457_24_CS_CAOS_R1

Job Reference

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Position

PhD Student - Software and hardware level approaches for the Analysis and Optimization of complex Ai-based solutions on top of Autonomous Driving frameworks (R1)

Data de tancament

Dimecres, 31 Juliol, 2024
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About BSC

The Barcelona Supercomputing Center - Centro Nacional de Supercomputación (BSC-CNS) is the leading supercomputing center in Spain. It houses MareNostrum, one of the most powerful supercomputers in Europe, was a founding and hosting member of the former European HPC infrastructure PRACE (Partnership for Advanced Computing in Europe), and is now hosting entity for EuroHPC JU, the Joint Undertaking that leads large-scale investments and HPC provision in Europe. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision and R&D into both computer and computational science (life, earth and engineering sciences) under one roof, and currently has over 1000 staff from 60 countries.

Look at the BSC experience:
BSC-CNS YouTube Channel
Let's stay connected with BSC Folks!

We are particularly interested for this role in the strengths and lived experiences of women and underrepresented groups to help us avoid perpetuating biases and oversights in science and IT research. In instances of equal merit, the incorporation of the under-represented sex will be favoured.

We promote Equity, Diversity and Inclusion, fostering an environment where each and every one of us is appreciated for who we are, regardless of our differences.

If you consider that you do not meet all the requirements, we encourage you to continue applying for the job offer. We value diversity of experiences and skills, and you could bring unique perspectives to our team.

Context And Mission

The Computer Architecture and Operating System group at the Barcelona Supercomputing Center aims at carrying out research on programming models for critical embedded systems in charge of controlling fundamental parts of cars, airplanes and satellites. Our work is mainly done in the context of bilateral projects with several processor companies as well as several European-funded projects. For a complete list of publications of the group in the last years, please visit: www.bsc.es/caos

The deployment of Artificial Intelligence (AI) based solutions to deliver advanced software functionalities is consolidating as a key competitive factor in several industrial domains. In the automotive industry, autonomous driving (AD) software is meant to support autonomous operation and decision making for all aspects in a vehicle, by processing of a massive amount of data coming from multiple sensors like cameras and LiDARs. The entailed computational requirements can only be matched by complex MPSoCs (Multi-Processor System on Chip) with generic and ah-hoc hardware accelerators. Moreover, the increasing complexity of AI-based software functionalities encourages the use of highly modular middleware frameworks such as ROS2, CyberRT, or Autoware, running on top of general-purpose and/or automotive operating systems. Performance and (timing) analyzability are two fundamental (and sometimes conflicting) requirements for this type of system, where extensive guarantees must be provided on the capability to deliver correct results in a timely manner, as dictated by domain-specific Functional Safety (FuSa) standards.

The current position is meant to cover a wide scope of activities to enable the analysis and deployment of cutting-edge AI solutions autonomous systems, on specialized middleware/runtimes, on top of industrially representative embedded devices. The candidate is expected to combine applied investigation and hands-on implementation covering both software and hardware level aspects, including: the functional and non-functional analysis, porting, and optimization of (possibly tailored) AI models within representative AD and autonomous operation frameworks, to meet performance and functional safety requirements on top of specialized and custom accelerators.

Key Duties

- Conduct a thorough study on state-of-the-art AI-based autonomous driving frameworks, covering both widespread AI models and non-functional (e.g. timing) requirements
- Familiarization with representative AI-based autonomous driving setup and simulation
- Design or tailor and optimize AI-models to support AI-based autonomous driving functionalities
- Identify and explore opportunities for optimization of both AI-models and platform configurations to meet performance requirements
- Devise software and hardware level solutions to improve performance and analyzability of AI-based autonomous frameworks

Requirements

- Education
    - Master's Degree on Computer Science, Computer Architectures, Mathematics, or similar
    - Bachelor's Degree on Computer Science, Computer Architectures, Mathematics, or similar

- Essential Knowledge and Professional Experience
    - Moderate expertise on AI modes and hardware architectures
    - Practical experience in generic programming (C, C++, etc.)
    - Familiarity with AI frameworks (TensorFlow, Pytorch, etc.)
    - Familiarity with scripting languages (e.g. Python)

- Additional Knowledge and Professional Experience
    - Minimal experience with Linux-based environment is also appreciated
    - Experience on hands on activity with hardware platform is a plus

- Competences
    - Problem-solving, proactive, collaborative, and result-oriented work attitude
    - Good communication skills including proficiency in English (both written and spoken)

Conditions

- The position will be located at BSC within the Computer Sciences Department
- We offer a full-time contract (37.5h/week), a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible working hours, extensive training plan, restaurant tickets, private health insurance, support to the relocation procedures
- Duration: Open-ended contract due to technical and scientific activities linked to the project and budget duration
- Holidays: 23 paid vacation days plus 24th and 31st of December per our collective agreement
- Salary: we offer a competitive salary commensurate with the qualifications and experience of the candidate and according to the cost of living in Barcelona
- Starting date: 01/09/2024

Applications procedure and process

All applications must be made through BSC website and contain:

- A full CV in English including contact details
- A Cover Letter with a statement of interest in English, including two contacts for further references - Applications without this document will not be considered

In accordance with the OTM-R principles, a gender-balanced recruitment panel is formed for every vacancy at the beginning of the process. After reviewing the content of the applications, the panel will start the interviews, with at least one technical and one administrative interview. A profile questionnaire as well as a technical exercise may be required during the process.

The panel will make a final decision and all candidates who had contacts with them will receive a feedback with details on the acceptance or rejection of their profile.

At BSC we are seeking continuous improvement in our recruitment processes, for any suggestions or feedback/complaints about our Recruitment Processes, please contact recruitment [at] bsc [dot] es.

For more information follow this link

Deadline

The vacancy will remain open until a suitable candidate has been hired. Applications will be regularly reviewed and potential candidates will be contacted.

OTM-R principles for selection processes

BSC-CNS is committed to the principles of the Code of Conduct for the Recruitment of Researchers of the European Commission and the Open, Transparent and Merit-based Recruitment principles (OTM-R). This is applied for any potential candidate in all our processes, for example by creating gender-balanced recruitment panels and recognizing career breaks etc.
BSC-CNS is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law.
For more information follow this link
Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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