JAUZA GAMA ZAIDAAN – 22.240.0095
IMPLEMENTASI DATA MINING MENGGUNAKAN ALGORITMA K-MEANS CLUSTERING UNTUK ANALISA POLA PELANGGARAN LALU LINTAS DI SATLANTAS POLRES KOTA PEKALONGAN
dibawah bimbingan Era Yunianto, M.Kom., dan Hari Agung Budijanto, M.Kom.

ABSTRAK

Data pelanggaran di Satlantas Polres Pekalongan saat ini belum dimanfaatkan maksimal untuk analisis strategis. Penelitian ini bertujuan mengimplementasikan algoritma K-Means Clustering guna menganalisis pola pelanggaran lalu lintas. Sasaran utamanya adalah membangun dashboard interaktif yang memvisualisasikan wilayah rawan, sehingga membantu kepolisian menentukan strategi penegakan hukum yang lebih objektif dan efektif.Penelitian menggunakan metode Knowledge Discovery in Database (KDD) dengan data tilang Agustus 2024. Algoritma K-Means Clustering diterapkan untuk pengelompokan data, dievaluasi menggunakan Silhouette Score. Pengembangan sistem dilakukan dengan bahasa Python dan framework Streamlit untuk menghasilkan visualisasi peta interaktif dan laporan analisis pola pelanggaran secara otomatis.Terbentuk 3 cluster pelanggaran dengan nilai Silhouette Score 0,3012. Cluster 1 mendominasi (220 data) dengan mayoritas pelanggaran sepeda motor tanpa STNK, disusul Cluster 2 (147 data) dan Cluster 0 (98 data). Dashboard mampu memvisualisasikan sebaran titik rawan berdasarkan lokasi, waktu, dan jenis kendaraan secara akurat. Hasil User Acceptance Testing (UAT) menunjukkan aplikasi mudah digunakan dengan navigasi jelas, proses unggah data lancar, visualisasi clustering sangat membantu (terutama warna peta untuk perbedaan wilayah), laporan analisis lengkap untuk bahan bulanan, serta proses analisis cepat (3-5 menit) dan stabil. Secara keseluruhan, sistem ini dapat digunakan untuk analisis pelanggaran lalu lintas secara visual dan terstruktur.

***Kata Kunci** : Data Mining, K-Means Clustering, Pelanggaran Lalu Lintas, Dashboard Interaktif, Silhouette Score.*

JAUZA GAMA ZAIDAAN – 22.240.0095
IMPLEMENTATION OF DATA MINING USING THE K-MEANS CLUSTERING ALGORITHM FOR ANALYSIS OF TRAFFIC VIOLATION PATTERNS AT THE TRAFFIC POLICE UNIT OF THE PEKALONGAN CITY POLICE
under the guidance of Era Yunianto, M.Kom., and Hari Agung Budijanto, M.Kom.

ABSTRACT

Traffic violation data at the Pekalongan Police Traffic Unit is currently not being fully utilized for strategic analysis. This study aims to implement the K-Means Clustering algorithm to analyze traffic violation patterns. The main objective is to build an interactive dashboard that visualizes high-risk areas, thereby assisting the police in determining more objective and effective law enforcement strategies. The study uses the Knowledge Discovery in Database (KDD) method with August 2024 traffic violation data. The K-Means Clustering algorithm is applied for data grouping, evaluated using the Silhouette Score. The system is developed using the Python language and the Streamlit framework to automatically generate interactive map visualizations and violation pattern analysis reports. Three violation clusters were formed with a Silhouette Score of 0.3012. Cluster 1 dominated (220 data points) with the majority of violations involving motorcycles without vehicle registration certificates, followed by Cluster 2 (147 data points) and Cluster 0 (98 data points). The dashboard was able to accurately visualize the distribution of hotspots based on location, time, and vehicle type. The results of User Acceptance Testing (UAT) show that the application is easy to use with clear navigation, smooth data upload processes, very helpful clustering visualizations (especially map colors for regional differences), comprehensive analysis reports for monthly materials, and fast (3-5 minutes) and stable analysis processes. Overall, this system can be used for visual and structured traffic violation analysis.

Keywords *: Data Mining, K-Means Clustering, Traffic Violations, Interactive Dashboard, Silhouette Score.*