

Introduction:

- Nowadays demand increases to create a paperless environment. Recognition of handwritten text is easy for a human but it is a complex task for computer systems. Many researchers have done work on this field but 100% accuracy is not achieved by the researchers.
- Handwritten Text Recognition is a technology that is much needed in this world as of today. Before proper implementation of this technology, we have relied on writing texts with our own hands which can result in errors. It is difficult to store and access physical data with efficiency. Manual labor is required to maintain proper organization of the data. Throughout history, there has been severe loss of data because of the traditional method of storing data. Modern day technology is letting people store the data over machines, where the storage, organization and accessing of data is relatively easier.
- Adopting the use of Handwritten Text Recognition software, it is easier to store and access data that was traditionally stored. Furthermore, it provides more security to the data. One such example of Handwritten text Recognition software is the Google Lens. The aim of our project is to make an application that can recognize the handwriting using concepts of deep learning. We are thinking by approaching our problem using CNN as they provide better accuracy over such tasks.

Literature Survey :

SL NO	TITLE	YEAR	METHODOLOGY	DRAWBACKS
1	Handwritten Text Recognition using Deep Learning	2016	Word Level Segmentation Character Level Segmentation	Limit of training example
2	Handwritten Text Recognition System Based on Neural Network	2016	Recognition of character using Artificial Nueral Network Accuracy 95%	It Recognizes only single character input
3	Handwritten Text Recognition	2014	Recognition of handwritten Text using OCR implemented in matlab	It recognizes clear handwritten Capital word
4	Character Recognition Using Neural Network	2013	Character recognition using neural network	It recognizes clear handwritten Capital Character

SL NO	TITLE	YEAR	METHODOLOGY	DRAWBACKS
5	A Technical Review on Text Recognition from Images	2015	Recognition Text from image using Artificial neural network	It recognizes only digital Text from image
6	Handwritten Text Recognition using Deep Learning (CNN & RNN)	2021	Recognition of handwritten text using CNN , RNN ,CTC	Recognition handwritten from only training dataset
7	Handwritten Text Recognition using Deep Learning with TensorFlowHandwritten Text Recognition using Deep Learning with TensorFlow	2020	Recognition handwritten text on line level	Recognition only for combined words from training dataset
8	Handwritten Character Recognition to obtain Editable Text	2020	Recognition of handwritten text using OCR tesseract module	OCR methodology to recognize accuracy 94%

Problem definition:

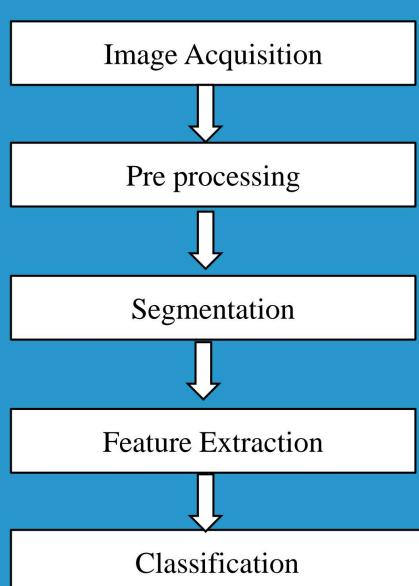
The purpose of this project is to take handwritten english text an input, process the text, train the neural network algorithm, to recognize the pattern and modify the input.

This project is aimed at developing software which will be recognizing text of english language. This project is restricted to english text. It can be further developed to recognize the text of different language.

Neural networks are particularly useful for solving problem that can not be expressed as a series of steps, such as recognition patterns, classifying them into groups, series prediction.

Pattern recognition is perhaps most common use of neural networks. The neural network is presented with a target vector and also a vector which contains the pattern information, this could be an image and hand written data. The neural network then attempts to determine if the data matches a pattern that the neural network has memorized.

Methodology :



Methodology:

1. Preprocessing :

the image is preprocessed using different image processing algorithms like inverting image, gray scale conversion, and image thinning

2. Segmentation :

after the preprocessing of the image segment is done. This is done with following methods

- I) remove the borders
- ii) divide the text into rows
- iii) divide the rows (lines) into words
- iv) divide the word into letters

3. Feature extraction :

once the character is segmented, we generate the binary glyphs and calculate the summation of each rows and columns values as an features

4. Classification :

in this phase, we are going to train and test the neural network, to finally identify the answer.

The model architecture proposed involves pre-processing the data and then feeding it into the cnn, after which it will be feeded into the rnn network which will then finalise and give us our output.

CNN :

CNN is meant to imitate human visual processing, and it's highly optimized structures to process 2D images. Further, it can effectively learn the extraction and abstraction of 2D features. In detail, the max-pooling layer of CNN is extremely effective in absorbing shape variations. Moreover, a sparse reference to tied weights makes CNN involve with fewer parameters than a totally connected network with similar size. Most significantly, CNN is trainable with the gradient-based learning algorithm and suffers less from the diminishing gradient problem. Providing the gradient-based algorithm trains the entire network to attenuate a blunder criterion directly, CNN can produce highly optimized weights and good generalization performance

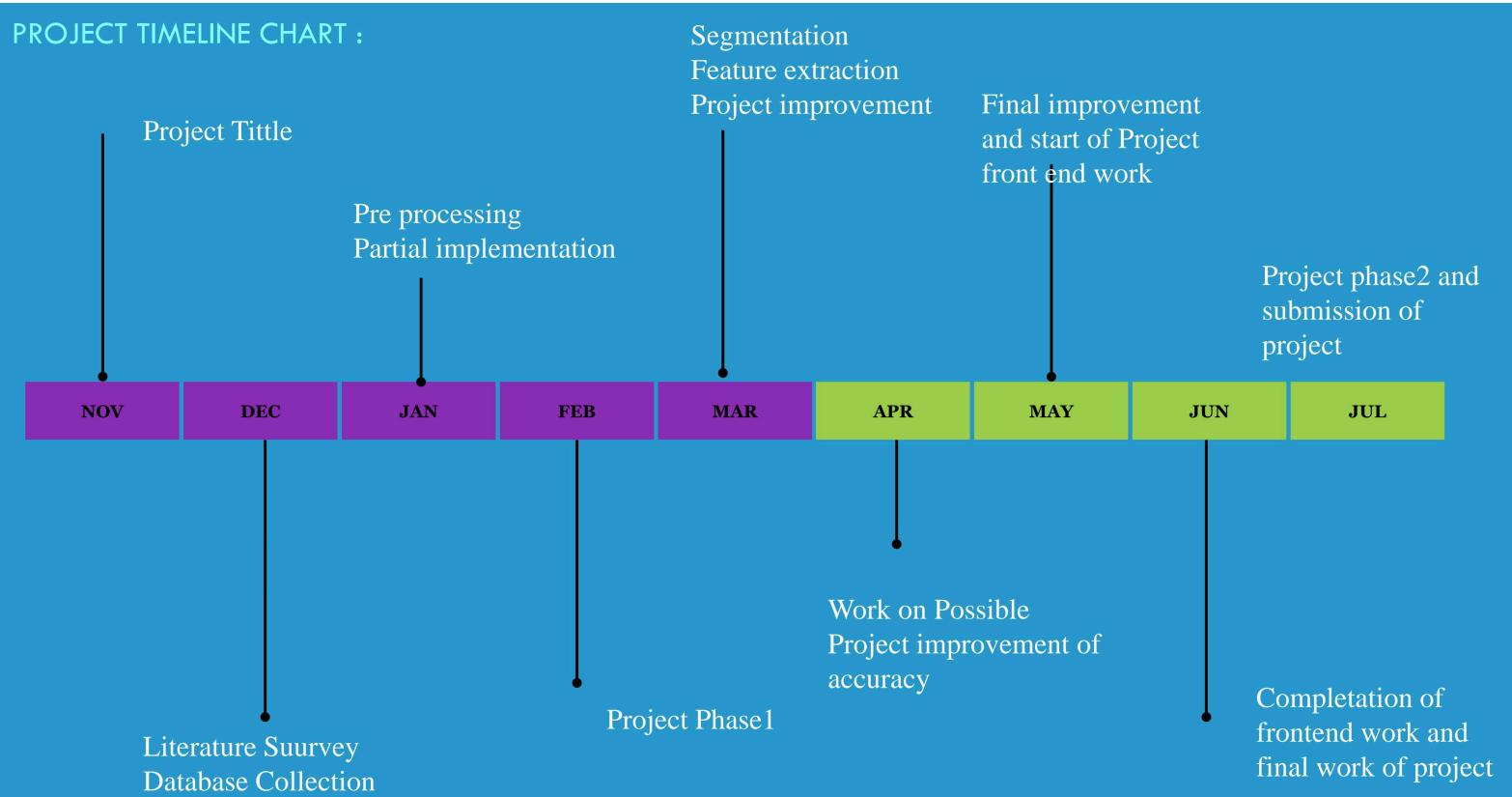
RNN :

RNN have a “memory” which remembers all information about what has been calculated. It uses the same parameters for each input as it performs the same task on all the inputs or hidden layers to produce the output. This reduces the complexity of parameters, unlike other neural networks.

CTC :

CTC may be a loss function that is employed to coach neural networks. There's no must align data because that may assign a probability for any label. CTC may be a align free. It works on he summing over the probability of all possible alignments between the input and also the label.

PROJECT TIMELINE CHART :



Implementation status :

Dataset :

collected images of 115320 words

Pre processing :



Greyscale image



Noise Removal



Binarization of image



Conclusion :

Advantages :

- We are training more dataset to achieve more accuracy
- We are using word level recognition
- The system has been made web based and make it more user friendly respective
- With the help of modern-day techniques like convolution neural networks we are able to scan and understand words with an accuracy never seen before in history
- The project gives best accuracy for the text which has less noise
- The accuracy completely depending on the datasets

Drawbacks :

- Accuracy is less for cursive handwriting
- Large variety of handwritings are available it is difficult to detect and recognize text.

References :

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Thank you