

靈峯論壇

Diagnosing Vehicles Using Automotive Batteries

2019/6/21 9:30

浙江大学教九525室



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Dr. Liang He is currently an assistant professor at University of Colorado Denver, USA. He worked as a research fellow at the University of Michigan during 2015-2017 and a research scientist at Singapore University of Technology & Design during 2012-2014. His research focuses on cyber-physical systems and internet-of-things, with particular interests on batteries, their management, and their roles in system operation. Dr. He has published over 70 research papers at premier conferences such as ACM MobiCom/MobiSys/MobiHoc, IEEE RTSS/RTAS/INFOCOM, and journals such as IEEE TMC/TON/TC/TSG, and ACM TCPS. He is the recipient of the best paper/poster awards of MobiSys'17, QShine'14, GLOBECOM'11, and WCSP'11.

Abstract

We design B-Diag, a battery-based diagnostics system that guards vehicles against anomalies with a cyber-physical approach, thus providing vehicles an additional layer of protection. B-Diag is inspired by the fact that the auto-motive battery operates in strong dependency with many physical components of the vehicle, which is observable as correlations between battery voltage and the vehicle's corresponding operational parameters, e.g., a faster revolutions-per-minute (RPM) of the engine, in general, leads to a higher battery voltage. B-Diag exploits such physically-induced correlations to diagnose vehicles by cross-validating the vehicle information with battery voltage, based on a set of data-driven norm models constructed online.