**Algorithms**

**LDA Algorithm**

1. Compute Mean vectors for the input features dataset (

Mean

1. Calculate the scatter matrices – within class(Sw) and between class(SB) matrices

M - Overall mean

1. Find linear discriminants by computing the eigen values for Sw-1 SB
2. Select the linear discriminants for the new feature set by sorting and choosing eigen vectors , with highest eigen values.
3. The new feature set obtained by the linear discriminants are then used to obtain transformed input dataset by following equation

**PCA Algorithm**

1. Compute Mean vectors for the input features dataset (

Mean

1. Calculate the scatter matrix – Covariance Matrix
2. Compute Eigen vectors and eigen values
3. Sort the eigen vectors in descending order ,
4. Project the principal components onto the input features dataset by using the below equation

**PCA+LDA Algorithm Pseudo Code 🡪Used in our proposed algorithm**

1. Compute Mean vectors for the input features dataset (

Mean

1. Calculate the scatter matrix – Covariance Matrix
2. Compute Mean vectors for the principal components (

Mean

1. Calculate the scatter matrices – within class(Sw) and between class(SB) matrices

M - Overall mean

1. Find linear discriminants by computing the eigen values for
2. Select the linear discriminants for the new feature set by sorting and choosing eigen vectors , with highest eigen values.
3. The new feature set obtained by the linear discriminants are then used to obtain transformed input dataset by following equation

**ALO Algorithms**

1. Initialize population of ants and antlions randomly,
2. Compute the best fitness for both antlions and ants
3. Determine best fit antlions and label them as elite
4. While

For

Each ant:

Choose a antlion by Roulette Wheel

Compute random walks

Normalize

Update Ant Position

End for

Calculate ant fitness

Replace antlions by their fittest counterparts

Update Elite antlions

End while

1. Return antlion\_fitness

**Equation for Random walks of ants**

**For replacing antlion**

**Elitism:**