Work

We want to perform segmentation.

The bat algorithm (BA) is a nature-inspired metaheuristic algorithm. It

Four main parameters are involved in the standard BA: pulse frequency, pulse rate, velocity, and a constant. For the standard BA, it is difficult to find a balance between global search and local search, which leads to a slow convergence rate. To solve this problem, Gandomi and Yang [[26](https://onlinelibrary.wiley.com/doi/10.1155/2020/9495281#bib-0026)] introduced chaos into the standard BA (CBA) to increase its global search mobility for robust global optimization.

The BA is inspired by the echolocation behavior of bats when sensing distances. When bats hunt at night, they typically emit short, loud sound impulses and listen to the echo bouncing back from an obstacle or prey. A bat can use its special auditory mechanism to identify the size and position of the object.