

INTISARI

Hybrid Clustering SOM–KMeans dan TOPSIS dalam Pemilihan Saham Terbaik untuk Optimisasi Portofolio dengan Slime Mould Algorithm

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Peningkatan minat investasi saham di Indonesia, khususnya di kalangan generasi muda, diiringi dengan tingginya risiko pasar dan kebutuhan akan strategi pengelolaan portofolio yang lebih optimal. Seiring perkembangan pesat algoritma optimisasi, khususnya algoritma metaheuristik, pendekatan klasik seperti mean-variance dinilai memiliki keterbatasan dalam menangani kompleksitas data pasar. Penelitian ini mengintegrasikan *Hybrid Clustering Self-Organizing Map–K-Means* dan metode *Technique for Order Preference by Similarity to Ideal Solution* (TOPSIS) sebagai tahap pra-seleksi saham, dengan kualitas kluster dievaluasi menggunakan *Silhouette Score*, *Davies–Bouldin Index*, dan *Calinski–Harabasz Index*. Selanjutnya, pembentukan portofolio dilakukan menggunakan *Slime Mould Algorithm* (SMA) dan dibandingkan dengan *Minimum Variance Portfolio* (MVP), *Constrained Minimum Variance Portfolio* (CMVP) yang dioptimisasi dengan *Genetic Algorithm*, dan *Particle Swarm Optimization*. Kinerja portofolio dievaluasi menggunakan *Sharpe Ratio*, *Treynor Ratio*, dan *Jensen’s Alpha* pada saham-saham indeks LQ45. Hasil penelitian menunjukkan bahwa klaster terbaik berdasarkan TOPSIS menghasilkan saham BBRI, ICBP, INDF, KLBF, dan TPIA yang mampu memaksimalkan *return*, meminimumkan risiko, serta memiliki *skewness* positif, dan optimisasi portofolio membuktikan bahwa *Slime Mould Algorithm* memberikan performa terbaik dibandingkan metode pembandingan.

ABSTRACT

Hybrid Clustering SOM–KMeans and TOPSIS in Selecting the Best Stocks for Portfolio Optimization with the Slime Mould Algorithm

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The increasing interest in stock investment in Indonesia, particularly among younger generations, is accompanied by high market risk and the need for more optimal portfolio management strategies. Along with the rapid development of optimization techniques, especially metaheuristic algorithms, classical approaches such as the mean–variance model are considered to have limitations in handling the complexity of financial market data. This study integrates Hybrid Clustering using Self-Organizing Map–K-Means and the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) as a stock pre-selection stage, with clustering quality evaluated using the Silhouette Score, Davies–Bouldin Index, and Calinski–Harabasz Index. Furthermore, portfolio construction is performed using the Slime Mould Algorithm (SMA) and compared with the Minimum Variance Portfolio (MVP), Constrained Minimum Variance Portfolio (CMVP) optimized using Genetic Algorithm, and Particle Swarm Optimization. Portfolio performance is evaluated using the Sharpe Ratio, Treynor Ratio, and Jensen’s Alpha on stocks included in the LQ45 index. The results indicate that the best cluster selected by TOPSIS yields stocks BBRI, ICBP, INDF, KLBF, and TPIA, which are able to maximize returns, minimize risk, and exhibit positive skewness, and that portfolio optimization demonstrates the superior performance of the Slime Mould Algorithm compared to the benchmark methods.