Research Fellow/Engineer (Space-based Manipulators) - WLB3
Singapore Institute of Technology

Job Title Research Fellow/Engineer (Space-based Manipulators) - WLB3

Department Engineering

Institution Singapore Institute of Technology
Singapore, , Singapore

Date Posted Aug. 21, 2023

Application Deadline Open until filled

Position Start Date Available immediately

Job Categories Research Scientist/Associate

Academic Field(s) Engineering Physics
Aerospace/Aeronautical/Astronautics

Job Website https://careers.singaporetech.edu.sg/cw/en/job/498488/research-fellowengineer-spacebased-manipulators-wlb3

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Job Description

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Job no: 498488
Department: Engineering
Contract type: Contract
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We are looking for suitable candidates to develop computer vision algorithms to perform object

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detection, object recognition, and depth perception as part of the solution for space-based manipulators to perform tasks in outer-space. The candidate shall study the requirements and develop solutions for the computer vision perception system that include the camera system, computational hardware and the computer algorithm. The objectives of the computer vision perception system will be to facilitate autonomous manipulation of tools and work parts in order for the space-based manipulator to perform its tasks of On-orbit Servicing, Assembly, and Maintenance (OSAM).

You shall be required to perform independent research into the different camera system, computer vision techniques, and computational hardware in order for the space robot to accomplish OSAM tasks described above. You shall perform quantitative assessment on these techniques. High fidelity models of the computer vision perception system shall be developed as part of your work scope. You will use space-flight modeling and simulation tools to perform tests on the candidates designs and perform trade-off as well as evaluation of the different designs. You should be required to develop deep knowledge of space-manipulators and spacecraft motion dynamics with interaction of work parts. You must possess an aptitude in spacecraft engineering and experience in designing computer vision perception system.

Your responsibilities shall include:

- Conduct work space analysis and requirements study to determine the constraints and to derive the possible configurations for the computer vision based perception systems.
- Develop metrics to evaluate the different design options and configuration.
- Determine the key sensor parameters needed to meet the requirements for the computer vision perception system (this include the camera, computational hardware, and computer algorithms).
- Design and develop image processing algorithms that is able to correct for distortion or other non-uniformity in image quality that could be due to the outer-space environment.
- Extraction of useful information from the output of the image processing algorithm. These information should include bounding box of objects detected as well as the depth of the objects from a reference coordinates in the perception system.
- Develop test and evaluation (T&E) experiments for the computer vision perception system. The T&E should include quantitative measures and include both cooperative targets as well as non-cooperative targets in the workspace.
- Create complete documentation for computer vision perception systems
- Troubleshoot defects and develop solutions rectify issues in the perception design.
- Keep abreast of advancements in aerospace and relevant fields
- Carry out Risk Assessment, and ensure compliance with Work, Safety and Health Regulations.
- Coordinate procurement and liaison with vendors/suppliers.
- Work independently, as well as within a team, to ensure proper operation and maintenance of

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equipment.

If you also have a great deal of resourcefulness and a vision about what your machines can do, we would like to meet you. Candidates with good bachelor's degree and postgraduate degree may apply for this position.

Job Requirements

- Well-versed in computer vision, applied physics, and mechanics
- Excellent knowledge of Aerospace modeling and simulation software
- Ability to develop and evaluate perception systems
- An analytical mind
- Resourcefulness
- Outstanding communication skills
- Good post graduate degree in Engineering and relevant experience in computer vision
- Prior industry experience helpful but not necessary for applicant with PhD projects in computer vision.

Key Competencies

- Able to build and maintain strong working relationships with people within and external to the university.
- Self-directed learner who believes in continuous learning and development
- Proficient in technical writing and presentation
- Possess strong analytical and critical thinking skills
- Show strong initiative and take ownership of work

Contact Information

Please reference Academickeys in your cover letter when applying for or inquiring about this job announcement.

Contact

Singapore