Call for Papers

Focused Section on

Real-time monitoring, diagnosis, and prognosis and health management for electric vehicles

Electric vehicles (EVs) represent one of the most promising technologies to green the transportation systems. To achieve zero carbon, many countries have set the timelines or are planning on the shift to EVs. For instance, in Norway, all new passenger cars and vans sold by 2025 should be zero emission vehicles. In the UK, sales of new petrol and diesel cars will end by 2030. All new vehicles sold in China must be powered by 'new-energy' by 2035. The USA will ban new car sales of diesel only and gasoline-only vehicles by 2035. As a result, EVs have become the development trend in the automotive industries around the world. EVs are composed of electric battery system, motor system, and electronic control system, which are safety-critical systems, therefore, there is a high demand to improve the operation performance, reliability, safety, and availability of the EVs by using real-time monitoring, fault diagnosis, fault prediction, and health management. Different from conventional automobiles, EVs have many alternatives in electric drive and control systems due to the different energy consumption types, leading to different fault types, accident types and accident causes. This has motivated ongoing research, but also brought challenges, for real-time monitoring, fault detection and diagnosis, fault prognosis and remaining useful life prediction, and health management for EVs.

It is evident that the key for promoting EVs is the battery, as the operation performance, safety, and reliability of the EVs are highly dependent on the batteries' performance and capabilities. As a result, it is paramount to develop health monitoring and prognosis techniques for electric vehicle batteries to improve the reliability and availability of the EVs. On the other hand, electronic control, and drive systems in EVs are also important to be real-time monitored, diagnosed, prognosed, so that appropriate control and management decisions can be taken to ensure a reliable operation performance of EVs. Thanks to large amount historical data and real-time data collected from a variety of sensors equipped in EVs, and powerful machine learning and artificial intelligence techniques, the research and development of health monitoring and management techniques for EVs has been much promoted. Recent developments on internet of things (IoT), cyber–physical systems, digital-twin, and cloud computation will further facilitate the monitoring, diagnosis, prognosis and health management techniques and applications for EVs.

This focus section aims to provide a platform for academic and industrial communities to report recent results and emerging research direction in real-time monitoring, fault diagnosis, prognosis, and health management for EVs. Topics include, but are not limited to, the following research topics and technologies:

- Condition monitoring techniques for EVs
- Fault diagnosis and prognosis techniques for EV components and systems
- Remaining useful life prediction of EV components and systems
- Health management for EV batteries
- Fault diagnosis and fault tolerant control for EV motors
- Resilient design techniques for EVs using hardware and software redundancy
- Diagnosis, prognosis, and health management for EVs using cloud data and computation
- IoT based remote monitoring, diagnosis, and prognosis for EVs
- Digital-twin based monitoring, fault diagnosis and fault prediction for EV components and systems
- Emerging research methods and application techniques for EVs
- Real-time implementation and application techniques for EVs
- Emerging standards and standards development in the relevant scope of EV topics

Manuscript preparation

Papers must contain original contributions and be prepared in accordance with the journal standards. Instructions for authors are available online at: http://www.ieee-asme-mechatronics.org/

Manuscript submission

Manuscripts should be submitted online at: https://mc.manuscriptcentral.com/tmech-ieee. The cover letter should report the following statement: This paper is submitted for possible publication in the Focused Section on "*Real-time monitoring,*

diagnosis, and prognosis and health management for electric vehicles". All manuscripts will be subjected to the regular TMECH peer review process. Any questions relating to this focused section can be sent to one of the Guest Editors below via emails.

Important dates:

Paper Submission	May 1, 2022
Completion of First Review	Aug. 1, 2022
Submission of Revised Papers	Sep. 15, 2022
Completion of Final Review	Nov. 15, 2022
Submission of Final Manuscripts and Copyright Forms	Dec. 31, 2022
Publication	Feb. 2023

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