

*CS 419: Computer Vision Project Proposal*

# Deep Sketch: Deep Convolutional Neural Networks for Sketch Recognition and Similarity

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**UNDER THE GUIDANCE OF**

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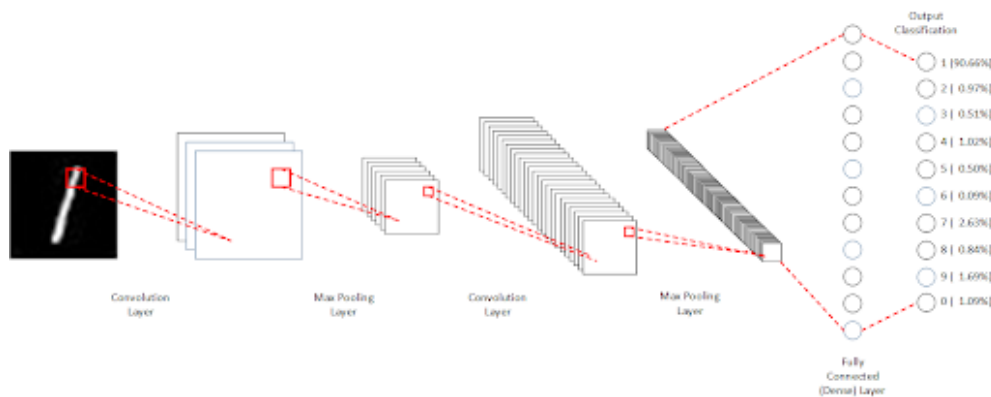
## Introduction

Freehand sketches are a simple and powerful tool for communication. They are easily recognized across cultures and can be used to both describe static and dynamic information. As a consequence, sketch recognition starts to attract more and more interest in the research community.

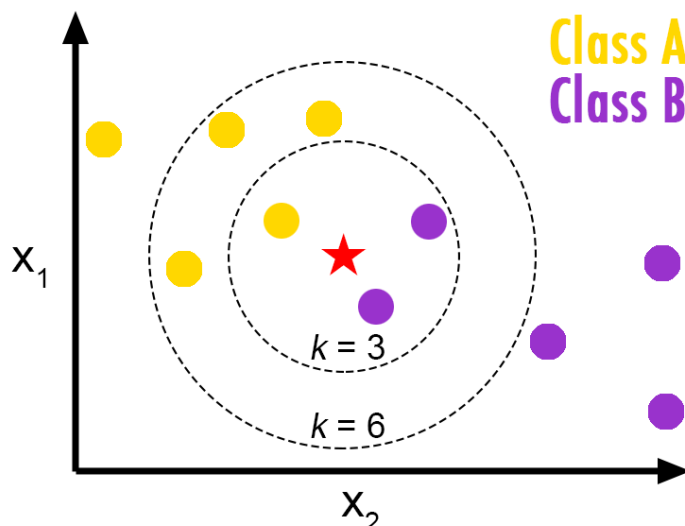
The aim of this project is to build a system which is able to recognize sketch belongs to what category and find similar sketches. Also, our system will perform real-time sketch detection.

## Methodology

- We will be using CNN to classify the image. In CNN there is an input image that we're working with. We perform a series convolution, pooling operations, followed by a number of fully connected layers. Convolution helps to extract features from the image such as edge, colour, curves and texture.



- We will be using K-NN to find image similarity. the K-nearest neighbour (K-NN) algorithm is used to perform the classification. The KNN algorithm assumes that similar things exist close to each other. KNN captures the idea of proximity and calculates the distance between points on graph. It is used in pattern recognition with a non-parametric method.



## Experimental Analysis

The analysis of the DCNN model and similarity search method will be done as follows:

1. Optimal values of hyper parameters will be calculated based of training and cross validation dataset. The split of the dataset into train, cross validation and test is – train set will have 13,000 samples, cross validation set will have 3500 samples and test set will have 3500 samples wherein each class will have equal representation.
2. The performance of DCNN model will be evaluated based of multi-class classification metrics like accuracy and class wise precision and recall.
3. Sketch classification should recognize same class even when the input sketch is translated, rotated, scaled or flipped. This invariance of the model will be tested.

## Dataset

TU-Berlin Sketch [Dataset](#)

The dataset includes 20,000 unique sketches distributed into 250 categories. These are human-drawn sketches.

## References

1. <http://cybertron.cg.tu-berlin.de/eitz/projects/classifysketch/>
2. <https://www.researchgate.net/publication/282211796>