

# Pengembangan Sistem Rekomendasi Pemuatan Barang dan Perencanaan Rute Pengiriman: Studi Kasus PT Paragon Technology and Innovation = Development of Goods Loading and Delivery Route Planning Recommendation System: Case Study PT Paragon Technology and Innovation

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## Abstrak

Dalam dunia industri, sistem perencanaan distribusi yang diterapkan merupakan faktor penting yang diharapkan dapat meningkatkan keuntungan dan efisiensi proses logistik suatu perusahaan. Hingga saat ini, PT Paragon Technology and Innovation mengatur proses logistik distribusi seluruh produk perusahaan secara mandiri melalui PT Parama Global Inspira. Namun, proses logistik hingga saat ini masih dilakukan secara manual oleh pegawai perusahaan yang mencakup penentuan muatan produk pada sebuah pengiriman dan pemilihan rute distribusi produk. Penelitian ini akan membandingkan 11 algoritma clustering dan 6 algoritma penyelesaian Bin Packing Problem (BPP) dan Vehicle Routing Problem with Time Windows (VRPTW). Implementasi algoritma akan bertujuan untuk memberikan rekomendasi pemuatan barang dan perancangan rute pengiriman. Penelitian berhasil memperoleh algoritma dengan performa terbaik yaitu Mean Shift dan First Fit Nearest Neighbor. Penelitian ini juga berhasil mengimplementasikan sistem berbasis website untuk digunakan PT Paragon Technology and Innovation dalam mengolah data order menjadi rekomendasi pemuatan barang dan perancangan rute pengiriman. Sistem tersebut dirancang oleh komponen UI/UX, pemrograman frontend, dan pemrograman backend.

.....In the industrial world, the distribution planning system is an important factor that is expected to increase the profits and efficiency of a company's logistics processes. Until now, PT Paragon Technology and Innovation manages the logistics process for distributing the company's products independently through PT Parama Global Inspira. However, the logistics process is currently still carried out manually by company employees, which includes determining product cargo for a delivery and selecting product distribution routes. This research will compare 11 clustering algorithms and 6 Bin Packing Problem (BPP) and Vehicle Routing Problem with Time Windows (VRPTW) solving algorithms. The implementation of the algorithm will aim to provide recommendations for goods loading and delivery route planning. The research succeeded in obtaining algorithms with the best performance, namely Mean Shift and First Fit Nearest Neighbor. This research also succeeded in implementing a website-based system for use by PT Paragon Technology and Innovation in processing order data into recommendations for goods loading and delivery route planning. The system is designed by UI/UX components, frontend programming, and backend programming.