NTNU - knowledge for a better world

The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Phd position - Smarter operation and maintenance of ships

PhD position - Smarter operation and maintenance of ships, using simulator-based condition predictions for decision support - applications on remote and autonomus operations.

The Department of Ocean Operations and Civil Engineering, has a vacancy of one PhD position which runs over 3 years (or 4 years including 25 % teaching). The position is funded by Markom2020 and is part of the joint PhD program in Nautical Operations. This is a research position that will lead to the doctoral degree (PhD) in addition to contributing to professional development at the faculty. The workplace is at NTNU in Ålesund, but the candidate will also participate and collaborate with a team of PhD students in Ålesund and at the Department of Marine Technology located at NTNU in Trondheim.

Description of the PhD research project

A number of research projects are investigating the feasibility of unmanned (or reduced crew) vessel concepts. The task of such projects is a real challenge, since marine vessels consists of complex machinery systems that require continuous control, periodic maintenance and in case of emergency - on-site repair interventions. All these actions are currently done by on board technicians, but the work required can be potentially minimized by the application of advanced control systems coupled with artificial intelligence systems that will predict condition and possible future failures, and hereby advise to operators to schedule interventions necessary to minimize the costs and down-time.

However, there is a number of challenges related to implementation of such systems. First of all, it should be mentioned that modern ships are "packed" with advanced technical solutions which in their turn require precise monitoring and control, hence thousands of different sensors and transducers are installed onboard. These sensors provide the crew with information about the current status of various processes/systems and "help" to make the right decisions. Most of this information is also stored on a digital drive and can be effectively used in predictive analytics, but ship-owners simply do not know how to utilize it.

The main aim of the proposed study is to develop and test methods for robust condition-based on-board decision support systems for operation and maintenance of machinery systems. Main power systems are complex and integrated systems, so as a first step a certain subsystem(s) as for should be chosen. The raw data might be of large volumes and variable quality, so the appropriate data reduction approaches should be identified and implemented. This will allow to reduce data volume and at the same time increase its value for analysis.

The next step is to study the available condition based maintenance techniques which in general can be divided into 3 groups: model driven, data driven and knowledge driven approach. After the reasoning for the chosen technique the model should be built for the considered system. The final step is to validate the applicability of the model to the real process.

Qualifications

The position requires a Master's degree in engineering science within the major fields: mechanical engineering, cybernetics, maritime technology or similar. The preferred candidate has a solid knowledge and interest in modelling and simulation of energy systems, and/or cybernetics and sensor technology. The candidate should be enthusiastic and highly motivated and be willing to work both independently and with other researchers.

The candidate must also fulfill the requirement for admission to a doctoral program:

- The applicants must hold a Master's Degree as mentioned above, with an average grade B or better measured in ECTS (European Credit Transfer System) grades, or similar education at the equivalent level
- Good theoretical and analytical skills
- Ability to work independently as well as in team
- Keen interest in the wider context of own research and ability to engage in cross-disciplinary teams
- Written and oral fluency in English (in case of foreign, applicant). The following tests can be used as such documentation: TOEFL, IELTS or Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE). Minimum scores are:
    - TOEFL: 600 (paper-based test) 92 (Internet-based test)
    - IELTS: 6,5 with no section lower than 5.5 (only Academic IELTS test accepted)
    - CAE/CPE: Grade B or A

In extraordinary circumstances, formal documentation of language skills can be relinquished. In such cases the candidate's language skills will be assessed in a personal interview.

Conditions

PhD Candidates are remunerated in the State's salary system, code 1017, starting at wage level 50, at a minimum of NOK 432 700 per year be before tax. There will be a 2 % deduction to the Norwegian Public Service Pension Fund from gross wage.

Engagement as a PhD Candidate is done in accordance with "Regulation concerning terms and conditions of employment for the posts of post-doctoral research fellow, research fellow, research assistant and resident", given by the Ministry of Education and Research of 19.07.2010.

The goal of the positions is to obtain a PhD degree. Applicants will engage in an organized PhD training program, and appointment requires approval of the applicants plan for a PhD study within three months from the date of commencement.

See http://www.ntnu.edu/ivt/phd for more information.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. Women are encouraged to apply.

According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

The application must contain information of educational background and work experience. Certified copies of transcripts and reference letters should be enclosed. Applications with CV, grade transcripts and other enclosures should to be submitted electronically via this page.

Application deadline is 31.01.2017. Start-up date may be discussed, but tentatively August 2017.

For further information about the position, please contact: Prof. Vilmar Æsøy, vilmar.aesoy@ntnu.no, Prof. Sergey Ushakov sergey.ushakov@ntnu.no and Prof. Houxiang Zhang hozh@ntnu.no

Jobbnorge-ID: 132124, Søknadsfrist: Avsluttet