Name of Student : AHMED ALI ANSARI **ID No : 1402-2020**

Task :

1. Enhance your own picture using Numpy and Sklearn?

ANSWER:

In [1]:
```
import numpy as np
from sklearn.decomposition import PCA
from PIL import Image
```

In [14]:
```
image_path = 'C:/Users/12-10-2021/Downloads/passportsize.jpg'  # Replace with the actual path to your image
image = Image.open(image_path)
image_array = np.array(image)
```

In [15]:
```
# If the image is in RGBA format (4 channels), convert it to RGB (3 channels)
if image_array.shape[2] == 4:
    image_array = image_array[:, :, :3]

# Reshape the image array to a 2D matrix for PCA
height, width, channels = image_array.shape
image_matrix = image_array.reshape(height * width, channels)
```

In [16]:
```
# Define the number of principal components to keep (adjust according to the image shape)
num_components = min(image_matrix.shape[0], image_matrix.shape[1]) - 1

# Create a PCA object and fit it to the image matrix
pca = PCA(n_components=num_components)
image_pca = pca.fit_transform(image_matrix)
```

In [17]:
```
image_reconstructed = pca.inverse_transform(image_pca)

# Reshape the reconstructed image matrix to the original shape
image_reconstructed = image_reconstructed.reshape(height, width, channels)

# Convert the image matrix back to an image object
enhanced_image = Image.fromarray(image_reconstructed.astype(np.uint8))
```

In [18]:
```
# Save the enhanced image
enhanced_image_path = 'path_to_save_enhanced_image.jpg'  # Replace with the desired path to save the enhanced image
enhanced_image.save(enhanced_image_path)

# Display the enhanced image
enhanced_image.show()
```

Before:

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AFTER:

Faculty of Computing and Information Technology (FCIT) Department of Computing Indus University, Karachi

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Artificial Intelligence