Image Recognition using K-Means.

# Abstract

Clustering and dimensionality reduction techniques have useful applications in many machine learning techniques. Although detecting features can be a daunting task with any classification technique. Neural networks circumvent the classification problem by training the system with human expertise and automating the classification problem. For the current project, we are examining the effectiveness of the retrieval system using the K-means clustering with the MNIST and OCR datasets. Training the system will be performed in the phase one followed by the testing to validate the performance of the proposed system. The summary of findings will be submitted after completion of the project.

# Project Motivation

Many applications require the manual identification of objects and facilities in the imagery. Because the character recognition for a system with the ASCII standards is becoming the conventional task, it is required for an analyst to perform feature extraction from an image. Since the analysts available to perform the classification are few, automating the system would come in handy. Nevertheless, the traditional object detection and classification algorithms that have shown promise for the automation of such tasks. It has achieved success in utilizing neural networks. In this project, we apply them to the problem of character recognition in an imagery.

# Project Methods and Outline

The project outline is described below,

**Pixel scanning**

As the dataset contains predefined pixel values with no segmenting required it will make the system perform with ease compared with other retrieval systems. Hence, the system directly scans the pixel value and performs clustering.

**K-means clustering**

In this project, clustering plays a significant role in classifying the image into characters. Clustering is the process of groups different cells which share a precise value in an image and can be measured using the variables like bandwidth and its cell value.

**Representation/extraction**

These terms refer to extracting features. In this stage we will be looking for the curves, corners, and holes, which allow us to distinguish the different digits and characters.

**Interpretation/classification**

In this stage we will be detecting objects based on their descriptors and identifying particular digits and characters that is performed in the training phase. From here on, the system decides the output whenever the image grid is given as the input.

# References

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