

CONSUMER ACCEPTANCE AND PERCEPTIONS OF ELECTRIC VEHICLES IN MALAYSIA USING SENTIMENT ANALYSIS (Penerimaan dan Persepsi Pengguna Terhadap Kenderaan Elektrik di Malaysia Menggunakan Analisis Sentimen)

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ABSTRACT

Despite the excitement around electric automobiles, Electric Vehicles (EVs) in Malaysia are still relatively new compared to more advanced markets such as European countries. To understand Malaysian acceptance and perception of EVs, this study uses sentiment analysis to ascertain whether Malaysians view and utilise EVs positively or negatively. The dataset is scrapped data collected from comments on YouTube with Term Frequency-Inverse Document Frequency (TF-IDF) as the feature extraction method. The machine learning algorithm, support vector machine (SVM), is then created to automatically identify and classify comments about EV acceptance and perception. Key performance indicators, including accuracy, precision, and recall percentages, are used to assess the algorithm's performance. Results reveal that for the sentiment distribution, there is 55% positive and only 14% negative sentiment, while the remaining is neutral. The main concerns identified are battery, charging station, and price. The classification was further analysed, and the result suggests that SVM with TF-IDF feature extraction offered 85.18% accuracy in classifying the sentiment. The result of this study provides nuanced insights into public opinions regarding EVs in Malaysia by seamlessly integrating machine learning and sentiment analysis. The findings will have substantial implications for researchers in the sustainable transportation sector, policymakers, and industry stakeholders.

Keywords: electric vehicles; sentiment analysis; classification; machine learning; perceptions

ABSTRAK

Di sebalik keterujaan mengenai kereta elektrik, Kenderaan Elektrik (EV) di Malaysia masih agak baharu berbanding pasaran yang lebih maju seperti negara Eropah. Bagi memahami penerimaan dan persepsi Malaysia terhadap EV, kajian ini menggunakan analisis sentimen untuk memastikan sama ada rakyat Malaysia melihat dan menggunakan EV secara positif atau negatif. Set data adalah data yang dikikis daripada ulasan di YouTube dengan *Term Frequency-Inverse Document Frequency* (TF-IDF) sebagai kaedah pengekstrakan ciri. Algoritma pembelajaran mesin, Mesin Vektor Sokongan (SVM) kemudiannya dibangunkan untuk mengenal pasti dan mengklasifikasikan ulasan secara automatik tentang penerimaan dan persepsi EV. Penunjuk prestasi utama, termasuk kejituan, kepersisan dan peratusan imbas kembali, digunakan untuk menilai prestasi algoritma. Keputusan menunjukkan bahawa untuk taburan sentimen, terdapat 55% positif dan hanya 14% sentimen negatif, manakala selebihnya adalah neutral. Kebimbangan utama yang dikenal pasti ialah bateri, stesen pengecasan dan harga. Klasifikasi telah dianalisis selanjutnya, dan hasilnya menunjukkan bahawa SVM dengan pengekstrakan ciri TF-IDF menawarkan ketepatan 85.18% dalam mengklasifikasikan sentimen. Hasil kajian ini memberikan pandangan yang lebih mendalam tentang pendapat umum mengenai EV di Malaysia dengan mengintegrasikan pembelajaran mesin dan analisis sentimen dengan lancar. Penemuan ini akan mempunyai implikasi yang besar kepada penyelidik dalam sektor pengangkutan mampan, penggubal dasar dan pihak berkepentingan industri.

Kata kunci: kenderaan elektrik; analisis sentiment; klasifikasi; pembelajaran mesin; persepsi

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