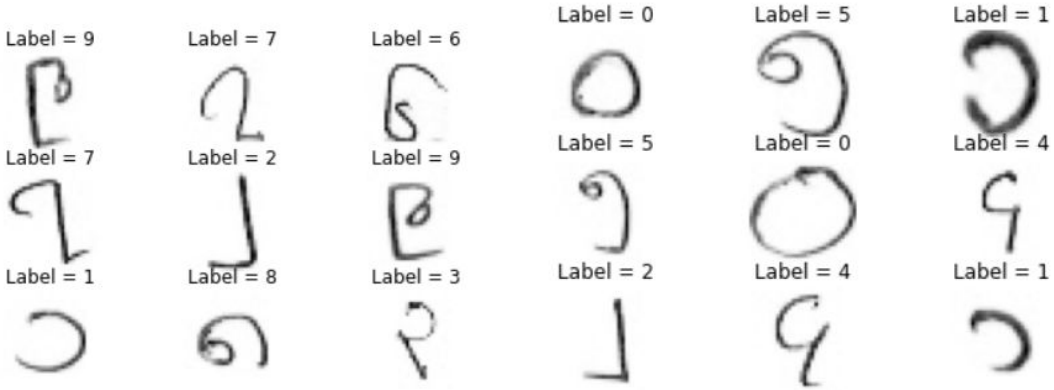
Photo : Google

Abstract

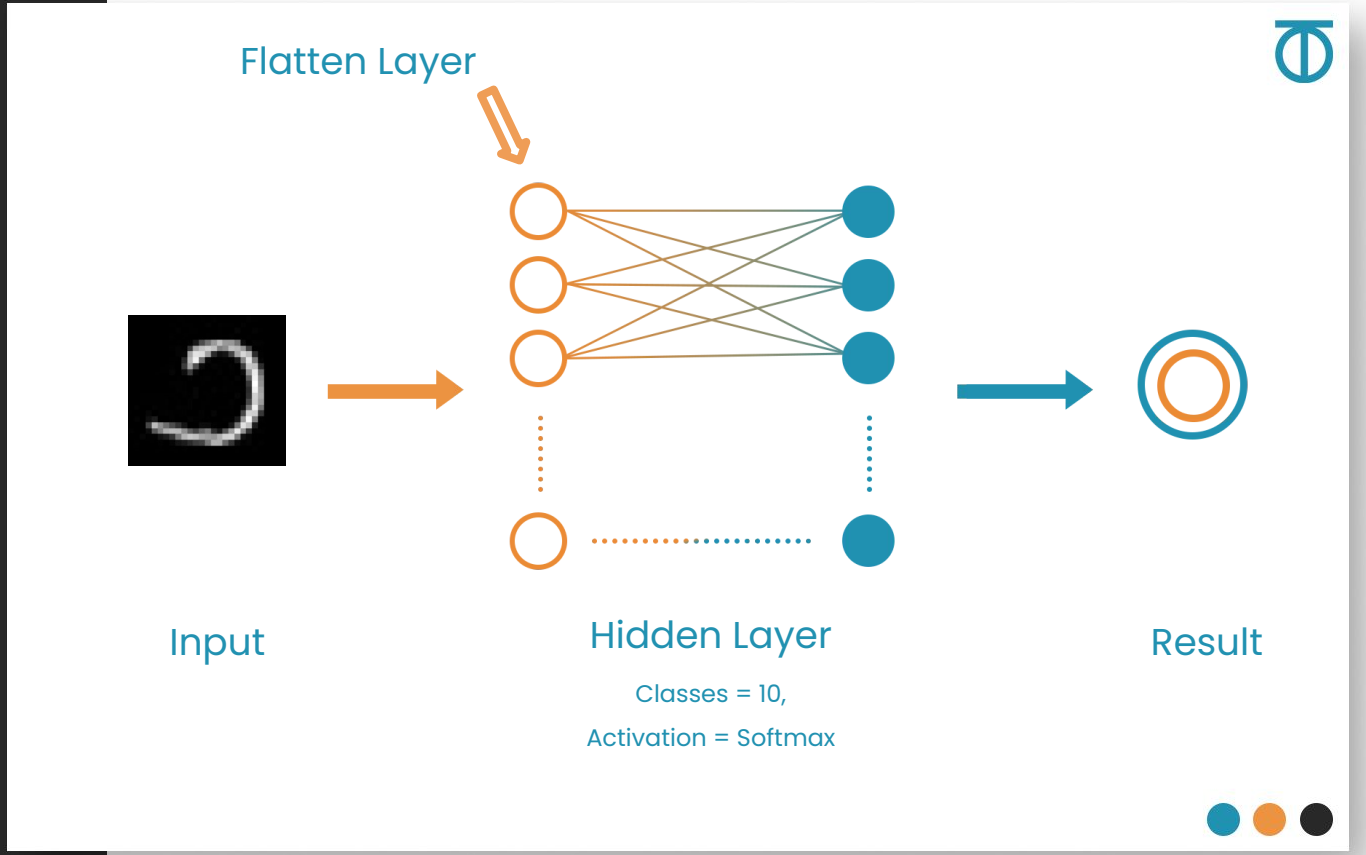
The goal of this project is to create a model that will be able to recognize and determine the handwritten digits from its image by using the concepts of Neural Networks , and BHDD dataset. Though the goal is to create a model which can recognize the handwritten digits, it can be extended to letters and an individual's handwriting. The major goal of the proposed system is understanding Neural Networks, and applying it to the Burmese handwritten recognition system.

Dataset

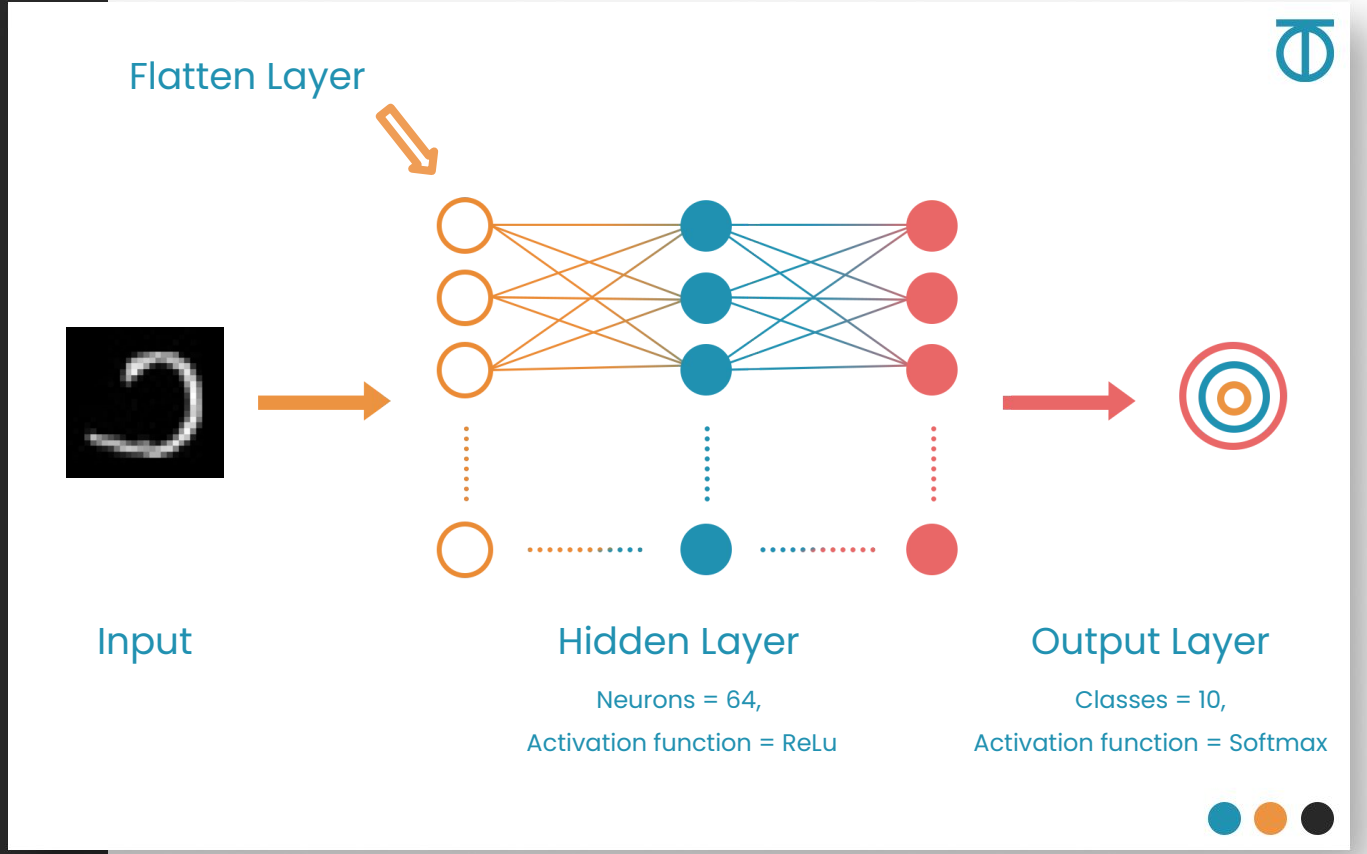
- Dataset Link : https://github.com/baseresearch/BHDD
- Train Images : 60000 with image size (28,28)
- Test Images : 27561 with image size (28,28)



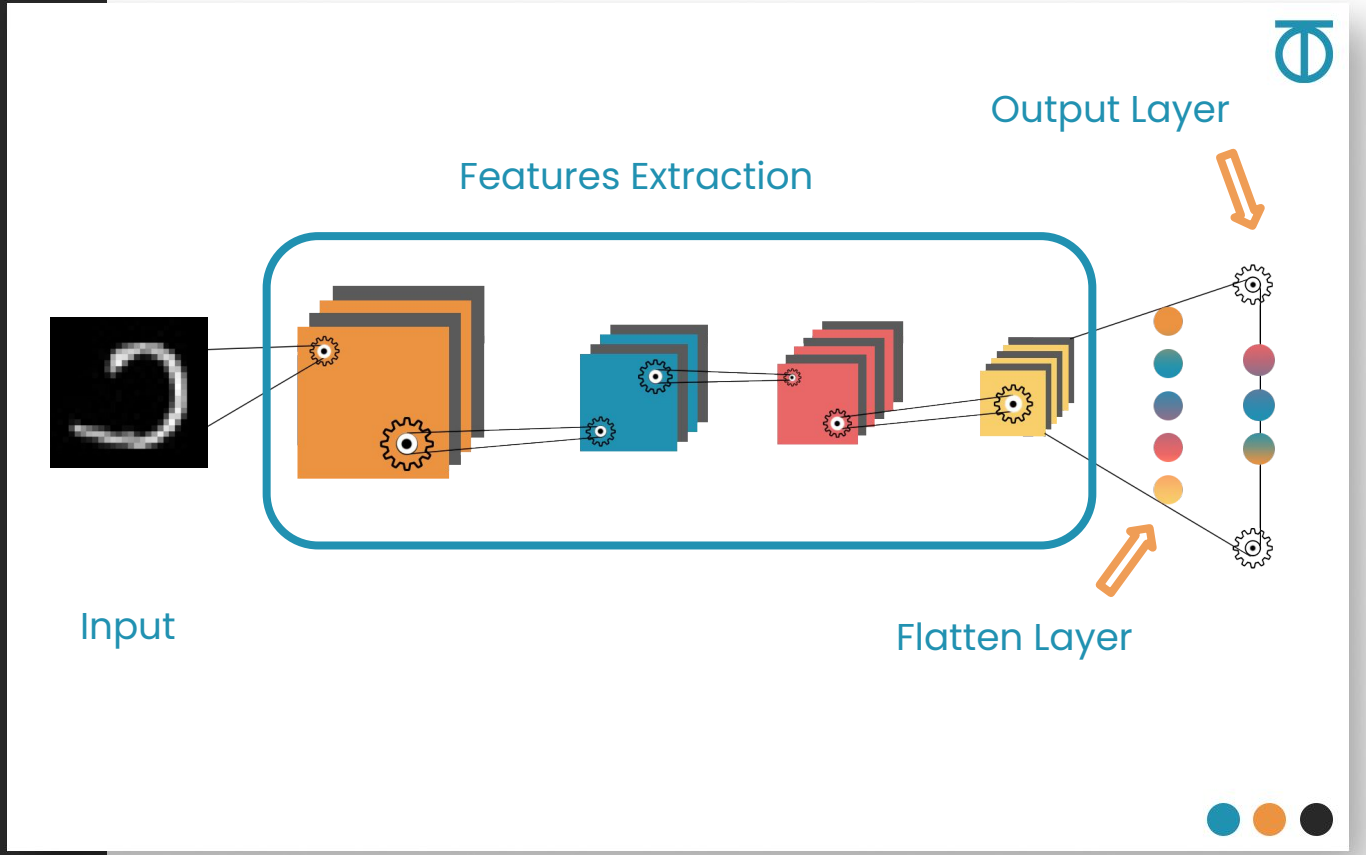
Single layer Perceptron



Multi-layer Perceptron



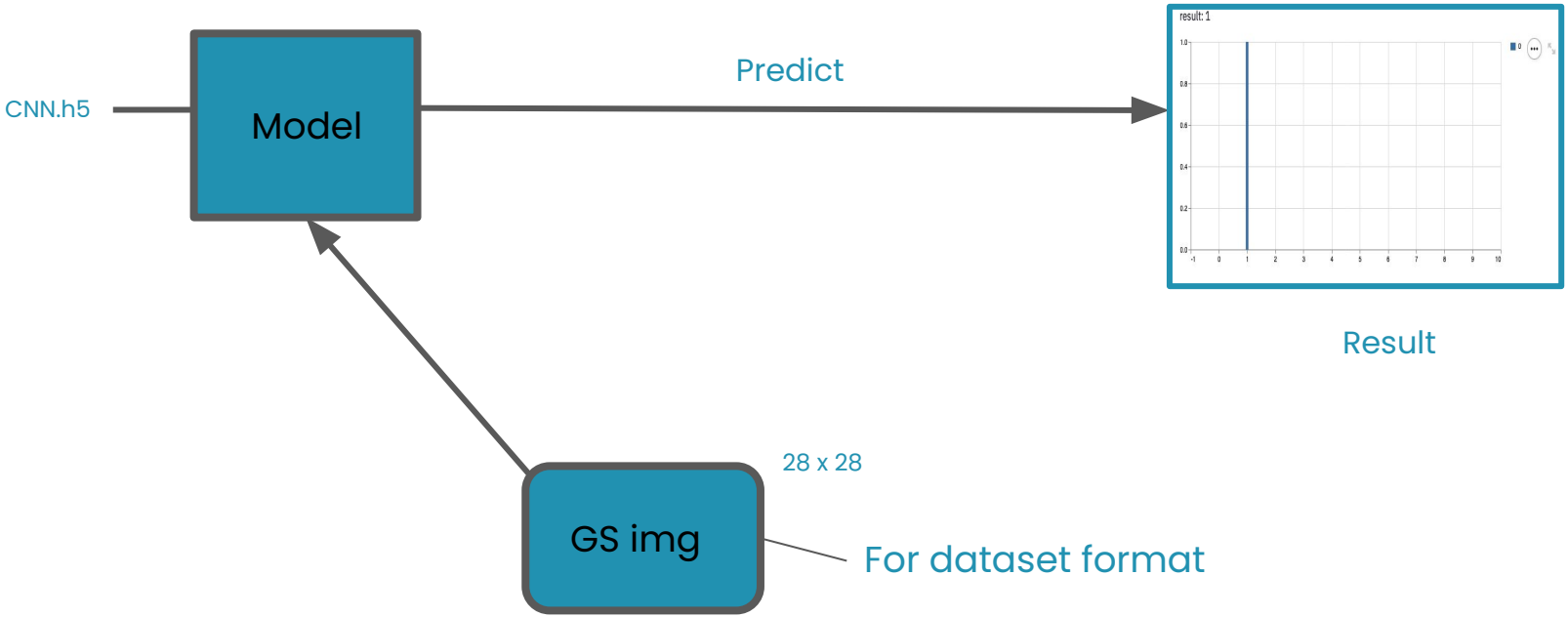
CNN model



Experimental Results

Model	Accuracy(%) on Test Split	Error rate (%) on Test Split	F1-Score	Exec Time (seconds) on GPU
Single-layer Perceptron	84.7	15.3	0.0018	1
Multi-layer Perceptron	97.16	2.84	0.97	38
ConvNet	98.7	1.29	0.9874	60

Deployment


CNN.h5
Model
Predict
result: 1
Result
28 x 28
GS img
For dataset format

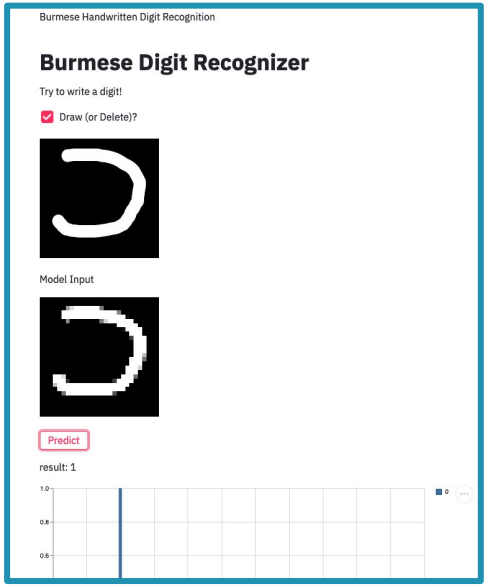
Resources

Our github repository as documentation

- https://github.com/ThuraAung1601/BHDD-using-basic-CNN

Demonstration

- Streamlit.io
- https://github.com/ThuraAung1601/BHDD-using-basic-CNN/blob/main/Image/Demo.gif



Conclusion and Future Work

- We got 0.98 F-score of classification as best result by using ConvNet with Regularization (Dropout). Future works still need to be done for architectural innovation on BHDD.
- Data Augmentation might be needed but haven't done it yet in this project.
- Further research for model innovation is needed.
- Burmese Handwritten Characters Recognition
- Recognition system for Burmese Character Set for Deep Learning based Burmese OCR system

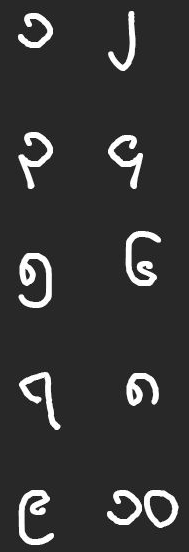
References

[1] https://github.com/baseresearch/BHDD

[2] A.Dutt, A.Dutt, Handwritten Digit Recognition Using Deep Learning, International Journal of Advanced Research in Computer Engineering & Technology, 2016.

[3] Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner. "Gradient-based learning applied to document recognition." Proceedings of the IEEE, 86(11):2278-2324, November 1998.

Any Questions?



THANK YOU!

"We can only see a short distance ahead, but we can see plenty there that needs to be done."

Alan Turing, Computing machinery and intelligence