SEGMENTATION USING CUSTOMER LIFETIME VALUE HYBRID K-MEANS AND ANALYTIC HIERARCHY PROCESS

THESIS

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ABSTRACT

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Developing predictive analytics based on understanding customers' electricity consumption patterns is essential to effectively manage the increasing electricity demand. This study presents a hybrid approach to customer segmentation by combining K-Means clustering, the concept of customer lifetime value, and an analytic hierarchy process to better understand customers' electricity consumption behaviour. We use K-Means clustering to identify initial market segments. Next, we evaluate and validate the customer segmentation results using the customer lifetime value concept and the analytical hierarchy process. Segment 1 has 282 business customers with a total capacity of 938,837 kWh, peak load usage of 27,827 kWh, and non-peak load of 115,194. In segment 2, there are 508 customers with a total capacity of 938,837 kWh, a peak load usage of 27,827 kWh, and a non-peak load of 115,194. In segment 2, there are 508,615 business customers with a total power of 4,260 kWh, then a peak load of 35 kWh and a non-peak load of 544. In segment 3, there are 37 business customers with a total power of 2,226,351 kWh, then a peak load of 123,297 kWh and a non-peak load of 390,803. Strategies to be taken based on the segmentation of these three customers will be integrated with CRM. For the least profitable segment, we propose an ongoing partnership program to encourage increased electricity consumption during non-peak periods and retail account marketing. For profitable and medium profitable customers, we propose a premium business to business approach that can accommodate their increased energy consumption without excessive electricity usage during peak periods. This approach will be supported by dedicated executive accounts for these customers.

Keywords: Customer Analytics, Electricity, Customer Lifetime Value, Customer Relationship Management, K-Means Clustering, Analytical Hierarchy Process.

ABSTRAK

SEGMENTASI BERBASIS CUSTOMER LIFETIME VALUE DENGAN TEKNIK HYBRID K-MEANS DAN ANALYTIC HIERARCHY PROCESS

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Mengembangkan analisis prediktif berdasarkan pemahaman pola konsumsi listrik pelanggan sangat penting untuk mengelola permintaan listrik yang meningkat secara efektif. Studi ini menyajikan pendekatan hibrida untuk segmentasi pelanggan dengan menggabungkan teknik clustering K-Means, konsep customer lifetime value, dan proses hierarki analitik untuk lebih memahami perilaku konsumsi listrik pelanggan. Kami menggunakan K-Means clustering untuk mengidentifikasi segmen pasar awal. Selanjutnya, kami mengevaluasi dan memvalidasi hasil segmentasi pelanggan dengan menggunakan konsep nilai seumur hidup pelanggan dan proses hirarki analitis. Segmen 1 memiliki 282 pelanggan bisnis dengan total kapasitas 938.837 kWh, penggunaan beban puncak 27.827 kWh, dan beban non puncak 115.194. Pada segmen 2, terdapat 508 pelanggan dengan total kapasitas 938.837 kWh, penggunaan beban puncak 27.827 kWh, dan beban non puncak 115.194. Pada segmen 2 terdapat 508.615 pelanggan bisnis dengan total daya sebesar 4.260 kWh, kemudian beban puncak sebanyak 35 kWh dan beban non puncak sebanyak 544. Pada segmen 3, terdapat 37 pelanggan bisnis dengan total daya sebesar 2.226.351 kWh, kemudian beban puncak sebanyak 123,297 kWh dan beban non puncak sebanyak 390. 803.Strategi yang akan diambil berdasarkan segmentasi tiga pelanggan ini akan diintegrasikan dengan CRM. Untuk segmen yang paling tidak menguntungkan, kami mengusulkan program kemitraan yang berkelanjutan untuk mendorong peningkatan konsumsi listrik selama periode non puncak dan pemasaran akun ritel. Untuk pelanggan yang menguntungkan dan sedang menguntungkan, kami mengusulkan pendekatan premium business to business yang dapat mengakomodasi peningkatan konsumsi energi mereka tanpa penggunaan listrik yang berlebihan pada periode puncak. Pendekatan ini akan didukung oleh rekening eksekutif khusus untuk pelanggan-pelanggan tersebut.

Keywords: Customer Analytics, Electricity, Customer Lifetime Value, Customer Relationship Management, K-Means Clustering, Analytical Hierarchy Process.

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