**Master**

1. **Driver**
   - Initialize the settings (set the attribute of MapReduce and algorithm-related parameters)
   - Generate input document and send it to the HDFS

2. **Mapper**
   - If (iteration = 0) Then
     - Initialize particles of iGA-PSO
   - Else
     - Update positions and velocity for each particle; Calculate fitness; Update p_best and its position;

3. **Reducer**
   - Shuffling (gene-id as the key-id)
   - If (iteration = migration) Then
     - Exchange particles among islands
   - Else
     - Perform GA operators (within each island): selection, crossover, mutation; Update g_best and its position;

4. **Reduce**
   - Until termination
   - Generate output document

**Slave(s)**

- Read result from HDFS at the final iteration
- Output dataset to the HDFS

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HDFS Files Database

particle data #1

particle data #2

particle data #3

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