DELHI TECHNOLOGICAL UNIVERSITY

[Formerly Delhi College of Engineering]

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MACHINE LEARNING (CO-327)

PROJECT PROPOSAL

Computer Engineering

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Topic: Convolutional Neural Network based OCR framework for handwritten Hindi and Marathi Text Recognition.
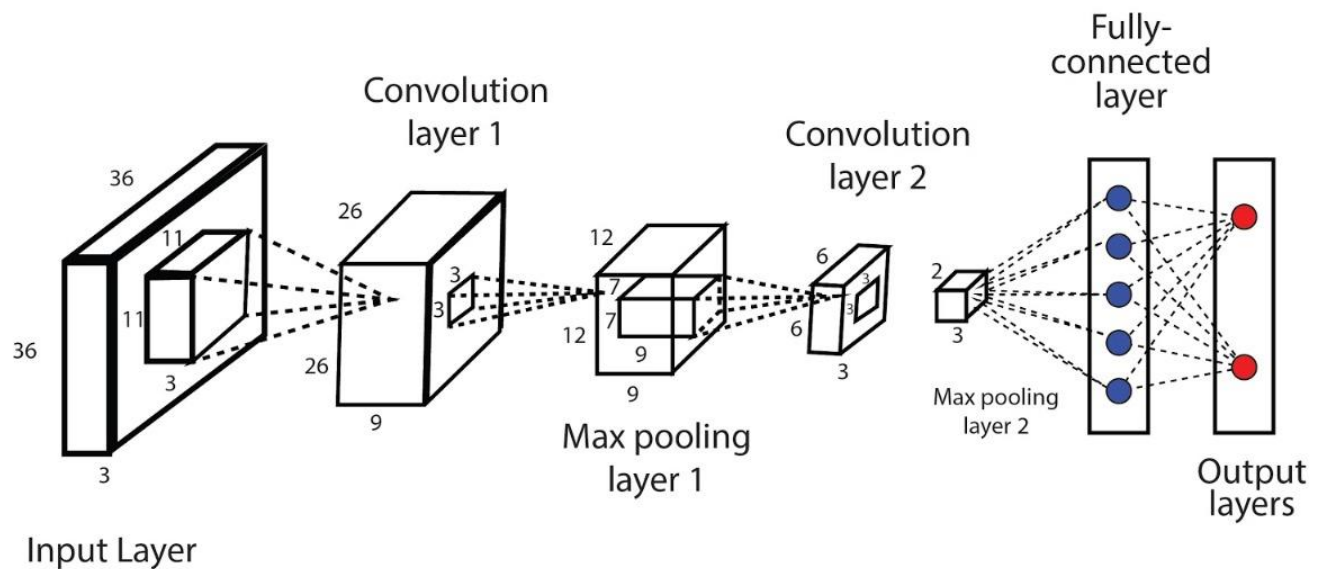
Problem Statement:

Converting handwritten text to digital text has been a tough problem as we cannot efficiently process physical documents with computers without converting them into digital documents. Recognition of handwritten Devanagari characters is a difficult errand, however, Deep learning can be adequately utilized as an answer for all such issues.

Objective:

Our goal of this research is to implement a model which recognises handwritten hindi and marathi scripts and replicates them into the printed structure has accomplished great outcomes utilizing Convolutional Neural Network (CNN) which reduces the manual human efforts to a huge degree.

In this project we will try to work on technology, we proposed a CNN based OCR framework which precisely perceives manually written Marathi words and delivers great quality printed Marathi text. We have proposed a character segmentation free methodology for perceiving the

manually written Devanagari text written in Marathi language and reproduced the perceived words in printed form.

Convolution layer 1

Fully-connected layer

Convolution layer 2

36
26
11
11
3
3
36
26
3
9
3
12
7
7
12
9
9
6
6
3
3
2
3

Max pooling layer 1

Max pooling layer 2

Input Layer

Output layers

IDEA:

Our research will be focused on "textual handwritten data handling and recognition".

Deep learning is one of the best techniques for recognizing images and shapes. A Convolutional Neural Network (CNN) is one of the most well-known algorithms for deep learning. They gain knowledge legitimately from pictures itself to classify them eliminating the need of manual feature extraction. Like other neural systems, a CNN is made out of an input layer, an output layer, and many concealed (hidden) layers in the middle.

We assemble an Optical Character Recognition System (OCR) utilizing Convolutional Neural Network (CNN), explicitly for handwritten Marathi/Hindi content. To build up a strong OCR

framework with high precision, we proposed the utilization of Convolution Neural Networks (CNN). We will investigate the curvature of characters and utilize curvelet transform for feature extraction and k-closest neighbour (KNN) as classifiers.

Some key challenges while recognizing handwritten Marathi text can be variation in strokes of handwriting, overlapping handwritten character, matra may be sometimes disjoined from the letters, variations in spacing, lack of availability of dataset etc. Recognizing individual Marathi/Hindi characters is an even troublesome task in light of the fact that some characters in Devanagari lipi are fundamentally the same as one another like "ma" and "bha", or "va" and "ba" or "sa" and "ra" etc. and numerous others as referenced in. These letters/characters have approximately the same features because of the same appearance and same strokes while writing them. This may further lead towards producing the incorrect recognized output.

In printed Marathi text, unique and similar fonts and styles are used throughout the entire document. So the features could be easily extracted. But in the case of handwritten Marathi/Hindi text documents the writing styles may vary person to person. The variation of an individual's writing style is the key challenge in developing handwritten OCR systems.

The complete word will be given as input for training the CNN model. The CNN model is proficient for learning the features automatically from the training samples in an unsupervised manner. The CNN model itself will take care of all the features to be extracted. We will design our own simple CNN model.