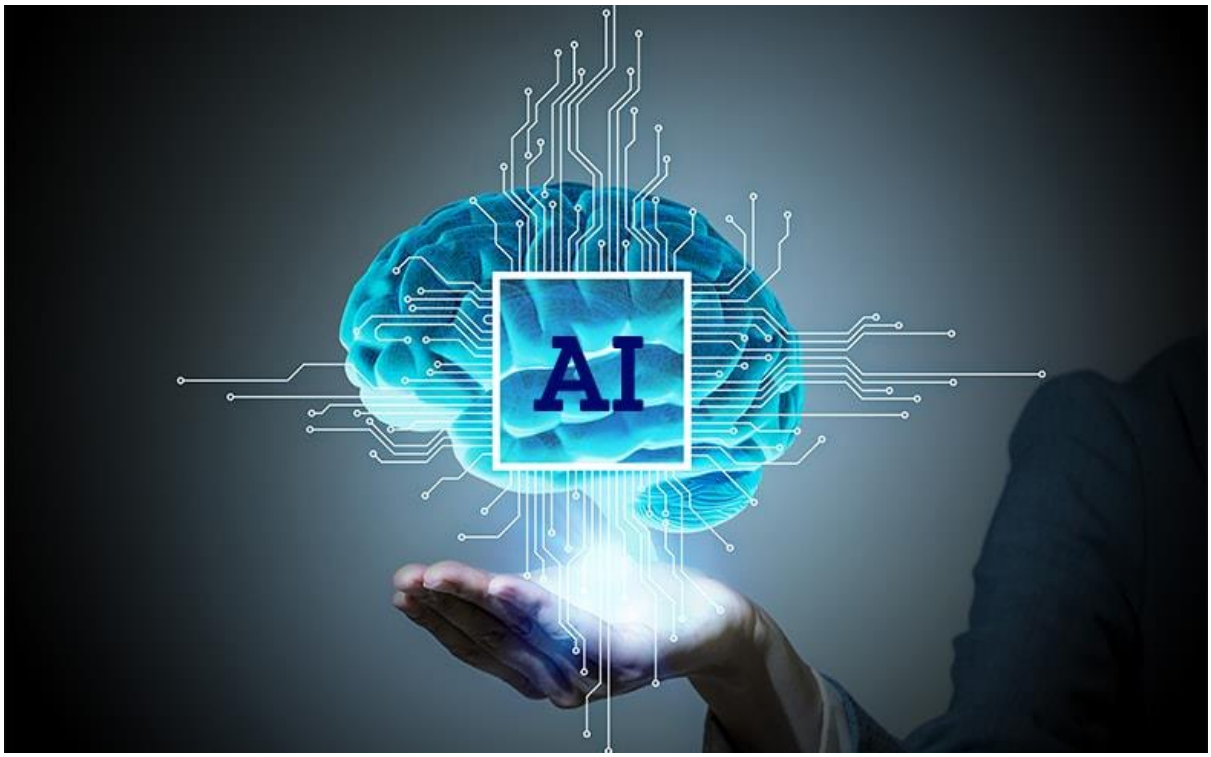

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Artificial Intelligence **(D)**

Assignment **03**

Results:

1. **Population Encoding:**

   Population is encoded as 3D array of size shape (100, 110, 77) where shape suggest 100 images of size 110x77. Why the size of image is 110x77, because input image is in this size. However, later on I am manipulating images in 1D array. Like population shape is (100, 8470).

2. **Fitness Function:**

   Fitness Function returns the sum of absolute difference of population images and resultant image. Value of fitness function for best solution is < 40000 when running for 50mins.

3. **Crossover and Mutation**:
   a. For Crossover, I randomly picked the pivot and two objects and changed swapped pixels until pivot. Finally add them to the new population.

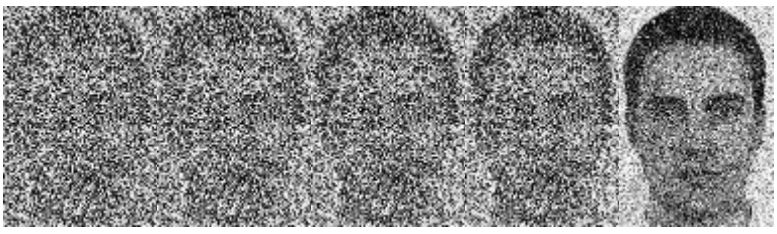
b. For Mutation, I applied the same concept of probability and gave 25% to every individual in population. Which individual get a chance to mutate, I simply randomize its one pixel. Selection of the pixel is also random.

4. **Population Size and Solution**:

   The initial population size is 100. Yes, the individual converges near to best solution.

5. **Selection Rate, Crossover Rate, Mutation Rate:**
   a. Selection Rate is 0.25
   b. Crossover Rate is 0.75
   c. Mutation Rate is 0.25
6. **Solution Cases:**
   a. Algorithm: Using only the fittest population.
      i. Generations: 60000
      ii. Cost: 9876

   b. Algorithm: Using the entire Population.
      i. Generations: 4000
      ii. Cost: 543222



   c. Algorithm: Using only the unfit population
      i. Generation: 1
      ii. Cost: 712002

iii. No images as did not run.