Battery positioning device disassembly

How to design a battery disassembly system?

The design of the disassembly system must consider the analysis of potentially explosive atmospheres (ATEX) 1 of the area around the battery pack and, if necessary, adopt tools enabled to work in the corresponding ATEX zone.

How does a battery disassembly process work?

Based on the review of several literature sources, Tan et al. divided the battery disassembly process at the module-level into four steps. It starts with removing the battery casing, followed by the extraction of the battery management system (BMS), power electronics, and the thermal management system.

How difficult is it to automate battery disassembly?

However, the current lack of standardisation in design remains a significant barrier to automating battery disassembly . Additionally, the uncertain conditions of end-of-life or damaged EVBs add to the complexity of executing the disassembly process effectively.

How can AI detect battery disassembly?

The proposed framework comprises the physical HRCD cell for battery disassembly and its digital twin. A 3D camera percepts the physical twin to detect the poses of the human worker and the positions of objects; combined with DSP, this information enables AI to recognise the disassembly phases.

How do you disassemble a battery pack?

To conduct the operations,destructive disassemblyhas been a prevailing practice. The disassembly phase of the battery pack includes cutting cable ties,cutting cooling pipes,and cutting bonded battery modules and the battery bottom cover for separation .

What are the different types of battery disassembly?

According to the degree of automation,the battery disassembly process can be divided into several categories,namely manual disassembly,semi-automatic disassembly,and fully automated disassembly. Automated disassembly has gradually become a significant trend since there are certain safety risks in the disassembly process.

This integrated approach can offer a flexible and adaptable solution for the disassembly of end-of-life vehicle power batteries, including the benefits like reducing the disassembly time, enhancing the flexibility of the ...

Wegener et al. [27] designed a novel HRC-based disassembly framework designed for the systematic disassembly of an Audi Q5 hybrid battery. The disassembly processes span from the battery pack to the battery cell. The framework meticulously delineates each disassembly operation, providing detailed insights into the involved tasks, disassembly ...

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The invention discloses a battery dismounting mechanism positioning method and device of battery replacement equipment, electronic equipment and a storage medium. The method is ...

Manual disassembly of the lithium-ion battery (LIB) modules of electric vehicles (EVs) for recycling is time-consuming, expensive, and dangerous for technicians or workers. Dangers associated with high voltage and thermal runaway make a robotic system suitable for the automated or semi-automated disassembly of EV batteries. In this paper, we explore battery ...

This paper analyses the use of robotics for EVs" battery pack disassembly to enable the extraction of the battery modules preserving their integrity for further reuse or recycling. The analysis highlights that a complete automatic disassembly remains difficult, while human-robot collaborative disassembly guarantees high flexibility and ...

Analysis of emerging concepts focusing on robotised Electric Vehicle Battery (EVB) disassembly. Gaps and challenges of robotised disassembly are reviewed, and future perspectives are presented. Human-robot collaboration in EVB processing is highlighted. The potential of artificial intelligence in improving disassembly automation is discussed.

Retired electric-vehicle lithium-ion battery (EV-LIB) packs pose severe environmental hazards. Efficient recovery of these spent batteries is a significant way to achieve closed-loop lifecycle management and a green circular economy. It is crucial for carbon neutralization, and for coping with the environmental and resource challenges associated with ...

AI-driven methods for planning battery disassembly sequences are examined, revealing potential efficiency gains and cost reductions. AI-driven disassembly operations are discussed, highlighting how AI can streamline ...

The invention discloses a battery dismounting mechanism positioning method and device of battery replacement equipment, electronic equipment and a storage medium. The method is applied to...

Based on the unique problems and challenges in the disassembly scenario of waste electric vehicle batteries (EVBs), we propose a knowledge-driven flexible human-robot ...

Disassembly automation generally refers to an automated system consisting of robot arms, equipped with disassembly tools, handling devices, and sensors. Automation is implemented in the disassembly process to address the problem in economic feasibility directly related to high labour costs, especially in developed

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countries. Disassembly automation can ...

Based on the unique problems and challenges in the disassembly scenario of waste electric vehicle batteries (EVBs), we propose a knowledge-driven flexible human-robot hybrid disassembly line. The disassembly line can not only split the EVB disassembling tasks layer by layer to the primitive-level subtasks based on knowledge but also ...

This paper presents a comprehensive survey of optimization developments in various aspects of electric vehicles (EVs). The survey covers optimization of the battery, including thermal, electrical, and mechanical aspects. The use of advanced techniques such as generative design or origami-inspired topological design enables by additive manufacturing is discussed, ...

Electric Vehicle Battery Disassembly Huaicheng Li 1,2, Hengwei Zhang 1, Yisheng Zhang 1, Shengmin Zhang 1, Yanlong Peng 1, Zhigang Wang 3, Huawei Song 4 and Ming Chen 1,* 1 School of Mechanical Engineering, Shanghai Jiaotong University, No. 800, Dongchuan Road, Shanghai 200240, China 2 School of Computer and Information Engineering, Central South ...

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