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EFFECT OF NEGATIVE CAMPAIGN STRATEGY OF ELECTION ALGORITHM IN SOLVING OPTIMIZATION PROBLEM

(Kesan Strategi Kempen Negatif dalam Al-Khwarizmi Pemilihan dalam Menyelesaikan Masalah Pengoptimuman)

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ABSTRACT

Election algorithm (EA) is an optimization technique based on minimization and coalition operations to solve competition among neurons. The Election algorithm gives the best individual of the population by enhancing both minimization and coalition operations while local search gives the best local solutions by testing all neighbouring solutions. Negative campaign mechanism is one of the most important mechanism in EA for its impact on the diversification and overcoming premature convergence of the entire search space towards optimal searching. The challenging task lies in selecting the appropriate negative campaigning operator that leads to optimal searching in a reasonable amount of time. The decision then becomes more difficult and needs more trial and error to find the best negative campaigning operator. This paper investigates the effect of negative campaign operators in enhancing the performance of EA based on the Travelling Salesman Problem (TSP). New negative campaign operator has been proposed based on selecting the best voter to be replaced. Experiments were conducted on the TSP to evaluate the proposed methods. The proposed mechanism was compared with other negative campaign operators. The result reveals the significant enhancement of the EA performance based on the proposed method in TSP problem.

*Keywords***:** negative campaign strategy; random supporters; furthest supporters; nearest supporters

ABSTRAK

Al-Khwarizmi pemilihan (EA) adalah teknik pengoptimuman berdasarkan pengoptimuman dan gabungan operasi untuk menyelesaikan persaingan di antara neuron. EA menghasilkan individu populasi terbaik dengan meningkatkan peminimuman dan operasi gabungan manakala pencarian tempatan memberikan penyelesaian tempatan yang terbaik dengan menguji kesemua penyelesaian jiranan. Mekanisme kempen negatif adalah satu daripada mekanisme terpenting dalam EA kerana kesannya terhadap kepelbagaian dan mengatasi penumpuan pramatang pada keseluruhan ruang carian ke arah pencarian yang optimum. Tugas yang mencabar terletak pada pemilihan operator kempen negatif yang sesuai yang mengarah kepada pencarian optimum dalam jangka masa yang sewajarnya. Keputusan itu kemudian menjadi lebih sukar dan memerlukan lebih banyak cuba jaya untuk mencari pengendali kempen negatif yang terbaik. Artikel ini menyelidik pengaruh pengendaliaan kempen negatif dalam meningkatkan prestasi EA berdasarkan kepada masalah Jurujual Mengembara (TSP). Pengendali kempen negatif baharu telah dicadangkan berdasarkan pemilihan pemilih terbaik untuk digantikan. Eksperimen dilakukan terhadap masalah TSP untuk menilai kaedah yang dicadangkan. Mekanisme yang dicadangkan dibandingkan dengan pengendali kempen negatif yang lain. Hasil menunjukkan peningkatan dalam prestasi EA yang signifikan berdasarkan kepada kaedah yang dicadangkan untuk masalah TSP.

Kata kunci: strategi kempen negatif; penyokong rawak; penyokong paling jauh; penyokong terdekat

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Effect of negative campaign strategy of election algorithm in solving optimization problem

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