


Ideation Phase Brainstorm & Idea Prioritization Template

Date	19 September 2022
Team ID	PNT2022TMID13012
Project Name	A Novel Method for Handwritten Digit Recognition System
Maximum Marks	4 Marks

Brainstorm & Idea Prioritization Template:

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Brainstorm & idea prioritization


1

Problem statement

- Handwritten Digit Recognition using MNIST Dataset and CNN.
- Detects the scanned images of handwritten digits.


PROBLEM


How might we detect the scanned images of handwritten digits. ?





Key rules of brainstorming


To run an smooth and productive session


 Stay in topic.

 Encourage wild Ideas.

 Defer judgment.

 Listen to others.

 Go for volume.

 If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping

Brainstorm and Idea Listing

Ayush Srikanth

MNIST database of handwritten digits has a training set of 60,000 examples, and a test set of 10,000 examples. It is a subset of a larger set available from NIST. The digits have been size-normalized and centered in a fixed-size image.

convolution layer with ReLU activation function and a max-pool layer. ReLU introduces non-linearity and max-pooling helps with removing noise.

The algorithm used by convolutional neural networks is better suited for visual image processing than the one used in traditional artificial neural networks. Convolutional neural networks are composed of convolutional layers and pooling layers.

When you check the shape of the dataset to see if it is compatible to use in for CNN.

Gayathri M

Convolutional layers take advantage of the fact that all images can be encoded in terms of 1s and 0s to create feature maps. A feature detector is simply a matrix, whose values correspond to a feature of the image (i.e. pointy ears, slit eyes...). The matrix overlays a section the image and performs bit-wise multiplication with all of the values at that location.

The results of the bit-wise multiplications are summed and put in the corresponding location of the feature map. It then shifts to another section of the image and repeats the process until it has traversed the entire image.

The data set contains 60,000 training images and 10000 testing images. Here the data is split into training and testing datasets respectively. The `x_train` & `x_test` contains grayscale codes while `y_test` & `y_train` contains labels from 0-9 which represent the numbers.

Many machine learning algorithms cannot operate on label data directly. They require all input variables and output variables to be numeric.

Goutham DT

After the model is defined, we need to evaluate it using various accuracy metrics available from k fold cross validation to precision, recall or F1 score

Find a way to upload or host the trained model in the cloud. So when a user inputs his drawing of a number the web app would help recognise the number

Create an editable canvas for the user to draw the numbers by utilising the handlers available for the mouse and touch by knowing the mouse up, down, touch and leave

SGD is the most basic form of GD. SGD subtracts the gradient multiplied by the learning rate from the weights. Despite its simplicity, SGD has strong theoretical foundations and is still used in training edge NNs.

Lavaniya H

Optimizers are algorithms or methods used to change the attributes of your neural network such as weights and learning rate in order to reduce the losses.

How you should change your weights or learning rates of your neural network to reduce the losses is defined by the optimizers you use. Optimization algorithms or strategies are responsible for reducing the losses and to provide the most accurate results possible.

Though conventional wisdom suggests that Adam does not require tuning, we find that tuning the initial learning rate and decay scheme for Adam yields significant improvements over its default settings in all cases.

Dimensionality reduction is achieved using a sliding window with a size less than that of the input matrix. Which reduces the processing time of the CNN model.

Grouping

Dataset

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Model

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Evaluation

The results of the bit-wise multiplications are summed and put in the corresponding location of the feature map. It then shifts to another section of the image and repeats the process until it has traversed the entire image.

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Step-3: Idea Prioritization

