

# Master Thesis – Knowledge Base and Inference Models for AI-based Optimization and Control of Air Cargo Processes

Availability: February 2019, Singapore

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## Introduction

TUMCREATE is a leading research institute set up by the Technical University of Munich, Germany in collaboration with the National Research Foundation (NRF) of Singapore. TUMCREATE has received funding and support for the SPEEDCARGO project from the Civil Aviation Authority of Singapore (CAAS) and the NRF to develop automation solutions that will transform the air freight logistics sector. TUMCREATE's SPEEDCARGO solution is the world's first AI-powered robotic system for improving the productivity, efficiency and security of air cargo processes.

SPEEDCARG 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 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 Employee Stock Ownership/Option Plans.

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/>

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## ABOUT TUM CREATE

TUM CREATE innovates. We are developing cutting-edge electric vehicle technologies and pioneering the *Ultimate Public Transport System* concepts for the growing transport and sustainability challenges in fast-growing tropical megacities. Germany's *Technical University of Munich* (TUM) and Singapore's *Nanyang Technological University* (NTU) — two world-leading engineering universities — have come together to collaborate on this ambitious joint research programme. It is funded by Singapore's National Research Foundation.

## Background of the thesis' work

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The SPEEDCARGO team has already developed technology to enhance the productivity of certain critical parts of the air cargo process. Through this point of entry, we have managed to get an overview of the entire air cargo ecosystem, which consists of multiple stakeholders, processes and data representation. There is a huge potential of implementing AI-driven optimization methods to improve the productivity and transparency within the industry. In order to achieve this, we intend to take carefully planned steps using state of the art knowledge modelling tools for formally representing the various factual aspects of the industry. Such a formal representation can further be used to develop AI based real-time decision support for different stakeholders within this industry.

## Objective & tasks

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The candidate selected for this thesis will be working on developing a knowledge base for converting the information of the air cargo industry assimilated by the SPEEDCARGO team. The web ontology language will be used to develop the knowledge graph. The candidate will also develop inference models and visualization tools for decision support.

## Mandatory Requirements

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1. Master/bachelor's degree in Computer Science/Mathematics from a reputable University
2. Strong knowledge of fundamentals in computer science and mathematics
3. Excellent academic record
4. Exposure to concepts in knowledge graphs, first order logic and computational linguistics
5. Strong analytical thinking and exposure to knowledge modelling tools such as Protégé

## What we expect from you

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- Strong competence in computer science
- Familiarity with Web Ontology Language (OWL), RDF, XML
- Familiarity with tools such as Protégé
- Experience in programming with C/C++, Python, Java,
- Experience in functional programming with Prolog, LISP
- Ability to work independently

## What we offer you

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

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

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