PhD Project

Machine learning I: State-machine-based approaches

Modeling and understanding of complex dynamical systems is one of the underlying research tasks in most of the research fields of the Chair SRS (Dynamics and Control) in Duisburg. We are doing research in several areas of complex dynamical system behaviors like wear and aging, human-machine-interaction, and plant control. In the last years we establish several new approaches and we are proud to be able to publish highly recognized papers on an international visable level in all the related different fields.

The newly introduced state machine-based automaton to be applied for Remaining Useful Lifetime estimation as well as for human behavior prediction appears also very attractive for this and other fields. In combination with experimental available data modeling via training and test is possible. The research in this fields may develop and assist us in developing new options to apply this approach.

Beside the development of method(s) we validate our approaches using our own test equipment and data sets.

The next intended research development steps concentrate on

- extending the approach.
- reduction of computational load.
- development of self-adapting options.
- Improvement of the quality.
- evaluation and comparison with other known approaches.

Therefore we need students from mathematics, from the automation and information science and engineering field, from mechanical or electrical engineering with
i) very strong and demonstrated programming skills,
ii) experience in optimization approaches, and
iii) the demonstrated ability to cross thinking borders.
If two of the three requirements are fullfilled, feel free to apply.

From the new candidate we expect that s/he is willing to become very fast an important and valuable member of our Chair.

Therefore we expect

i) a shown and strong expertise in related scientific fields to be integrated,

ii) your ability and commitment to develop and validate NEW methods and approaches, and

iii) your willingness and commitment to write scientific contributions on a world class level.

In case of interest please provide beside the usual application material (CV, grades, ...) material stating that you have strong English language skills (TOEFL IBT better than 95, IETLS better than 6.5) and a detailed and described interest ONLY in the described research fields. Your German language skills can be (if necessary) improved by language

courses in parallel (for example at the Goethe Institute, Düsseldorf) (on your cost). For further information about the requirements see also the website of the Chair SRS: www.uni-due.de/srs/prospective.

About you:

Bachelor and Master degree in Electrical or Mechanical Engineering or Information science or Mathematics or Automation/Control (with strong interests in programming) (with clear related specification) necessary, deep interest in the field, excellent grades in related courses. Related and/or diverse qualifications can possibly also be very attractive.

About us:

Chair SRS (Head: Prof. Söffker) at U DuE, Germany:

With a mix of coworkers and PhD students the Chair has a strong and long tradition in supervising academic trainees. The internal organization scheme will allow an improved organization of the academic work of the PhD students in guided groups. Academic qualification includes not only the PhD topic related work but also advising coworking students (Bachelor/Master level) based on individual qualification and skills etc.

The PhD students working in the group are financed by the university or by public funding, financed by industry projects, by their home countries or by DAAD scholarships.

Be aware about the time schedule of your DAAD-application:

An application now or in September/October year 1 leads to the beginning of german language courses in May/June year 2 and start PhD research at the Chair SRS in October year 2.

In case of other application (government programs, national/university training programs):
You should be supported for more than 3,5 years. In case of support for less than 3,5 years, you should convince us based on existing international publications from the last five years.

The successful candidate is primarily directly related to:

Prof. Söffker (Scientific supervisor: Prof. Söffker)

Next steps:

1. Be aware of your national DAAD application deadline (which varies between February and November each year).

2. Contact Prof. Söffker directly by E-Mail (soeffker@uni-due.de, subject: DAAD-Appl. HMS) and send copy of CV, certificates, recommendation letters as well as a first proposal (2-3 pages) about your understanding of the intended topic, your intended working schedule, the state of the art in this field as well as the deduced definition of your project. A ‘copy and paste’-strategy will disqualify you immediately.

3. Be aware about the time schedule of your application: DAAD example application in September/October year 1 leads to begin language courses in May/June year 2 and start PhD research in October year 2.

4. Joint improvement of the proposal: If the quality of the project proposal is finally fitting to the groups standard (=perfect) Prof. Söffker will invite you by writing the required acceptance letter.

5. The final decision is with the DAAD committees.