# Algorithm Ranking and Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Rank | Algorithm | MAE vs MeanShift (%) | MAE vs GT (%) | Reason |
| 1 | PSO | 7.70 (Best) | 4.34 (Best) | Best For: Global search, single-objective tasks (e.g., fat area estimation). Avoid For: Multi-objective/discrete problems. Lowest errors due to swarm intelligence balancing individual and global bests. |
| 2 | GE | 9.50 | 7.01 | Best For: Medium-complexity problems. Avoid For: High-dimensional spaces. Second-best GT alignment due to balanced exploration/exploitation. |
| 3 | DE | 13.49 | 11.48 | Best For: Multi-objective/noisy landscapes. Avoid For: Fast-convergence needs. Moderate here (single-objective focus) but outperforms ACO against GT. |
| 4 | ACO | 15.23 | 9.79 | Best For: Discrete/combinatorial tasks (e.g., pathfinding). Avoid For: Continuous/high-dimensional spaces (e.g., image segmentation). High MeanShift error due to niche focus. |
| 5 | GP | 18.47 (Worst) | 14.73 (Worst) | Best For: Symbolic/model-based problems. Avoid For: Simple parameter optimization. Poor performance here due to task simplicity. |