Mathematical Optimization Expert for Robotics

Availability: June 2018, Singapore
Contact: Dr. Suraj Nair (suraj.nair@tum-create.edu.sg)

Introduction

TUMCREATE is a leading research institute set up by the Technical University of Munich, Germany in collaboration with the Singapore Government. TUMCREATE has received funding and support for the SPEEDCARGO project from the Civil Aviation Authority of Singapore (CAAS) & the National Research Foundation (NRF) to develop automation solutions that will transform the air freight logistics sector. The SPEEDCARGO solution is the world’s first AI-powered robotic solution for automatic build-up and break down of aviation cargo pallets and will help Singapore lead the transformation of the logistics industry globally. The project is seeking technical experts with a passion for creating world class products, and a willingness to work in a fast paced, quality obsessed, multi-cultural global environment. On successful completion, the project will spin-off as a start-up with members of the project team having the option to join the start-up with benefits that include attractive ESOPs. Apply now if you are interested in working on cutting edge technologies, changing the world with your work and joining a dynamic start-up team.

More details on the project:

https://www.speedcargo.sg/
The design of real-world robotic systems is a multi-disciplinary effort. It involves the development of advanced perception systems, artificial intelligence-based decision making, mechanical elements like sensors and actuators, electronic components for connecting and controlling the mechanical elements and software for higher-level planning and process control.

This job profile focuses on development of the mathematical models and algorithms for the core intelligence of the system. It will focus on developing algorithms for multiple constrained based optimizations for optimal and safe packing of air cargo shipments into a pallet/container. The constraints will include quantitative aspects from airline regulations, machine constraints from robots and gripper, motion planning, grasp planning and also qualitative aspects looking at end-to-end supply chain within an air cargo process scenario. The job will be within an emerging deep-tech startup working towards commercialization of SPEEDCARGO - world’s first AI-powered robotic solution for automatic build-up and break down of aviation cargo pallets.

**Background**

**Objective & tasks**

Successful candidate will be working in a team to primarily integrate software components of a large robotic system that includes an industrial robot, actuating end effectors, vision sensors, high level robot control and intelligent systems. There will be potential to do development in a wide range of algorithms in these areas. The primary responsibility of the candidate will be development of advanced optimization algorithms. In addition candidate will require collaborating closely with the rest of the group in optimizing the process flow and troubleshooting problems that arise during testing in a resourceful manner.

**Mandatory Requirements**

1. PhD/Master/Bachelor Degree in Computer Science/Mathematics from a reputed University
2. Strong fundamentals in computer science and mathematics.
3. Ability to collaborate with software developers to transform the prototypical algorithms to production level code

**What we expect from you**

- Strong fundamentals in Linear Algebra
- Very good knowledge of Statistical analysis, State Estimation (Kalman Filters, Particle Filters) and Machine Learning (SVM, Decision Trees, Neural Networks).
- Familiarity with ROS, C/C++, Java, Python, Linux, git, OpenCV, PCL, OpenGL, MATLAB
- Knowledge of advanced techniques such as reinforcement learning
- Ability to work independently

**What we offer you**

- An international and multidisciplinary working environment
- Opportunity to work on deep-tech robotic system
- Challenging tasks with real-life relevance

**PLEASE NOTE THAT ONLY SHORTLISTED CANDIDATES WILL BE CONTACTED**