Working Principle of a Personal Image Classifier

A personal image classifier is a machine learning model that is designed to classify images into different categories. The classifier is usually trained on a dataset of images and can then be used to identify new, unseen images. Here's a detailed description of the working principle:

1. Dataset Collection

The first step in building an image classifier is to collect and label a dataset of images. These images should be categorized into different classes that the classifier will eventually learn to recognize. For example, if the goal is to build a classifier that distinguishes between Normal, XL & XXL, you will need a set of images that are labelled as either Normal, XL & XXL

Images: The dataset consists of multiple images representing each class

Labels: Each image is assigned a label that represents the class it belongs to.

2. Data Pre-processing

Before feeding the images into a model, they often need to be preprocessed. This ensures that the images are in a format that the machine learning model can understand.

Resizing Images: Images are often resized to a fixed shape (e.g., 128x128 or 224x224 pixels) so that all images have the same dimensions.

Normalization: Pixel values of images are often scaled to a range between 0 and 1 to ensure numerical stability during training.

Data Augmentation: Techniques like flipping, rotating, or zooming into images can artificially increase the size of the dataset, which improves model generalization.

3. Model Training

The model is trained by passing the pre-processed images through the network. The training process adjusts the model's weights to minimize a loss function, which measures the difference between the model's predictions and the actual labels.

Training: The model is trained on a training dataset using techniques like back propagation and optimization algorithms like Adam.

Validation: The performance of the model is often evaluated on a validation dataset to ensure that the model is not over fitting to the training data.

4. Model Architecture

The core of the image classifier is its model, which is typically built using neural networks. Mobilenet are the most commonly used architectures for image classification because they are highly effective at identifying patterns in visual data.

Fully Connected Layers: These layers take the output from the convolutional and pooling layers and make predictions by combining learned features.

Epoch: Applies the value as 100 for high accuracy

5. Model Evaluation

After training, the model is evaluated using test data to determine how well it can classify new, unseen images.

Accuracy and Loss: Metrics like accuracy and loss are commonly used to evaluate the model's performance.