ESR5

Project title: Robust all-weather environment 3D perception and obstacle avoidance

Place of employment and planned mobility*:* Örebro University, Sweden: 9 months; John Deere Forestry Oy, Finland: 21 months; GIM Oy, Finland: 6 months

Supervisory team: Achim Lilienthal, Henrik Andreason, Timo Käppi, Mika Hyvönen

Project tasks and objectives: Operating in a cluttered environment, such as a forest, is challenging; possibilities for collisions are high, thus posing a cognitive burden on the operator. The challenge is magnified when working during the dark winter season in Nordic regions, a typical working time of the year. Active vision sensor technology is advancing fast, thanks to the massive efforts in driverless car and drone applications. Sensor technology gets smaller and cheaper, which opens up novel opportunities for many domains.

The scientific objectives include (1) To robustly perceive the environment and map obstacles around the vehicle using multiple sensing modalities; (2) to predict human intentions and identify possible collisions; and – based on the developed perception and human intention prediction – (3) to devise algorithms to safely and efficiently move to a goal configuration. A key motivation is to devise a tool that provides pose estimation and tracking information to an operator as well as information about possible collisions in real-time.

The ESR will acquire broad knowledge on signal processing, sensor fusion and filtering, machine learning and robot control.

The ESR will also be involved in dissemination through social media promotion of the network, such as Webropol surveys, and LinkedIn groups, Youtube video channels, Twitter and blogging.

Starting date: January 1st, 2020. Negotiable.

Duration of the work contract: 36 months/full-time contract

Trial period: 6 months

Target degree: PhD degree from Örebro University, Sweden

Approximate gross salary: about 3600 EUR/month plus family allowance if applicable

Eligibility: ESR shall at the date of recruitment, be in the first four years (full-time equivalent research experience) of their research careers and have not been awarded a doctoral degree. The researcher must not have resided or carried out his/her main activity (work, studies, etc) in the country of his/her first employer (Örebro University, Sweden) for more than 12 months in the 3 years immediately prior to his/her recruitment.

The applicant must be in possession of Master of Science (MSc) diploma in engineering, computer engineering, mathematics, automation, etc. at the beginning of the employment.

English language requirements: Proficiency in written/spoken English is mandatory.

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Application

Closing date: 13.11.2019

The applicant must submit the following documents through LAURA portal, only a clear copy of the documents will be considered

1. **Certified copies of the bachelor's and master's degree certificates with the Diploma Supplement (DS)** as approved by the EU Commission for degrees completed in European universities (when applicable) Official translations into English (if the original documents are in a language other than English)
2. **Curriculum Vitae/CV** (preferably in Europass format)
3. **List of publications (if any),** your contributions in the publication
4. **References:** Contact details of 2 or more referees included in the CV
5. **Motivation letter: maximum** 1 page where you introduce yourself and present your qualifications; you may include also your previous research fields and main research results. Please emphasize your future goals career-wise
6. **Copy of the passport**
7. **Proof of residence:** statement and certificates/documents demonstrating your residence(s) in the last 4 years. A template is available on the website under *How to Apply*.

Additional information

Working and living conditions in Örebro, Sweden - Ph.D. students in Sweden are University employees and they have all the social and financial rights of other employees. Among these: a fixed monthly salary adequate to the cost of living in Sweden, inclusion in the Swedish social security system, and at least 28 days of paid vacation each year. These conditions are guaranteed for three years as long as the requirements for the Ph.D. studies are fulfilled. Ph.D. students in Sweden have to take advanced courses during their study program. These are typically technical courses relevant to their research project, but may also be courses about other related disciplines, including scientific methodology and project management. Courses at the Centre for Applied Autonomous Sensor Systems (AASS) are meant to provide students with a unique educational background in autonomous sensor systems. Ph.D. candidates in Sweden may devote up to 20% of their time to institutional work. This work typically consists in helping with the undergraduate education. The percentage of time spent with institutional work is added to the total duration of the Ph.D. studies. In summary, the Ph.D. students at AASS will be doing four sorts of things during their Ph.D.: work on their research project; take graduate courses; contribute to undergraduate education; and participate in the scientific life of AASS and of the international community. More information about the Ph.D. studies at AASS can be found here.

The **University of Örebro** is a young university currently enrolling more than 14000 students. It is located in Örebro, a city with 130000 inhabitants, which is in central Sweden. For more information about the Universiy of Örebro click here and about the city, here.

Working and living conditions in Finland at John Deere Forestry – Finland is among the most stable, free and safe countries in the world, based on prominent ratings by various agencies. It is also ranked as one of the top countries as far as social progress is concerned. John Deere Forestry is a world leading forest machinery company which develops and manufactures machines that are used for cut-to-length harvesting, loading and transporting the trees out of the forest. Advanced R&D focuses on leading edge technology development of machine automation and forest-site solutions.

Working and living conditions in Finland at GIM – GIM is a high-technology company specializing in mobile robotics. We are a family of highly talented and experienced robotics engineers that love to solve complex problems. The unique competence of GIM Robotics is in navigation and 3D perception algorithms for mobile robots. We provide services in product development, piloting and rapid prototyping,

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while advancing our own product by pushing the state-of-the-art forward. We have customers from wide range of industries, including automotive, forestry, construction, marine, maintenance.

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