Comment from Award Recipient

Sensors and Materials (S&M) Young Researcher Paper Award 2025

Title:

Addressing Time Variance in Measurement Systems with Bayesian Model Updating

Authors:

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I am deeply honored to receive the distinguished S&M Young Researcher Paper Award 2025 from Sensors and Materials, which is an authoritative journal on sensors and sensing materials. I sincerely thank my co-author and PhD supervisor, Prof. Steffen Marx (TUD Dresden University of Technology), for his continuous support and invaluable guidance throughout this work. This work was funded by the German Research Foundation, as part of the Collaborative Research Centre 1463 "Integrated Design and Operation Methodology for Offshore Megastructures" (subproject C01, project number 434502799).

In this study, we investigated aging-related time variance in measurement systems using laser triangulation sensors as a case study and proposed a compensation approach based on Bayesian model updating. Across more than 140 subtests, we quantified random and systematic error sources, including effects related to cable length, sensor positioning, and temperature variations. The proposed method captures the time-dependent drift in measurement accuracy, particularly in early aging stages, and was validated experimentally with high precision. These results contribute to more reliable and long-lasting monitoring systems. In my future research, I will continue to focus on uncertainty quantification in measurement systems, as well as on robust sensing concepts and related materials, to further advance reliable structural health monitoring.

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