

ABSTRAK

Dinas Pendidikan, Pemuda, dan Olahraga Kabupaten Magelang, khususnya pada bidang pendidikan Sekolah Dasar Negeri, mengalami permasalahan dalam penempatan guru. Dengan harapan kinerja guru terjaga, total jarak terpendek antara guru dan sekolah digunakan untuk menilai efektivitas penempatan guru. Masalah ini sulit dipecahkan karena ada begitu banyak kombinasi dalam menata guru dan sekolah. Dalam ilmu sains, masalah ini termasuk *NP-complete* yang sulit dipecahkan atau membutuhkan waktu yang sangat lama untuk diselesaikan menggunakan metode tradisional. Penggunaan Algoritma Genetika adalah pilihan lain untuk menyelesaikan masalah ini. Penelitian ini mengembangkan Algoritma Genetika Hibrida agar mampu meningkatkan kualitas solusi.

Data yang digunakan dalam penelitian ini bersumber dari Dinas Pendidikan, Pemuda, dan Olahraga Kabupaten Magelang dengan jumlah 106 data sekolah dan 636 data guru. Penelitian ini menggunakan *single point crossover* sebagai operator kawin silang, *scramble* mutasi sebagai operator mutasi dan *roulette wheel* sebagai operator seleksi *parents*. Pada penelitian ini dilakukan perbandingan antara algoritma genetika murni tanpa pencarian lokal, algoritma genetika hibrida menggunakan *reverse local search* (AGH-RLS), algoritma genetika hibrida menggunakan *insert local search* (AGH-ILS), dan algoritma genetika hibrida menggunakan *swap local search* (AGH-SLS). Kinerja gabungan dari operator-operator ini diukur berdasarkan nilai total jarak minimum.

Berdasarkan percobaan dapat disimpulkan bahwa jarak total algoritma genetika hibrida lebih baik dari algoritma genetika murni dalam menemukan solusi optimal, kemudian kombinasi *reverse local search* memberikan nilai total jarak minimum lebih baik dibandingkan algoritma genetika hibrida lainnya yaitu 11370,488 Km.

Kata kunci: Penempatan guru, Optimasi, Algoritma Genetika Hibrida, Algoritma Pencarian Lokal

ABSTRACT

Department of Education, Youth, and Sports of Magelang Regency, especially in the field of public elementary school education, experienced problems in teacher placement. With the expectation of maintained teacher performance, the shortest total distance between teachers and schools was used to assess the effectiveness of teacher placement. This problem is difficult to solve because there are so many combinations in organizing teachers and schools. In science, these problems include NP- completes that are difficult to solve or take a very long time to solve using traditional methods. The use of Genetic Algorithms is another option to solve this problem. This research develops a hybrid genetic algorithm to improve the quality of solutions.

The data used in this study were sourced from Department of Education, Youth, and Sports of Magelang Regency and consisted of 106 school data and 636 teacher data. The study utilized single-point crossover as the crossover operator, scramble mutation as the mutation operator, and roulette wheel as the *parents* selection operator. A comparison was made between pure genetic algorithms without local searches, hybrid genetic algorithms using reverse local search (AGH-RLS), hybrid genetic algorithms using insert local search (AGH-ILS), and hybrid genetic algorithms using swap local search (AGH-SLS) in this study. The combined performance of these operators was measured based on the minimum total distance value.

Based on the experiment, it can be concluded that the total distance of the hybrid genetic algorithm is better than that of the pure genetic algorithm in finding the optimal solution. Furthermore, the combination of reverse local search provides a minimum total distance value that is better than other hybrid genetic algorithms, which is 11,370.488 kilometers.

Keywords: Teacher placement, Optimization, Hybrid Genetic Algorithm, Local Search Algorithm