

KEYNOTE

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Title

Mapping a Machine Learning Path Forward for Tidal Stream Turbines Biofouling Detection and Estimation

Abstract

Durability of tidal stream turbines in a marine environment presents a significant challenge, largely due to the potential impact of biofouling. The accumulation of organisms like algae, mussels, and barnacles can affect the turbine shape and roughness, reducing its efficiency. While anti-corrosive materials can be used to minimize corrosion, the management of biofouling is much more complex. Although biofouling on ship hulls has been extensively researched, limited studies have been conducted on its effects on tidal stream turbines. Consequently, it is essential to develop a specific biofouling management and monitoring strategy that includes regular assessments and adjustments to maintain the desired level of biofouling control and ensure optimal turbine performance. Essentially, the strategy should aim to identify when the effects of fouling become significant enough to warrant removal and prevent degradation of tidal stream turbine performance over time.

In this context, this keynote proposes an overview of biofouling and its impact on tidal stream turbines, current techniques for detecting and estimating biofouling, recent developments, and challenges in the field, as well as several promising prospects for biofouling detection and estimation



Mohamed Benbouzid received his Ph.D. in electrical engineering from the Institut National Polytechnique de Grenoble, Grenoble, France, in 1994, and the Habilitation à Diriger des Recherches degree from the University of Amiens, Amiens, France, in 2000.

Following the completion of his Ph.D., he served as an Associate Professor of electrical engineering at the University of Amiens, Amiens, France. Since September 2004, he has been with the University of Brest, Brest, France, where he is a Full Professor of electrical engineering. Prof. Benbouzid is also a Distinguished Professor and a 1000 Talent Expert at the Shanghai Maritime University, Shanghai, China.

Prof. Benbouzid research interests and experience are primarily focused on electromechanical systems, including traction, propulsion, and renewable energy applications, with a particular emphasis on fault diagnosis, fault prognosis, and fault-tolerant control.

Prof. Benbouzid is an IEEE Fellow and a Fellow of the IET. He is the Editor-in-Chief of the International Journal on Energy Conversion and the Applied Sciences (MDPI) Section on Electrical, Electronics and Communications Engineering. He is a Deputy Editor for the IET Renewable Power Generation.