PHD POSITION: NETWORK-ENABLED CAPABILITIES THROUGH TASK-ORIENTED PROGRAMMING (NECTOP)

Computer and Information Sciences Institute, Radboud University

Level Master

Maximum employment 38 hours per week (1 FTE)

Duration of contract 4 years

Salary scale €2042 to €2612 per month gross

JOB DESCRIPTION

The Netherlands Defense organization is increasingly faced with missions requiring Networked-Enabled Capabilities (NEC). Characteristic of NEC are: cooperation between different organizations, remote collaboration over computer networks, and the breaking of classical hierarchical communication channels (stovepipes). Examples of NEC occur when international organizations need to work together, when a ship needs help for maintenance from shore or if there is a need for collaboration with civil parties in modern peacekeeping operations.

While the physical network structures and protocols needed to exchange information in a NEC setting have already been developed to an advanced stage, the proposed cooperation is not yet well understood and lacks adequate user interfaces and software support. Groupware systems provide insufficient process support, and standard workflow management systems are not flexible enough to cope with the dynamically changing situations that are typical for defense operations. An effective system increases the Shared Situational Awareness of the team of users through transparent interfaces where relevant information can be shared. Moreover, the system facilitates adaptive teams: it enables the dynamic distribution of tasks over people and other resources to adapt to the current situation. Important factors for a well-balanced task division are cognitive over- and under load of the team members, and the capability and authorization of a team member to perform a particular task.

Therefore, these issues must also be monitored by other team members (or systems).

A support system for NEC is dependent on the envisioned ways of collaboration: the collaboration model. Therefore, we are not looking for one solution to all forms of NEC. Our approach consists of a generic tool that allows complex models of cooperation to compile and convert to (prototype) applications that can be used to support collaborative processes. This kind of system development is expected to lead not only to increase efficiency (faster development time), but will also lead to better quality support systems. This is because the development tool enforces a way of working that is based on the task model itself in which all aspects relevant for cooperation are included.

The goal of this project is to develop a task-oriented development environment that is suitable for defense-related NEC applications, and test it by means of some concrete (prototype) applications. We will start from the iTasks toolkit (which is based on a functional programming language), which has been developed at Radboud University Nijmegen.

Main research questions are:

1. How to design a task-oriented development toolkit which is suitable for realizing complex NEC applications.

2. How to apply this task-oriented development toolkit in a methodologically sound user requirements engineering framework.

3. How to make the toolkit usable also for non-experts.

REQUIREMENTS

The work will apply the iTask toolkit to defense-related NEC applications and validate the approach by several (prototype) applications. An important theme is to monitor, allocate, and reallocate tasks among team members working in a complex and dynamic environment.

Your responsibilities include implementing several working iTask prototypes in a real life domain (e.g. for remote maintenance and support on navy vessels), interviewing domain experts to derive correct task models, and placing the work in a sound methodological

framework for user requirements engineering. You have a university Master degree in the area of Computer Science, Human-technology Interaction or Artificial Intelligence. Your performance in the Master program can be classified as excellent. Experience with pure functional programming languages such as Haskell or Clean is required. You possess good social skills, and are able to collaborate with colleagues from different disciplines. You are comfortable with working in a multi-disciplinary domain. You will publish in renowned journals and present the research at international congresses. The work will lead to a PhD under the supervision of prof.dr.ir. M.J. Plasmeijer, dr. J. van Diggelen, and dr. J.M. Jansen.

The PhD student's base of operation will be Radboud University in Nijmegen, and at TNO Soesterberg.

CONDITIONS OF EMPLOYMENT

Radboud University offers an attractive benefits package, including a flexible work week, and the option of assembling a customised compensation and benefits package (the 'IKA'). Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.

Radboud University Nijmegen

Radboud University Nijmegen is one of the leading academic communities in the Netherlands and is renowned for its leafy campus, modern buildings and state-of-the-art equipment. It has seven faculties and enrols over 17,500 students in approximately 90 study programmes. The university is situated in Nijmegen, the oldest city in the Netherlands, which has a rich history and one of the liveliest city centres in the Netherlands.

Computer and Information Sciences Institute

The mission of the Institute for Computing and Information Sciences (iCIS) is to improve analysis and development of computer-based systems, through mathematically founded theories, methods and tools. Research is concentrated within three recognizable research programmes -Digital Security, Intelligent Systems and Model-Based System Development. iCIS received excellent scores in a recent national computer science research assessment, and scored best in the Netherlands.

TNO

One of the PhD student's bases of operation will be at TNO Soesterberg. TNO is an independent, not-for-profit, body with a public mission. TNO is primarily concerned with the application of knowledge to improve the competitiveness of companies and to assist governments with policy matters. TNO Soesterberg, is one of the main human factors laboratories worldwide. Its mission is to optimize human performance in complex and demanding environments. Its multidisciplinary staff includes psychologists, interaction designers, engineers, and physicists. It has extensive, advanced tools and facilities for human-in-the-loop testing with low and high fidelity prototypes or simulations in the lab or (remote) location.

INFORMATION AND APPLICATION

For more information about this position, please contact
prof.dr.ir. M.J. Plasmeijer, Radboud University (rinus@cs.ru.nl),
dr. J. van Diggelen, TNO, (jurriaan.vandiggelen@tno.nl), and
dr. J.M. Jansen, Netherlands Defense Academy,
(JM.Jansen.04@NLDA.NL).

To apply, please submit the following application materials:

(1) Curriculum Vitae including contact details of references.

(2) Course lists with grades.

(3) A letter of application in which you explain both your interest and the relevance of your skills and experience in the context of this research project.

At this stage, please do NOT submit papers or theses that you might have written. You may submit your materials by email to rinus@cs.ru.nl. Please send your application by 15 april 2012.