別紙４（課程博士）

Date of Submission:
平成　２７年　７月　８日

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Abstract

論文内容の要旨（博士）

Title of Thesis 博士学位論文名	Viewpoint Planning Framework for Single Guard Robot in Indoor Environment （屋内環境における見守りロボットの視点プラニングに関する研究）

(Approx. 800 words)
(要旨　1,200 字程度)

For supporting human life, a robot needs to be close and interacts with human. Generally, those closeness and interactions enforce the robot to have abilities for recognizing human and having the space awareness. For a specific need, the robot also has to be equipped with a specific ability, too. This ability is often imitated from the human behavior when one faces the same task or situation.

The goal of this thesis is to make a guard robot which imitates the job of the guardians. The robot is given a task to keep an eye on a person inside an indoor environment like the museum, gallery, or exhibition room. Besides the main task of the robot which is to watch the person, the robot also should be aware of the space in the environment in order to take its advantages. For example, the robot can increase the efficiency of the batteries by stopping at the point which has a large coverage. Another benefit is that the stopping robot can reduce noises and blurs in the image frames due to the robot's instability when the robot moves.

To accomplish the above problem, this thesis describes a global planning algorithm for a single guard robot in an indoor environment. The planner is used for the guard robot to continuously and effectively watch a certain object such as a person. Our proposed planner exploits the topological features of the environment, by extracting a set of viewpoints using a generalized coverage solver. We subsequently search for escaping gaps from which the target may go out of the robot's sight. We then plan the action for the robot based on a geodesic motion model and escaping gaps. A stochastic approach and a greedy method are presented to choose an optimal action. Particularly, a particle-based approach combined with a chance constraint bound is utilized for ensuring that the target person is always under the robot visibility. Experimental results using a 3D simulator and the real robot are provided to show the effectiveness and feasibility of our algorithm.