

A Smart Computational Tool for Hydrodynamic Design of High Speed Craft

Summary

In this PhD project, a computational tool based on intelligent machine learning will be developed, that is able to predict the hydrodynamic performance of high-speed planing craft. The required dataset for creating the Smart Computational Tool should be developed based on validated mathematical models and existing experimental data.

Research field:	Mechanical Engineering
Supervisor:	Abbas Dashtimanesh
Availability:	This position is available.
Offered by:	Estonian Maritime Academy
Application deadline:	Applications are accepted between May 03, 2021 00:00 and May 31, 2021 23:59 (Europe/Zurich)

Description

Artificial Intelligence is one of the most enabling technologies of digital transformation in the industry. The methods and processes that are carried out in Marine Technology cannot be left out of intelligent machine learning. There are many aspects in which Artificial Intelligence (AI) can be applied in ship design because of its direct impact on generating added value, saving time, decreasing the costs and obtaining a more competitive product. The first stage of the lifecycle of high-speed craft (HSC) is designing and the main design aspect of such craft is directly related to their hydrodynamics behavior including resistance, seakeeping and maneuvering motions.

Responsibilities and tasks of the PhD student:

This project aims to develop a computational tool based on intelligent machine learning, that is able to predict the hydrodynamic performance (resistance, seakeeping and maneuvering) of a particular kind of high-speed craft. The required dataset for creating the Smart Computational Tool (SCT) should be developed based on validated mathematical models as well as existing experimental data. Moreover, Genetic Algorithm is another methodology that should be considered in SCT to enable the user to find the optimized solution by considering various constraints and objectives including fuel efficiency. SCT has to be developed in an open source framework in which everyone can extend its functions and capabilities.

Applicants should fulfil the following requirements:

A background in naval architecture, information technology, computer engineering, mechanical engineering or related disciplines, is suitable. Prior experience in developing open source software is a significant advantage and skills with programming tools such as Matlab, Python and C++ is necessary. The applicant should prove his/her capabilities in writing technical reports and scientific papers for high quality journals. Priority will be given to those who received first-class honors for his/her bachelor's degree and master's degree by coursework with research components and/or publications. The applicant for the position must have a Master's degree and must fulfil the requirements for doctoral students at TalTech.



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