

Master/Bachelor Thesis

Visual Image Guided Movement Control of Snake-like Robot

Motivation

A successful field robot must be able to sense, plan and act, are these three essential components of an autonomous system. Research in snake robots has focused on the acting component, with various work being done to improve the control and fundamental understanding of snake locomotion. The other two constituents of autonomy, sensing and planning, have been comparatively unexplored.

Visual Servoing (VS) has been used in a wide spectrum of applications, from fruit picking to robotized surgery, and especially in robotics mapping. Combined with the visual servoing technology, the vision sensor in our snake robot makes it possible to map remote 3D environments. This range information, in the form of 3D pointclouds, is used to provide environmental data to the planning algorithm such as the location of obstacles.

The planner then employs a motion primitive approach to enable task-specific autonomy.

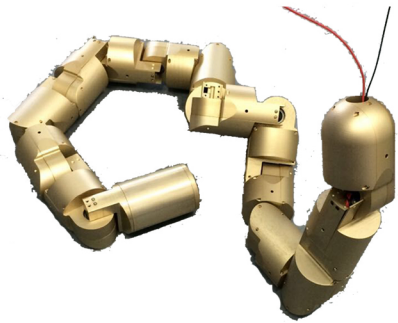


Fig.1 The snake robot in this thesis

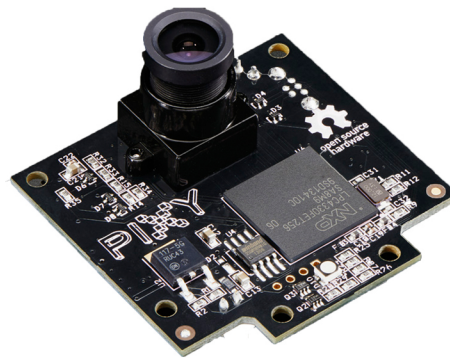


Fig.2 The vision sensor in this thesis

Task

1. Implement the CMU Pixy visual sensor on the snake robot, getting the image from the sensor and analyze.
- 2 Construct a simple scene using the image, for example a pole in a room
- 3 Feedback the target position to the snake robot.

This work is in English.

Arrangement

- 1 Learn the instruction of CMU Pixy visual sensor and test it
- 2 Learn the OpenCL programming skills
- 3 Construct a simple scene using the point cloud from the sensor
- 4 Feedback the target information and control the snake to travel

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