

*Description of bachelor thesis*

# **Vehicle Routing Problem for Mobile Hospital Robots**

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In hospitals a significant amount of resources is spent on transportation of goods, e.g. blood samples, medicine, food, and trash. Usually these transportation tasks are carried out by humans. A current research project involving DTU Informatics, DTU Management, Force Technology, and Bispebjerg Hospital aims to reduce the required man power by letting these transportation tasks be carried out by a group of mobile robots. It is a complex problem involving a wide range of subjects: automation, robot vision, obstacle avoidance, localization, mapping, path finding, routing, multi-agent systems, and more.

The current bachelor project concerns the routing subproblem: How should the transportation tasks be distributed among the individual robots? The goal is to minimize the number of required robots, and the time spend on delivering the goods. This kind of problem is known as a Vehicle Routing Problem (VRP) and is often solved using methods from algorithmics, in particular operations analysis.

The aim of the current bachelor project is to try to give a solution to the specific vehicle routing problem involved in the hospital robots project. To separate the routing problem from problems of localization and mapping, the vehicle routing algorithms will not be implemented on the hospital robots themselves, but on a group of Lego NXT robots navigating in a well-defined and localization-friendly environment.