



# Battery function detection method

The function of  $e_1$  is used to ... A fault detection method of electric vehicle battery through Hausdorff distance and modified Z-score for real-world data. *J. Energy Storage*, 60 (2023), Article 106561. [View PDF](#) [View article](#) [View in Scopus](#) [Google Scholar](#) [19] J. Sun, S. Chen, S. Xing, et al.

First, a density-based semi-supervised cluster (DBSSC) method is proposed containing three novelties: the objective function is originally defined and a multilayer L-shaped ...

The analysis and detection method of charge and discharge characteristics of lithium battery based on multi-sensor fusion was studied to provide a basis for effectively evaluating the application performance. Firstly, the working principle of charge and discharge of lithium battery is analyzed. Based on single-bus temperature sensor DS18B20, differential D ...

To address the challenge posed by traditional target detection methods, particularly their inefficiency in detecting small targets within lithium battery electrode defect detection, this study introduces an innovative model: ...

Wu et al. [13] performed health monitoring on lithium-ion batteries with ultrasonic reflection method and data fusion technology. It achieved battery aging assessment and early fault diagnosis. Obviously, the existing ultrasonic detection methods can predict battery SOC by observing the changes in TOF and amplitude of ultrasonic echoes.

Battery defect detection based on the abnormality of external parameters is a promising way to reduce this kind of thermal runaway accidents and protect EV consumers from fire danger. However, the influence of temperature and EV states, i.e., charging and driving, on the battery characteristic will complicate the method establishment.

In this article, an online multifault diagnosis strategy based on the fusion of model-based and entropy methods is proposed to detect and isolate multiple types of faults, including current, ...

1 &#0183; Traditional battery fault detection methods are fundamentally based on physical and chemical models that aim to replicate the battery's internal mechanisms, thereby predicting its performance outcomes and pinpointing potential fault scenarios [24,25,26]. These models stand out for providing a solid theoretical basis and a high level of ...

Table 1: Battery test methods for common battery chemistries. Lead acid and Li-ion share communalities by keeping low resistance under normal condition; nickel-based and primary batteries reveal end-of-life by elevated internal resistance. At a charge efficiency of 99 percent, Li-ion is best suited for digital battery estimation.



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Defect detection of product surface can be made manually or automatically utilizing pattern recognition. Traditional methods usually suffer from low efficiency, high cost, sensitivity to environmental changes, and low detection accuracy. This paper proposes a deep convolutional neural network (DCNN) approach for battery panel defect detection. The training data can be ...

In battery packs, these methods may no longer be applicable, because not all LIBs are equipped with current sensors and it is impractical to establish an accurate model for each battery. ... implying that the ISC resistance calculation method may have the function of the ISC detection. But exactly, we cannot use only the ISC resistance ...

More than 30% of electric vehicle accidents are caused by the battery system; hence, it is vital to investigate the fault diagnosis method of lithium-ion battery packs.

Gao et al. proposed a fault detection method for the micro-short circuit, using the cell difference model and extended Kalman filters to estimate the cell SOC differences. The extra depleting current is identified with RLS to ...

The data-driven battery fault diagnosis method generally does not require a complicated modeling process or the establishment of complex determination rules, but only needs to use the collected dynamic parameters of the battery for fault analysis and develop some fault detection algorithms using the extracted fault features to complete the ...

Taking into account the nonlinearity of the battery pack and the detection accuracy, an equivalent model for battery pack insulation detection is established, and the double Kalman filter algorithm is used to identify the model parameters, which solves the problem that the convergence ability of the commonly used recursive least squares method ...

Targeting the issue that the traditional target detection method has a high missing rate of minor target defects in the lithium battery electrode defect detection, this paper proposes an improved and optimized battery electrode defect detection model based on YOLOv8. Firstly, the lightweight GhostConv is used to replace the standard convolution, and the ...

Experimental results on a real battery test platform show that the proposed method significantly outperforms existing CC-based methods in terms of fault detection latency, fault detection rate ...

The method uses the battery voltage signals' intrinsic mode functions which are computed by a variational mode decomposition algorithm in an outlier detection system. The outliers are categorized via density-based clustering with a Laplacian Eigen-mapping dimension reduction, and a dimensionless indicator of the voltage data.

Ting Cai et al. / IFAC PapersOnLine 53-2 (2020) 12491-12496; EUR"12496 12493 Cai et al. (2019a), for a



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battery storage drum, a gas detection method targeted at CO<sub>2</sub> concentrations shows a much faster detection speed than that from temperature monitoring at the drum surface.

Battery failure has traditionally been a major concern for electric vehicle (EV) safety, and early fault diagnosis will reduce many EV safety accidents. However, the short-circuit signal is generally very weak, so it is still a challenge to achieve a timely warning of battery failure. In this paper, an initial microfault diagnosis method is proposed for the data of electric vehicles ...

Li et al. [22] investigated a fault detection method based on the intraclass correlation coefficient (ICC), which calculates the ICC value from the non-trending voltage ...

Fault detection/diagnosis has become a crucial function of the battery management system (BMS) due to the increasing application of lithium-ion batteries (LIBs) in highly sophisticated and high-power applications to ensure the safe and reliable operation of the system. The application of Machine Learning (ML) in the BMS of LIB has long been adopted ...

Targeting the issue that the traditional target detection method has a high missing rate of minor target defects in the lithium battery electrode defect detection, this paper proposes an improved and optimized battery ...

As well as SOC, SOH detection method can be applied in various ways. Here, we overview two R cur detection methods that are conventionally carried out as a characteristic evaluation of the batteries. Two examples of traditional methods for detecting internal resistance of a battery are given in Table 2 [1, 5, 6]. One method obtains measurement data of current I ...

The battery parameter detection method is based on the simple approach, which is described in [32, 33]. According to Figure 3,  $R_i$  is electrolyte resistance and  $R_{ct}$  and  $C_{dl}$  are equivalent circuit elements for modelling of polarization effect [ 34, 35 ].

To realize a stable supply of electric power in an automobile, an accurate and reliable detection method of SOC (state-of-charge) in a lead acid battery is required. However the dynamics of the battery is very complicated. The characteristics of the battery greatly change due to its degradation. Moreover a automobile has many driving patterns, which are unknown ...

The data-driven fault diagnosis method mainly analyzes and processes the operation data of the system, extracts the characteristic parameters reflecting battery faults, ...

This work proposes a novel data-driven method to detect long-term latent fault and abnormality for electric vehicles (EVs) based on real-world operation data. Specifically, ...

The statistical analysis method sets detection thresholds based on the battery operating data, and captures fault characteristics by analyzing abnormal changes in battery ...



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