

ABSTRAK

Pengelolaan data klimatologi memerlukan penyajian informasi yang mampu menggambarkan pola dan karakteristik data secara jelas sehingga dapat mendukung proses analisis di Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) Sultan Mahmud Badaruddin II Sumatera Selatan. Penyajian data dalam bentuk tabel masih menyulitkan pengguna dalam mengidentifikasi kecenderungan maupun hubungan antarparameter klimatologi. Untuk mengatasi permasalahan tersebut, dikembangkan sebuah Sistem *Dashboard* Analitik Klimatologi Berbasis *Web* yang mengintegrasikan pengelolaan data, analisis, dan visualisasi dalam satu platform. Sistem dibangun menggunakan metode *Waterfall* dengan memanfaatkan Laravel, React.js, dan MySQL. Analisis dilakukan menggunakan metode *K-Means Clustering* dan *Hierarchical Clustering*, dengan *Elbow Method* sebagai penentu jumlah *cluster* dan *Silhouette Score* sebagai evaluasi kualitas hasil pengelompokan. Data yang dianalisis meliputi suhu udara, kelembapan, dan curah hujan yang diperoleh dari BMKG Sultan Mahmud Badaruddin II Sumatera Selatan. Implementasi sistem menghasilkan *dashboard* yang mampu menyajikan hasil *clustering* dalam bentuk scatter plot, heatmap, dendrogram, serta laporan analisis yang dilengkapi fitur validasi oleh pimpinan. Kehadiran sistem ini memberikan penyajian informasi klimatologi yang lebih terstruktur, mudah dipahami, serta dapat mendukung proses analisis dan pengambilan keputusan di lingkungan BMKG.

Kata kunci: *Dashboard* Analitik, Klimatologi, *K-Means Clustering*, *Hierarchical Clustering*, Data Mining.

ABSTRACT

The management of climatological data requires an information presentation that clearly illustrates data patterns and characteristics to support analytical activities at the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) Sultan Mahmud Badaruddin II Sumatera Selatan. Presenting climatological data in tabular form often makes it difficult for users to identify trends and relationships among climatological variables. To address this issue, a web-based Climatology Analytics Dashboard System was developed by integrating data management, analytical process, and data visualization into a single platform. The system was developed using the Waterfall software development methodology with Laravel, React.js, and MySQL as the main technologies. Data analysis was performed using the K-Means Clustering and Hierarchical Clustering methods. The Elbow Method was applied to determine the optimal number of clusters, while the Silhouette Score was used to evaluate clustering performance. The dataset consisted of air temperature, humidity, and rainfall records obtained from the Sultan Mahmud Badaruddin II Meteorological Station of BMKG South Sumatra. The implemented system successfully provides interactive visualizations, including scatter plots, heatmaps, dendrograms, and analytical reports equipped with a report validation feature by management. The system offers a more structured and informative presentation of climatological data, enabling users to better understand climate patterns and supporting decision-making process within BMKG.

Keywords: Analytics Dashboard, Climatology, K-Means Clustering, Hierarchical Clustering, Data Mining.