IMAGE RECOGNITION WITH CLOUD VISUAL RECOGNITIONS

IMAGE RECOGNITION DATA PROCESS

Image recognition is **the process of identifying an object or a feature in an image or video**. It is used in many applications like defect detection, medical imaging, and security surveillance.

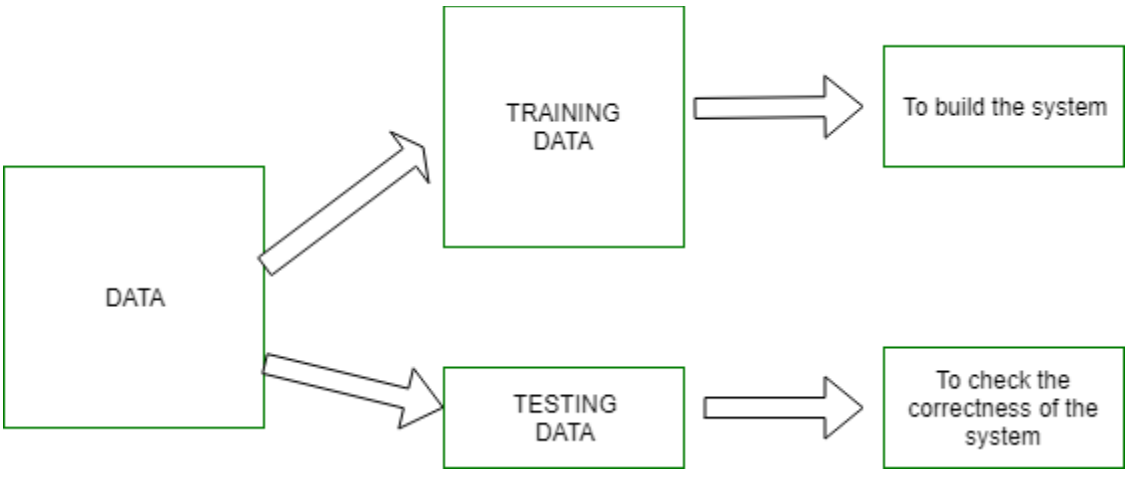
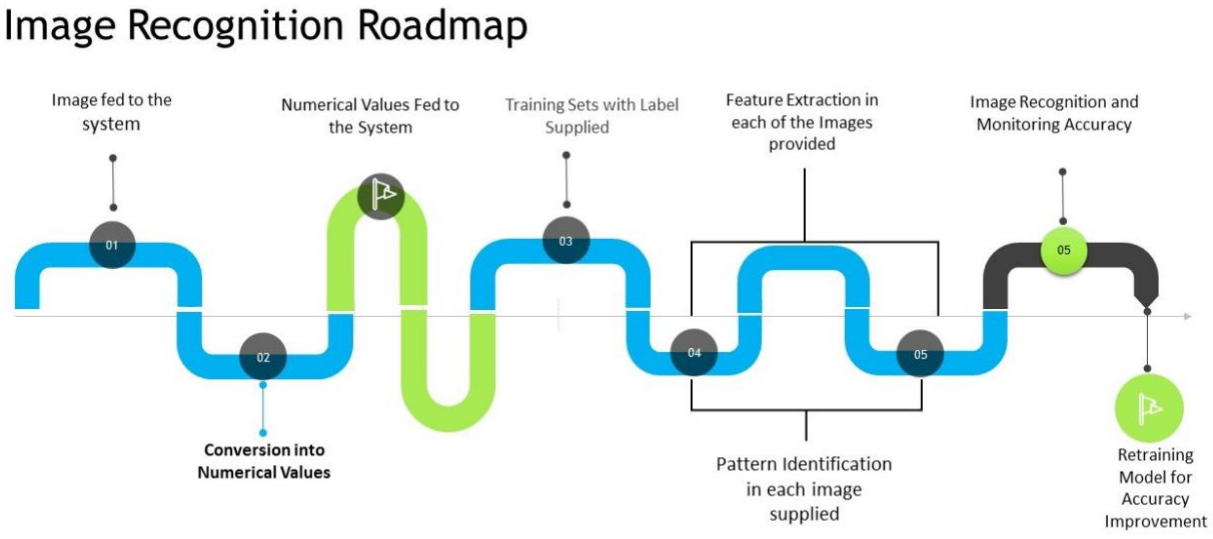


Image recognition allows machines to identify objects, people, entities, and other variables in images. It is **a sub-category of computer vision technology** that deals with recognizing patterns and regularities in the image data, and later classifying them into categories by interpreting image pixel pattern

The context of machine vision, is **the ability of software to identify objects, places, people, writing and actions in digital images**. Computers can use machine vision technologies in combination with a camera and artificial intelligence (AI) software to achieve image recognition.

WHICH ALGORITHM IS USED FOR IMAGE RECOGNITION



Some of the algorithms used in image recognition (Object Recognition, Face Recognition) are **SIFT (Scale-invariant Feature Transform), SURF (Speeded Up Robust Features), PCA (Principal Component Analysis), and LDA (Linear Discriminant Analysis)**.

LIMITATIONS OF REGULAR NEURAL NETWORKS FOR IMAGE RECOGNITION

- The huge availability of data makes it difficult to process it due to the limited hardware availability.

- Difficulty in interpreting the model since the vague nature of the models prohibits its application in a number of areas.

- Development takes longer time and hence, the flexibility is compromised with the development time. Although the availability of libraries like Keras makes the development simple, it lacks flexibility in its usage. Also, the Tensorflow provides more control, but it is complicated in nature and requires more time in development.

USES OF IMAGE RECOGNITION

DRONES:

Drones equipped with image recognition capabilities can provide vision-based automatic monitoring, inspection, and control of the assets located in remote areas.

MANUFACTURING:

Inspecting production lines, evaluating critical points on a regular basis within the premises. Monitoring the quality of the final products to reduce the defects.

AUTONOMOUSVEHICLES:

Autonomous vehicles with image recognition can identify activities on the road and take necessary actions. Mini robots can help logistics industries to locate and transfer the objects from one place to another. It also maintains the database of the product movement history to prevent the product from being misplaced or stolen.

MILITARYSURVEILLANCE:

Detection of unusual activities in the border

areas and automatic decision-making capabilities can help prevent infiltration and result in saving the lives of soldiers.

FOREST ACTIVITIES:

Unmanned Aerial Vehicles can monitor the forest, predict changes that can result in forest fires, and prevent poaching. It can also provide a complete monitoring of the vast lands, which humans cannot access easily.

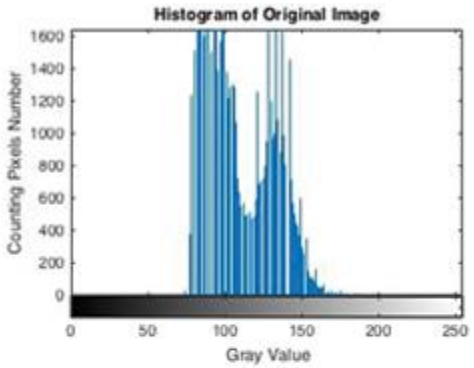
ROLE OF CONVOLUTIONAL NEURAL NETWORKS IN IMAGE RECOGNITION

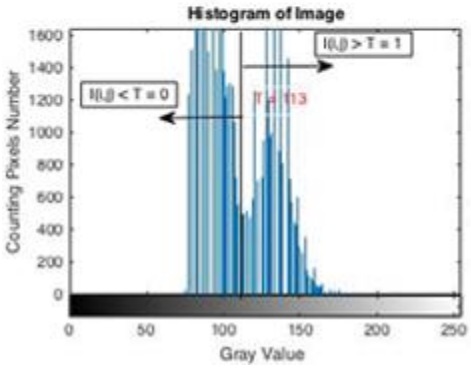
Convolutional Neural Networks play a crucial role in solving the problems stated above. Its basic principles have taken the inspiration from our visual cortex.

CNN incorporates changes in its mode of operations. The inputs of CNN are not fed with the complete numerical values of the image. Instead, the complete image is divided into a number of small sets with each set itself acting as an image. A small size of filter divides the complete image into small sections. Each set of neurons is connected to a small section of the image.

CODING

```
I = imread('pout.tif');
% Calculate Histogram of Image
I_hist = imhist(I);
% Calculating threshold value
T = graythresh(I);
% Applying threshold value to image and convert binary image
I_thresh = im2bw(I,T);
% Add brigtness value
b = 50;
I_new = I + b;
figure, imshow(I_new);
figure,
subplot(2,2,1);imshow(I);title('Original Image');
subplot(2,2,2);imhist(I);title('Histogram of Original Image');
subplot(2,2,3);imhist(I);title('Histogram of Image');
subplot(2,2,4);imshow(I_thresh);title('New Binary Image');
```





Thank You